Made in Hungary

Andrew L. Simon

MADE IN HUNGARY:

HUNGARIAN CONTRIBUTIONS TO UNIVERSAL CULTURE

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Preface

Carburetor, helicopter, stereo radio, television, electric transformer, dynamo, holography, ball point pen, telephone exchange, krypton light bulb, automatic exposure, binary code, vitamin C, neutron bomb, Rubik's cube, jet propulsion, torpedo, contact lens, water turbine: they all have one thing in common. All of them are Hungarian inventions. Quite impressive for a nation that numbers less than 15 million, about the population of Florida. Of these, only about two-thirds live in present day Hungary, the others are in neighboring countries, or virtually all over the globe. Not only are they immediately recognized by their exuberant music—Liszt, Lehár and Bartók comes to mind—but by their scientific attainments. Hungarian scientists have won eleven Nobel Prizes in the twentieth century. This small nation is quite competitive in the world of sports also. On the average, Hungary's athletes were among the first eight in winning medals in Olympic Games, competing against the world. But not only in science, technology and sports, Hungarians also excel in arts. Men and women with some claim to Hungarian ancestry were nominated for Oscars 136 times between 1929 and 1996, or an average of two nominees each year. They won the golden statuettes on thirty occasions. Who are these Hungarians—or Magyars, in their own language—and why are they so successful? This is an attempt to explain.

Although they live in the very center of Europe for over 1100 years, ethnically Hungarians differ from their neighbors. Neither Slav, nor Latin or Teutonic, Hungarians speak a language that is linguistically closer to Japanese than to any European language except perhaps Finnish and Estonian. Although today a small country, Hungary was an established Christian kingdom generations before the Norman Conquest. From the year 1,000 AD until 1945 this kingdom was in continuous existence. The country's history is marked by three catastrophic events: the Mongol Onslaught in 1241, the Battle of Mohács, dawning the Turkish occupation in 1526 and the Treaty of Trianon, the breakup of historic Hungary in 1918. However, it is not Hungary's history that will be addressed here, but the attainments of her people. For those readers who are interested in a chronological review of Hungary's history, Stephen Pálffy's work, *The Kings of Hungary* is included as an appendix.

The Hungarian character, if one may allow any such generalizations, may be described by such manifestations as acute individualism, pervasive sense of humor, a tendency to showmanship and passionate hospitality. On the seamy side, among three Hungarians you can expect five different points of view. Contrary to the Anglo-American behavior pattern, showing effort is poor sportsmanship for a Hungarian. "I partied all night, never cracked the textbook and aced the exam" is what a Hungarian student would likely say, even though he might have studied through the night. But behind the indolent charm, lazy grace, characteristic to Hungarians, there is often a far from lazy brain. They have a proclivity to outwit their opponents. The definition of a Hungarian, to quote one their world renowned savants, is "the person who gets into the revolving door behind you and gets out ahead of you." Their history, punctuated by foreign invasions, sharpened their survival skills. Connoisseurs of wine, women and song, they have been called "the Irish of Central Europe".

A sixteenth century English travelogue derided Hungarians about their gluttony. In Hungary, it is probably considered a virtue. Hungarians are peerless when it comes to entertaining their guests.

Even those, who may dislike Hungarians must admit that, somehow, whatever they are doing, they are obviously quite good at it. This book is a testament to that.

In the past half a century, Hungarian contributions to the world include two monumental episodes. On October 23, 1956, the Hungarian Revolution started. That was the first time in the history of World Communism that an entire nation rose up against their Communist oppressors. On November 9, 1989, the Hungarian government decided to roll up the barbed wires, take up the mine fields, rein in the dogs and open Hungary's borders to tens of thousands of escaping East Germans. This brought down the Iron Curtain. As German Chancellor Kohl put it: "The Hungarians knocked out the first brick from the Wall. We will never forget it!" Hungary's role—without a doubt—had been crucial in the eventual collapse of the Soviet Union.

The Cold War is over. Hungary is not under Soviet domination anymore, but progressing steadily toward complete re-integration into the European community of nations. With the onset of a new millennium and entering the 12th century of Hungary's statehood, Hungarians proudly look toward their future with growing confidence and anticipation. They are ready to regain their place in the European community—preserving their national identity at the same time.

I express my sincere appreciation to Francis S. Wagner for allowing the use of his 1976 book *Hungarian Contributions to World Civilization* as a source for much of the material in this book. The *Hungarian Lexicon* published by Hungary's National Technical Information Center (Budapest, 1992) was invaluable in collecting and checking the data. Many thanks for those who assisted in gathering and evaluating new information, particularly to Imre Balogh, Ralph Gracza, Gábor Hosszú, István Isépy, Károly Kapronczay, Marianne Krencsey, Szabolcs Magyaródy, Szabolcs Marka, Péter Raics and Ödön Starosolszky. Without their expert assistance this book would not have been completed.

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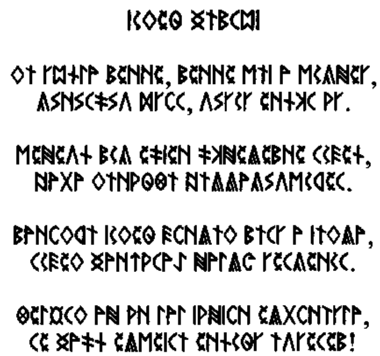
Pronunciation Guide

This book con tains many Hun gar ian names and a lot of other Hun gar ian words in book ti tles and such. Eliminating all ac cents would make some names un de ci pher able. For those who are not fa mil iar with the Hun gar ian language accents would present considerable difficulty. Hence it is use ful for the reader to be came fa mil iar with the ba sic con cepts of Hun garianpronunciation.

Hun gar ian be longs to the Ural ic fam ily of lan guages. It is an "ag glu ti nating" lan guage, that is, a lan guage that uses large num bers of suf fixes and post-positions. Typical constructions in this system are the one-word phrases like "fejemen" *on my head, which breaks down into "fej " head*, "-em-" *my* and "-en" *on*; and "utamon" *on my way*, which is put to gether by "út " *way*, "-am-" *my* and "on" *upon*. In Indo-European lan guages these re la tionships are shown by sep a rate words; Hun gar i ans link them up as suf fixes. Yet the Hun gar ian lan guage is eas ier to learn than many oth ers, be cause it lacks oblig a tory gen der and the usual Indo-European agree ment rules between ad jec tives and nouns. In Hun gar ian the stress, the em pha sis, is always on the first syl la ble of a word, re gard less how long the word is, like in Eng lish the words *Governmental* , or *Poet*. For ex am ple the Gabor sis ters and called *gaBOR* in Eng lish and *GÁbor* in Hungarian.

Hun gar ian is among the few lan guages that have their own an cient alpha bet, the so called *Sekler* (székely) *Runic* writing. It is, of course, fully suited to the Hun gar ian pro nun ci a tion, each sound has its own let ter. It was gen er ally writ ten from right to left, but there are ex am ples for the left to right ver sion, in a mir ror im age for mat. An ex am ple of the Sekler Runic writ ing is shown on the fol low ing page.

This is the Sekler Anthem, a well known Hungarian song, written in Sekler Ru nic, in left to right for mat, in the Hun gar ian lan guage. There are many an cient rem nants, mainly in Transylvania, but some even as far as Is tan bul, of such Hun gar ian Ru nic writ ings. The Pau line Friars have



used a variant of it extensively as late as in the 16th century as a form of secret code. In Transylvania, Sekler Runic writing was taught in schools even in the 18th century. Due to Christian religious pressure, the runic writing has been suppressed and replaced by the Latin alphabet during Hungary's early centuries.

Adaption of the Western alphabet has necessitated the introduction of letter combinations, double letters like *cs, sz, ny, ty*, etc., to handle sounds of the Hungarian language not present in the Latin. Conceptually, these double letters are no different from those in the English language, like *sh, ch, th* and others.

The Latin alphabet of the Hungarian language consists of 44 Roman letters and digraphs, letter combinations, as follows: A, Á, B, C, CS, D, DZ, DZS, E, É, F, G, GY, H, I, Í, J, K, L, LY, M, N, NY, O, Ó, Ö, Ä, P, Q, R, S, SZ, T, TY, U, Ú, Ü, à, V, W, X, Y, Z, ZS. The acute accent means a difference in vowel quality. For example O is the same as Ó, except it is a longer sound. The double acute accent—a diacritical mark that is unique to the Hungarian language—similarly indicates that the umlauted vowels are longer.

Hungarian Pronunciation[1]

A - as in *Bob, lot, got* (British); or *saw, moth* (US).

Á - as in father (most dialects) or *Bob, got* (US).

B - as in *Bob, bean, better.*

C - like English ts as in *hats*; word initially as in *tse-tse*.

CS - like ch in *Charlie, chicken, choose.*

D - as in *do, did, Douglas*.

DZ - like ds in English plurals such as *lads, lids, needs.*

DZS - like English in *June, Jill*, or *dg* in *judge.*

E - as in 'open' *e* pronunciations of *let's get set* (US), noticeably different from Australian and New Zealand 'closed' *e* pronunciation.

É - as in French *été*, Australian *leg, Meg, keg*; does not have a glide at the end like the Anglo-American 'long" *a* in *able, came, bay.*

F - as in *Frank, fist, foot, fight*.

G - is always 'hard' as in *goose, go, get*.

GY - is a palatalized d, as in the British pronunciation of *due, dew, adieu*.

H - as in *Howard, hill*.

I - is as high and tense as *ee* in English, but shorter; it has no real English equivalent.

1 These examples were taken, with some changes, from Adam Makkai : *In Quest of the Miracle Stag*, Chicago: Atlantis-Centaur, Inc. 1996.

Í - has the same quality as Hungarian I but is long; it therefore approximates English *æ* as in *feet, sheep, heel,* but it lacks the diphthongal glide at the end of those English sounds.

J - like English y in *yes, you, Yankee* and German in *ja, Jugend, jemand.*

K - as in *skill, school, skate* ; it does not have the extra puff of air after it that occurs in *kill, cool, Kate.*

L - as in *look, like, love.*

LY - is a historical digraph always pronounced with a silent L, like English *y* in *buyer, by-and-by, you.*

M - as in *mom, Mike, limb.*

N - as in *no, enemy, bend.*

NY - is a digraph for the palatalized *n* sound spelled *ñ* in Spanish in *español , otoño* and spelled *gn* in French in *espagnol , agneau*; a similar sound, divided between two syllables, occurs in English in *canyon, onion, opinion*.

O - as in Northern British and some quasi-Scottish pronunciations of *lots, hot, boy, mob*; distinct from the pronunciations of A discussed above.

Ó - has a similar quality to Hungarian O but is long; comparable to the Scottish pronunciation of *go, so, no, woe* ; does not have a glide at the end like either the British or the American pronunciations of these words.

Ö - as in German *ö* or *œ* in *Götter, Goetz* and French *e* in *meurt* ; it has no real English equivalent.

Double-accented O - has the same quality as Hungarian Ö but is long; comparable to the long French *eux* in *deux* and to German *öh* in *öhl* , it has no real English equivalent.

P - as in *spill, spoil, lisp*; it does not have the extra puff of air that occurs after it in *pill, Peter, pull.*

Q - is mostly used in foreign words and is pronounced like K.

R - is a trilled sound as in Scottish English, it is never pronounced as in American *hear, her, murmur*; most British dialects pronounce a similar but shorter trill in the words *very American.*

S - like *sh* in most English words, *shoe, she* , and like English *s* in *sugar, sure* .

SZ - like English *s* in *Sam, Sit, sew, this* .

T - as in *still, stole, empty*, it does not have the extra puff of air that occurs in *Tom, till, tidy.*

TY - is a ‘palatalized’ *t* as in the British pronunciation of *student, stew, Tudor*; American *get you, meet you, met you,* come close unless turned into the *ch* sound in faster, more informal speech.

U - lies between English *oo* as in *soot, foot* and *u* as in *tube* .

Ú - has the same quality as Hungarian U but is long, resembling North English and Scottish English versions of *who, knew, woo*, unlike the diphthongized Anglo-American forms which have a glide at the end.

Ü - like French *u* in *tu* and German ü in *zünden, Sande* , English has no real equivalent.

Double-accented U - has the same quality as Hungarian Ü, but is long. It is like German *spüren, fühlen, Mühe* .

V - as in *victory, nave, live* .

W - is pronounced the same way as Hungarian V.

X - occurs only in foreign words and is pronounced like KS.

Y - forms digraphs with preceding G, L, N, T; after any other letter it is pronounced like Hungarian I.

Z - as in *zoo, zany, amaze* .

ZS - like English *s* in *pleasure, leisure, measure* .

Hungarian Names

One should not pass a guide on pronunciation without mentioning a few peculiarities of Hungarian names. Quite alone in the western world, Hungarians write their surname first and their 'first name' second. Only the East Asian nations follow the same rule.

While many Hungarians have German, Polish, or other surnames, many real Hungarian names end with *I* or *y*. Just as in Farsi and Arabic, it simply means "from". Filmstar Béla Lugosi , for example, came from the town of Lugos and the Hungarian filmstar in the 1960's, Marianne Krencsey's ancestors came from the village of Krencse.

In ancient times the *y* ending indicated nobility and was prohibited to be used by non-nobles. A noted liberal aristocratic reformer in the 19th century, whose name was Lenkey, changed it to Lenkei , to show his intention to reject his noble prerogatives, like being exempt from taxation. In the case of Ms. Krencsey, the Communist film authorities insisted on billing her as Krencsei , which sounded properly proletarian for them.

Nobility was inherited by all descendants, hence thousands of Hungarian families had some claim to it. But most had no wealth to back it up. Today this is an inconsequential matter.

Two qualifications on the *i* or *y* ending are in order here. The frequent Hungarian name, Nagy, meaning *big*, ends with the digraph *ny*, not as it seems, with *y*. Another case is the ancient ending *-ffy*, meaning the son of someone, like Pálffy, son of Pál.

When abroad, some Hungarians elected to make reference to their ancestors noble background. In German speaking countries the word *von* (pronounced *phone*, with a short *o*) is the indicator of nobility. This is why the father of supersonic flight, Tódor Kármán, came to be known as Theodore von Kármán. Another such example is the great mathematician John von Neumann, called margittai Neumann János in Hungary. Incidentally, these two examples of Hungarians of Jewish faith holding *hereditary* nobility, firmly disprove any claim of discrimination against Jews in Hungary.

In Francophone countries, the equivalent of *von* is *de*. Hence a Hungarian noble named Bakay, emigrating to Lebanon after the 1848-49 revolution, introduced himself as DeBakay and became the progenitor of the famous heart surgeon of Texas, Michael DeBakey.

A universal practice dating back to the years of the Austro-Hungarian Empire is the wearing of the doctors degree as a part of one's surname. In the past, a majority of Hungarian doctorates were academically equivalent to a doctor of education degree from Podunk State. Hence it is easy to find an apartment building in Budapest where all residents are Dr. This or Dr. That.

Even more peculiar is the habit of Hungarian wives and widows to use their husband's name with a *né* ending, meaning 'the wife of'. Therefore Dr. Kiss Albertné, for example, could be the divorced former wife of Albert Kiss, who himself may have finished law school. If all this appears ridiculous to the reader, *he or she* should study the byzantine system of titles, appellations and the associated different grammatical forms that were in wide use before World War II. But, on the other hand, one may talk about a person in Hungarian for a whole hour, without ever giving a clue whether the person is male or female. Politically correct feminists would have a dreadful time in Hungary.

Milestones of Progress

The Conquest

Historians, linguists and archaeologists almost unanimously agree that the Magyars are of Finno-Ugrian origin both ethnically and linguistically. Their ancient home some millenniums ago was in the Kama River region, between the Ural Mountains and the Volga River. However, the problem of their origin cannot be regarded as completely solved. Folklore and mythology point to important Asian analogies, that science has until now failed to fully clarify and utilize. Quite recently, there has been many arguments about their ethnic origin and ancient home, that may have been as far East as China's Western regions: Dzungaria, Xinjiang, Uygur provinces. There have been Japanese scientific studies, though inconclusive, that point to possible linguistic similarities to Hungarian.

Finno-Ugrian peoples formed a nomadic pastoral society. They were relatively advanced in animal (especially horse) breeding, knew the primordial forms of agriculture, could make earthenware and could weave and spin. Their decorative metal work is unique and artistic. The earliest remains show similarities to Persian art of the Sassanide period.

The pagan Magyars believed in animism. Other principal elements of their shamanistic faith seemed to be their belief in the duality of the soul and body, the cult of the dead, the spirits of good and evil and the immortality of the soul.

Prior to reaching the Danube Valley, the wandering tribes met and assimilated a number of different peoples and cultures, Turkish, Iranian and others. Hence, when they appeared in the Carpathian Basin, the Magyars happened to be quite a mixture of many ethnic entities and their respective cultures. However, the dominant feature of their language, culture and lifestyle remained Magyar. Their wanderings acquainted the Magyar tribes with the then already well-established religions such as the Christianity, Judaism and Islam. In the light of all written sources, these early Magyars attitude to other religions and races seemed to be quite tolerant, if not friendly.

The Conquest of the Danube region occurred in the closing years of the ninth century A.D., about the same time the barbarians sacked Rome. Under the leadership of Árpád about a half a million Magyars—formed into seven tribes—settled in the region. Under intense pressure from the attacking Pechenegs, it was a carefully planned withdrawal from the Eastern foothills of the Carpathian Mountains.

At the time of the Conquest, Slavs, Germans, Italians and some other peoples already lived there. Their number was about the same as that of the Hungarian invaders. The Magyars, characteristically, did not enslave the native populations as did the earlier rulers of the region, the Huns and the Avars. Their economic order was built on the contemporary feudal system and not on the barbarian exploitation of subjugated peoples. While the Huns and the Avars who earlier occupied primarily the Great Hungarian Plains, the central base of the Magyar Conquest lay in Dunántúl (Transdanubia), the very edge of Western cultural sphere. These circumstances determined the future of this area for centuries to come. In the formative period the old nomadic nation concept of the Magyars embraced all separate nationality groups who lived on the territories under Hungarian military and political supremacy. This fairly elastic concept of nationality saved the Magyars during their long and tragic struggles against the Mongols, Turks and others.

Christianization

For decades after the Conquest, Hungarian warriors on swift horses forayed into the disintegrating Carolingian empire and defeated its slow feudal cavalry. Historians say that at the time what the Vikings didn't hit, the Hungarians most likely did. Their military tactics were entirely unknown in the West. Sudden, unexpected attack, followed by pretended retreat to break up the pursuing enemy's formations, ferocious arrow attacks shooting backwards from their horses, then turning again for hand-to-hand combat.

Finally, a military disaster at Augsburg in 955 put an end to their lightning raids. Hungarians had but two alternatives: to continue their seminomadic life style and perish as did their predecessors the Huns and the Avars, or adapt themselves to the feudal socioeconomic conditions of Western Europe by the adoption of Christianity. The Hungarians choose the latter.

There have been efforts both from the Byzantine and the Roman Church to Christianize Hungary. Some Hungarian tribes first took on the Eastern Orthodox religion before switching their allegiance to Rome. Some historians claim that the question of Hungary's conversion has significantly contributed to the break between Eastern and Western Catholicism.

King Stephen I, the Saint, reigning between 1000 - 1038, founded the Christian kingdom. Rather than joining the Holy Roman Empire, Stephen accepted the crown directly from the Pope, thereby ensuring Hungary's political independence, unlike the Kingdom of the Czechs.

Upon their conversion to Christianity, the Magyars began the process of adapting themselves to the Latin-speaking culture of feudal Europe. From that time, until the end of World War II, the country remained a kingdom. Its cultural life developed within the framework of Western Christian civilization. This profound change was carried out by the kings of the House of Árpád (cca. 890 - 1301) with the aid of foreign priests and missionaries (Slavic, German, French, Italian and others) who disseminated Christianity in Hungary.

Hungary's success in integrating herself into Europe is well indicated by the strong dynastic ties that have developed over centuries between the House of Árpád and the other royal houses of Europe, ranging from Scotland to Byzantium. There were scarcely any major royal houses that were not related, one way or another, to the House of Árpád. After the expiration of Hungary's last primaeval king, there were numerous royal houses, Anjou, Jagellion and Habsburg claiming the throne by inheritance. Stephen Pálffy's *The Kings of Hungary*, appended at the end of this book details these events.

The intellectual growth of the country was remarkable. The most famous library of that time, the still existing Benedictine Library of Pannonhalma, was founded in 1001. The first reference to a Hungarian college, established in the eleventh century in Veszprém, was made as early as 1276. However, the Age of Humanism and the Renaissance, much more than the centuries of Medievalism, helped inspire the genius of the Magyars. Hungarians were sent abroad to study as early as in the time of St. Stephen, who established a dormitory for Hungarian seminarians in Rome.

The Mongol invasion in 1241 almost wiped out the cultural achievements of Christianity by destroying nearly all their monasteries, schools and libraries. Hungarians quickly rebuilt most of these cultural centers.

In the initial phase of cultural evolution theology and history writing—annals, chronicles, legends and gestas—were the primary intellectual efforts. But quite unlike the German annals and chronicles, these Hungarian gestas were true national *historias* in the Medieval sense. From a methodological point of view, these early forms of historiography were influenced by French, German, Italian and English models up to the Age of Renaissance, when the country's historical science tended to follow and imitate the works of the Italian masters. Until the reign of King Matthias Corvinus (1458 - 1490), gesta and chronicle writing was almost exclusively the job of clergymen, who in a number of cases were officially designated as court historians. In addition to the royal chancery, some ecclesiastical bodies (monasteries, cloisters, etc.) were entrusted with notarial functions. They were thus the precursors or early forms of public archives for issuing documents, diplomas and conducting verification procedures.

Renaissance

From the thirteenth century on, many young Hungarians frequented the universities of Paris, Padova, Bologna and primarily those of Cracow, Prague and Vienna. The University of Vienna had 4,600 Hungarian students between its foundation in 1363 and the Battle of Mohács in 1526. Progress in the sciences is shown by the fact that several universities were founded in the last two centuries of the Middle Ages: the University of Pécs in 1367 and the University of Óbuda in 1389. When these short-lived universities ceased to exist, the Archbishop of Esztergom, Joannes (János) Vitéz (1408 - 1472), founded the so-called Academia Istropolitana in Pozsony (now Bratislava, Slovakia) in 1467. Some what later, in 1497, Konrad Celtis established the Sodalitas Litteraria Danubiana (Danubian Scholarly Society) in Óbuda and Vienna, presumably in the pattern of Italy's Academia Platonica. The membership, consisting of Hungarian, German, Czech and Italian humanists, arranged symposia to discuss scholarly topics.

The Renaissance court of King Matthias Corvinus, among its many-sided activities, asserted the primacy of mundane glory and interests over transcendentalism. Historical, as well as belletristic works reflected a specific philosophy of man, which did not have much in common with the Christian attitude of preceding centuries. Janus Pannonius (1434 - 1472), Bishop of Pécs and a member of the royal court of King Matthias I, attained European fame as a humanist poet and was also very popular in Italy. Janus Pannonius was the first poet who sang of beauties of Hungary's scenery and her people's patriotism. Incidentally, the grave of Pannonius was found in 1991 under the main altar of the old subterranean part of the cathedral of Pécs.

The humanistic trend was an import from Italy. In 1486, Antonio Bonfini (1434?- 1503) became a member of the royal court of Matthias at Buda and was commissioned there by the King to rewrite the country's past in Renaissance spirit.

King Matthias' library, the "Corvina", was one of the great libraries of contemporary Europe. Its holdings of some 3,000 to 5,000 volumes in Greek and Latin represented heretofore hardly cultivated branches of human knowledge: philosophy, mathematics, physics and the social sciences. What remains of Matthias' humanist library—168 codices—resides in thirty cities of Europe and the United States. Hungary has only forty-three of them.

The printing of the Bible by Johann Gutenberg (ca. 1400-1468) was probably completed late in 1455 at Mainz, Germany. Seventeen years later, in 1472 András Hess set up the first Hungarian printing shop in Buda and printed the first book, *Chronica Hungarorum* in 1473. It was in the Age of Renaissance that Hungary, through the ministrations of King Matthias' royal court, entered the cultural community of Western nations as an equal member.

Reformation

In the dawn of the Modern Age, Hungary suffered the most devastating defeat by the Ottoman Turks at Mohács in 1526. The country was torn into three parts. Its western and northern parts constituted the Habsburg Kingdom, which later became the Austro-Hungarian Empire, the eastern part formed the Principality of Transylvania, while the central part of the country remained under Turkish occupation for a century and a half.

The epochal principles announced by Calvin and Luther quickly reached Hungary. The Reformation and Counter-Reformation were turning points in the intellectual development of the nation. The adoption of the Reformation coincided with the dual oppression of the nation by the Turks and by the Habs burg dy nasty. The con quest of the country by the Turks and the anti-Hungarian pol icy of the Habsburgs put a prolonged halt to Hungarian cultural development. The Western-oriented for eign pol icy of the Habs burg Em pire and hence its neglect of the Eastern front, was chiefly responsible for the long-lasting Turk ish oc cu pa tion. It af fected first of all the eth nic struc ture of its population. Dur ing the reign of King Matthias, in the sec ond half of the fifteenth cen tury, the pop u la tion amounted to 4,000,000 of which roughly 80% were Hun gar i ans. At the end of the Turk ish con quest, more correctly in 1720, due to the con tin u ous strug gles with the Turks and their de por ta tions to the Ori ent, the pop u la tion had dwin dled to 2.57million. Hungarians be came a mi nor ity in their own coun try.

Hungarians, like the Poles and Aus tri ans, view them selves as the defenders of the West against the Ot to man Turks. Had they not stopped the on slaught of Is lamic Tur key, the Turks would have over run a Eu rope ex hausted by re li gious wars. As Eng lish his to rian and sec re tary of war, Thomas Babington Macaulay (1800-1859) said: “The Ko ran would now be taught in Ox ford.”

Af ter the Turks’ de par ture, the set tle ment pol icy of the Habsburgs in the eigh teenth cen tury ag gra vated the al ready di sas trous con di tions. In or der to di vide and rule, they fa vored non-Magyar, chiefly Ger man, settlers that cre ated is lands of eth nic minorities across the coun try.

Faced with these con di tions, pro po nents of both the Ref or ma tion and Counter-Reformation tried to save the cultural heritage of the nation. The Reformation proved to be an effective counterbalance to the Germanizing ef forts of Habs burg Ca thol i cism. There was a pe riod of two decades when three fourths of the population were converted to Protestantism. Stephen Bocskay (1557-1606), Prince of Transylvania, battled for and gained equality under the law for Protestantism: The Treaty of Vi enna in 1606 guar an teed con sti tu tion al ity and re li gious freedom in Hun gary. Bocskay is im mor tal ized by the Me mo rial to the Ref or ma tion erected in Geneva.

While contemporary Europe generally accepted the principle that each country should adhere to a single religion, in Transylvania under the rule of Hungarian princes the situation was quite different. The Diet of 1564 proclaimed that each and every town and province in Transylvania should be given the free choice of its own religion. According to the Diet of 1571 three nations, Magyar, Sekler and Saxon[2] and four accepted religions (*receptae religiones*), the Catholic, Lutheran, Calvinist and Unitarian, were recognized in Transylvania. The Transylvanian Diet was the first legislative body in Europe to enact religious freedom.

The Reformation greatly intensified religious fervor not only among the Protestants but among Catholics too, by way of reaction and as self-defense. In a matter of decades, owing to the application of the principle "cuius regio eius religio" in the process of conversion, Hungary again became a predominantly Catholic country.

Protestantism remained alive in disputed areas between Turkish and Habsburg rule. In the Eastern region, centered around the city of Debrecen, "the Calvinist Rome", the College of Debrecen, founded about 1538, provided a cultural beacon. It was the alma mater of many leading Hungarian scientists. The Calvinist College was in continuous existence until it became a state university in 1914. Today, called Louis Kossuth University of Sciences, it proudly displays over 460 years of history.

Because of the lack of local higher educational institutions in the sixteenth century, more and more Hungarian students resumed the old custom of frequenting foreign universities. Protestants went primarily to the University of Wittenberg which during the sixteenth century was attended by more than 1,000 Hungarian students. A fair number of Hungarian youths studied at the universities of Bologna, Padova, Vienna and

2 Germans who were invited to settle in Western Hungary centuries earlier.

Cracow. In the 16th century the *Collegio Ungarico-Illyrico* was established at the University of Bologna. In the seventeenth century Lutherans studied at Wittenberg, Calvinists went to the universities at Heidelberg, Basel, Utrecht and Leiden in the Netherlands and some even to Oxford.

From a cultural point of view, the introduction of the vernacular language in all branches of knowledge was the truly unsurpassable accomplishment of the Reformation. Beginning with Bible translations, by the end of the eighteenth century several thousand foreign books had been translated into Hungarian. Gáspár Károli's complete Bible translation in 1590 represented a milestone in translation literature. Gáspár Károli can be compared with Hieronymus and Martin Luther among the greatest Bible translators of the world.

In 1635—a year before the founding of Harvard College—the leader of the Counter-Reformation, Cardinal Péter Pázmány (1570-1637) founded the country's most prestigious university (now Lóránd Eötvös University of Sciences, Budapest). A prolific writer, Pázmány created the modern prosaic style in Hungarian literature.

During this period, cultural life developed under the influence of the Italian Renaissance and German Protestantism. In spite of the disadvantageous circumstances of the Turkish Age, more and more individuals became engaged in promoting knowledge. Miklós Oláh (1493-1568), later Archbishop of Esztergom, wrote a remarkable, very reliable historico-geographical description *Hungaria* (ca. 1536, published in Belgium). As a friend and to some extent a co-worker of Desiderius Erasmus (d. 1536), he rose to the stature of a great celebrity. His protégée András Dudith (1533-1589), Bishop of Pécs—who later left the Catholic Church to become a Calvinist then a Unitarian—traveled throughout Europe and developed working relationships with outstanding humanists. Dudith can be regarded as a polymath, who, as a prolific author of Latin works, scrutinized current questions of theology, classical literature and natural history.

Enlightenment

After Prince Ferenc Rákóczi II's War of Independence (1703-1711), conditions fundamentally changed. Scholars and scientists began interpreting the world in terms of human values and experiences. In the second half of the eighteenth century it became quite evident that Hungary entered the period of change from semi-feudalism to capitalism. The country's intellectual life already seemed more and more interwoven with the threads of the rationalist philosophy of the Enlightenment and with the ideas that triggered the French and the American revolutions. These foreign influences helped shape the concept of nation as a historical entity and put it in the focus of scholarly as well as public attention. Many a new literary product of that age, affected by the progressive trends of the contemporary West, expressed to some degree an anti-clerical mentality.

A major step toward spreading ethnocentric knowledge and secularism was taken by the issuance in 1777 of *RatioEducationist* . József Ürményi, Dániel Tersztyánszky and Pál Makó were commissioned by Queen Maria Theresa to prepare this all-important educational reform plan. This, in essence, placed public education under strict government control and introduced rationalism at all levels of schools. Accordingly, in the service of utilitarianism, curricula of mathematical and natural sciences, physics, writing, the reading of newspapers, bookkeeping, physical education, etc., were prescribed. New districts of school administration were set up, under the leadership of high-ranking government officials. This reform plan acknowledged and materialized the principle of state-church separation. This whole process of educational reforms took place under the influence of Rousseau and the French Enlightenment.

Queen Maria Theresa's decree on September 17, 1763, was epochal in the consequent development of a world class engineering education in Hungary. She decided to establish an academy of mining engineering for all her dominions at Hungary's chief mining town, Selmecbánya[3] (now Banska Stiavnica, Slovakia). Teaching commenced in the fall of that year. Chemistry, metallurgy and mineralogy were taught by Vilmos Jaquin, whose yearly salary was set at 2 thousand golden thalers, a princely sum at the time. Mathematics was taught by Miklós Boda, who was also responsible to set up the library. In 1765 he was given 600 thalers to start buying books. Additional faculty joined the academy in 1770, when the school gained full accreditation. Mineralogy, geology and paleontology collections were purchased; a library and several laboratories were built. Initial enrollment was set at 140 and half of the students received royal stipends. High school diploma, two years of practical experience in mining and royal permission were the admission requirements. A unique feature of the curriculum was the incorporation of field and laboratory work, to provide practical training along with a scientific one.

The Academy's teaching language was German until 1848. Between 1780 and 1848, the international fame of this institution attracted students from Austria, Germany, Italy, Poland, Russia, Denmark, France, Sweden and even from as far as Spain and Portugal. In 1794, during the French Revolution, when the Paris École Polytechnique was established, Antoine Fourcroy[4], in an address to the revolutionary National Convention, recommended that the mining academy of Selmecbánya be adopted as a pattern for the newly founded French engineering school [5]. In 1808 a faculty of forestry was added. This engineering institute fulfilled a real mission because by 1850 it had turned out 1,275 engineers. By 1870, when the academy was 100 years old, it had six departments, and offered four year degrees in mining and metallurgical engineering, as well as a three year degree in forestry.

In 1777 the Royal Scientific University, founded by Cardinal Pázmány in 1635, was transferred from Nagyszombat (now Trnava, Slovakia) to Buda. This was followed with one of the most portentous steps of these reforms, the creation of the *Institutum Geometrico et Hidrotechnicum*. In

4 Co-discoverer of the element Iridium, neurophysiologist.

5 Alas, this is not acknowledged at the École Polytechnique today.

1782, this Institute of Surveying and Hydrotechnics was created by King Joseph II, son of Maria Theresa. Organized as part of the Royal Scientific University, this was Europe's first university-level training institute for engineers. In 1857, the Institute merged with the former Joseph Trade School (Ipartanoda) teaching mechanical engineering subjects and the new *Polytechnicum* was created, encompassing all fields of engineering of the time. Its direct descendant today is the Technical University of Budapest, the alma mater of a stunning gallery of eminent scientists and engineers known to the world.

The two engineering institutions, the mining engineering school and the hydraulic engineering institute, were set up as an answer to clearly defined public needs. The deepening mines called for higher technology in dewatering, ventilation, smelting and other technological areas. Hydraulic engineers and surveyors, were sorely needed for flood control and land reclamation. These early institutions later served as a scientific infrastructure—mathematics, physics, mechanics and other engineering sciences—for the rapid development of newer engineering fields such as mechanical and electrical engineering. This is the underlying historical cause of the spectacular success of Hungarian engineering education.

In spite of progress in the educational field, a disillusioned progressive intelligentsia and the Hungarian nobility turned against the policy of the Vienna Imperial Court. However, their movements could not become politically large-scale, partly because most of the progressive elements were intimidated by the events of the French Revolution. But the essence of the Enlightenment, the idea of progress, remained the chief goal of all human activities; social, economic, political and cultural. Characteristically, the ideas of the French Enlightenment came to Hungary through Viennese channels due to the modernization trends of Maria Theresa and her son, Joseph II.

The Age of Reform

Hungary was fortunate that in a critical period, following the Napoleonic wars, a group of great leaders arose. First and foremost, Count Stephen Széchenyi, (1791-1860) son of a wealthy noble family must be mentioned. He visited France and England and returned imbued with progressive ideas. He wrote several books propagating modern economic and other concepts, founded the Academy of Sciences, and the National Library; the National Casino, initiated flood control measures, navigation on the Danube, development of a flour milling industry, countrywide transportation system, universal taxation; propagation of various sport activities, horse racing and so on. His political opponent, nationalist political leader Lajos Kossuth dubbed him "the Greatest Hungarian". Széchenyi and his numerous associates, the cream of the Hungarian nobility, within a quarter of a century changed a conservative backward feudalistic country into a modern progressive one.

One of the central issues in the Age of Reforms (1825-1848) was the struggle for self-fulfillment of all ethnic minorities throughout the Habsburg Monarchy, especially in Hungary. All ethnic minorities happened to be more or less involved in these self-realization movements. Emotional prejudices on all sides came to the fore in public life. The conflicting forces of nationalism sowed the seeds of the downfall of historic Hungary.

In 1825—at the initiation of Széchenyi, who offered a year's worth of his income in support—the Hungarian Academy of Sciences was founded. Through this the country gradually entered the mainstream of world civilization. Notably, the Academy of Sciences initiated its first foreign contact, not with the flourishing royal institutions of Europe, but with the Philadelphia-based American Philosophical Society founded by Benjamin Franklin in 1751. In order to explain this unusual phenomenon in an age when intercontinental travel was dangerous and took many months, let us review its historical background.

Contacts with America

In Central and Eastern Europe, on the frontier of Christian civilization small nations had stood in the path of the expansion of the Ottoman Empire. In their historic struggle against Turkish "heathenism", literary men of nations subjected to Turkish occupation became disillusioned by the inept diplomacy of the great Christian powers and riveted their eyes upon the New World. The Hungarian Miklós Istvánffy (1583-1615) displayed the essential characteristics of such feelings; in his *Historia Regni Hungarici* he said that America was simply discovered "for the glory of Christianity" (p. 16). In the decades to come, Hungarian Protestant sources often referred to the New World. In 1654 Gáspár Miskolczi Csulyák made mention of America, New England and New Plymouth in his book on independence[6]. The famed Samuel Köleséri,[7] went further in the preface of his collection of sermons by citing Thomas Hooker, an English Puritan author who emigrated into America, among his sources.

A few years later, in 1694, the first Hungarian book about America appeared, a translation of Increase Mather's (1639-1723) *De successu evangelii apud Indos Occidentales, in Nova Anglia, etc*.[8]

During the last quarter of the 18th century, the earlier developed idea of the "bulwark of Christendom" was consistently being replaced by the content of the American Revolution and focused on the Declaration of Independence and the Constitution itself. The American freedom concept with all its well-known requisites (state-church separation, relatively classless society, republicanism, free enterprise, etc.) obviously attracted

6 *Angliai Independentismus* (English Independentism, Utrecht, 1654, p. 41).

7 See Samuel Kölecséri, *Szent Irás Rámárája Vonatott Fél-Kertyén.* Debrecen, 1677.

8 László Országh, *'Misztótfalusi Kis és az els Å magyar könyv Amerikáról,* " Magyar Könyvszemle, vol. 74, no. 1. 1958. p. 22.

the political and cultural philosophy of the European cultural elite. The land of opportunity and its promise of a brilliant future captivated, among others, the French Michel-Guillaume de Crevecoeur who already in 1782, in the early formative period of the American nation said: "Here individuals of all nations are melted into a new race of men, whose labors and posterity will one day cause great change in the world. Americans are the western pilgrims, who are carrying along with them that great mass of arts, sciences, vigor and industry, which began long since in the East; they will finish the great circle."[9]

The portrait of America has varied from time to time, keeping pace with general requirements of the cultural progress of mankind. Benjamin Franklin happened to be the first American of great cultural importance whose inventions helped create a very impressive image of scientific America. Through the invention of the lightning rod he became the premier scientist of the world in the eyes of contemporary Europeans. A professor of mathematics at the University of Buda, Pál Makó (1723-1793)—author of the first Hungarian book on electricity—showed high regard for Franklin's scientific accomplishments.[10] The rise in Franklin's popularity was so high that many contemporary poets sang

9 *Letters from an American farmer , etc.* London, 1782. See also Francis S. Wagner, *"The image of America in foreign books,"* Free World Review, vol. 5, no. 4, Winter 1959-1960, 28-31.

10 *A mennykÅnek mivoltárol való böltselkedés mellyet deák nyelven irt, és most feles másolásokkal és toldalékokkal megjobbitott Makó Pál, magyarázta pedig Révai Miklós, Posonyban és Kassán, Landerer Mihály költségével és betüivel, 1781.* See its review by Oszkár Szimán, *"Az els Å magyar nyelvü könyv az elektromosságról,"* Fizikai Szemle, vol. 10, no. 8, Aug. 1960, pp. 252-255. At the same time the enlightened Piarist, Elek Horányi, applied Franklin's theory of electricity in teaching Antal Grassalkovich and Ignác Almássy. Cf. Merkur v. Ungarn, 1786, p. 977.

enthusiastically about his newly invented lightning rod.[11]

So it was not surprising that Hungarian men of science wished so eagerly to become acquainted with Franklin's land of liberty and prosperity and to establish lasting, mutual relationships with Americans. Sándor Bölöni Farkas (1795-1842), a prolific scholar, did the pioneer work through his widely publicized travel notes[12] of his brief sojourn in the New World (September 4 to November 24, 1831), during which he traveled 2,450 miles by land and water. He said America, this "happy country" was chosen by Providence to demonstrate "whether human society is able to establish a good administration through free elections in the service of the happiness of mankind" (pp. 28-29). When Bölöni Farkas returned to Europe, he bade America farewell in these ardent words: "God bless you, glorious country! Be the immortal guardian of the noblest heritage of mankind! Stand as an everlasting model of encouragement for the souls of the enslaved!" (p. 343)

Apart from the American system of democracy, the cultural life of Franklin's Philadelphia made the deepest impact upon the thinking of Bölöni Farkas, illustrated with the following excerpts: "Many a traveler says and writes that Philadelphia is the most beautiful city of the world… But the various divisions of science stand in the most beautiful light in the city of Philadelphia. It seems this city is the place of education for men of science, the cradle of scientific activities… The American Philosophical Society, founded in 1743 by Franklin, is foremost among all scientific societies with its outstanding library, natural history and other collections."

11 See, for instance, LÅrinc Orczy's poem (1718-1789) in Oszkár Szimán's above-quoted article.

12 S. Bölöni Farkas, *Utazás Észak Amerikában.* Kolozsvárt, lfjabb Tilsch János tulajdona, 1834. 346 p. Its 2nd and 3rd eds. were publ. in 1835.

After arriving home early in 1832, Bölöni Farkas discussed his American experience with many of his acquaintances, including Gábor Döbrentei, then the powerful secretary of the Hungarian Academy of Sciences.[13]

With the help of Count Stephen Széchenyi, then vice president and treasurer of the Hungarian Academy of Sciences—and a leading pro-Anglo-American figure—these actions contributed to the idea of a cultural exchange. Soon the noted mathematician and astronomer, Academician Károly Nagy (1797-1868), sailed to Bölöni Farkas' "happy country" and contacted Peter Duponceau, president of the American Philosophical Society. As a result of this initial contact, vigorous correspondence was maintained between the American and Hungarian scientific institutions, leading to periodic exchanges of scientific information and equipment. The original records are still extant in the Archives of the American Philosophical Society Library.

Due to the 1848-49 revolution in Hungary, and the subsequent repression, the highest institution of Hungarian science was compelled to weaken, or even sever, its carefully built up foreign relations. It might not be entirely accidental that its 1852 shipment (containing volumes 3-7 of the Academy's Yearbook) was mailed on March 15, the anniversary of the uprising.[14]

The foreign exchange programs of the Hungarian Academy of Sciences has increased greatly since those pioneering years. In the mid 1970's, some 150 years after its founding, the Hungarian Academy of Sciences'

13 For more information about their friendship see Dr. Elemer Jancsó, *'Bölöni Farkas Sándor élete és munkássága"* (pp. 3-54) in Sándor Bölöni Farkas , *Nyugateurópai utazás.* Bevezetéssel ellátta: Dr. Jancsó Elemér. Kolozsvár, Minerva Rt.. 1943. 180 p. (Erdélyi Ritkaságok).

14 The shipment was acknowledged by the APS at its November 5, 1852 meeting.

exchange programs involved more than 1,700 institutions of some 86 countries.

Industrialization

The War of Independence of 1848-1849 ended in complete defeat for Hungary's cause. Owing to the lessons drawn from this political struggle for independence, it dawned on the intelligentsia that there had accumulated by then numerous shortcomings in scientific and cultural policy. The modernization of the aims of the National Academy of Sciences came to fore.

Modernization in industry, transportation and agriculture and the country's constitutional and economic bonds with Austria positively influenced this development. Between the Austro-Hungarian Compromise of 1867 and the collapse of the Monarchy in 1918 the rates of growth in all areas were enormous. The expansion of modern market-economy served the progress of the mathematical and natural sciences of this era and proved a healthy stimulus to the advancement of the arts and humanities. Three newly founded universities were added to the network of higher educational institutions. By the end of the nineteenth century the country's progress in sciences, arts and sports equaled the Western European pattern. The strong economic integration of fifty-two million people composed of some fifteen different nationalities, using a common currency, the rule of uniform laws, individual freedom and relative prosperity made this age "the good old times" in later years.

Not all was well, though. Agricultural modernization forced many peasants off the land. Emigration to the United States reached a critically high level. Of Hungary's 18 million citizens, about 1.5 million left the country before the first world war. Two-thirds of these were ethnic Hungarians. American Senator Daniel Patrick Moynihan characterized these emigrants as follows: "The 20 million odd immigrants who arrived between 1870 and 1910 were not the wretched refuse of anybody's shores. They were an extraordinary, enterprising, and self-sufficient folk who knew exactly what they were doing, and doing it quite on their own, thank you very much. Just as important, the Europe they left behind had attained a general degree of civility and legality unknown in its history. If political rights were not always advanced, civil rights generally were[15]." Indeed, Hungary's 1868 nationality law, for example, allowed every citizen to use his native language when corresponding with government offices and compelled officials to respond in the same.

The narrow vision, ignorance and arrogance of many Hungarian politicians bode ill for the future. Not that they were entirely responsible for the eventual dissolution of the country. The forces of progress, economic as well as technological, supported the need for "Magyarization". For instance, just as the British and French railways disallowed the use of Welsh and Breton, managers of the Hungarian railways were obviously right not to allow Croat to be spoken in official business. Yet this was one of the alleged slights leading to the partition. Fifty-three per cent of the population of historic Hungary was ethnic Hungarian. Before one calls for a judgement that this fact was a sound reason for partitioning the country, it should be recalled that "French was considered a foreign language by roughly half of the population that came of age in France in the last quarter of the nineteenth century"[16]. But the idea of nationalism won in the Danubian lands and as a result, the region was Balkanized at the end of World War I. Instead of one large country encompassing many nationalities in an efficient economic unit, now there were several economically inefficient small countries encompassing many nationalities. Ethnic intolerance, racial hatred, oppression provided fertile ground for the totalitarianism that came later.

15 Daniel Patrick Moynihan: *Pandaemonium: Ethnicity in International Politics,* Oxford University Press, 1993, p. 136.

16 Eugen Weber: *Peasants into Frenchmen: The Modernization of Rural France, 1870 - 1914,* Stanford University Press, 1976, p. 67.

Interwar Years

The conclusion of World War I and the Treaty of Trianon (June 4, 1920) entirely changed Hungary's position in the family of nations.

Hungary's success in these trying times largely rested in her rather unique history in the region. To quote the former editor of *The Economist*, Graham Hutton[17]: "There is no people in Europe as strongly individualistic as the Hungarian and the stratification of Hungary's social system is as like that of England as the Hungarian Constitution and limited monarchy in like the English equivalents. Perhaps that is why the English and Hungarian versions of 'democracy'—less essentially democratic than those of other liberal régimes in Europe—have been more successful than those of the German Weimar republic, France, Czecho-Slovakia, Belgium. For both England and Hungary, with their vestigial aristocracy, their rigidly defined class and caste barriers which everyone voluntarily respects, thereby gain in national cohesion." … "a people not willing to be tyrannized; a grudging collaborator in peace, but a formidable blackmailer and rebel in time of war."

Indeed, Hungary was fortunate that in times of crisis she had larger-than-life leaders. Like Széchenyi, Wesselényi and Andrássy in the previous century, now Bethlen, Apponyi and Teleki, all members of the historic Magyar aristocracy—and, incidentally, all of Anglo-American political orientation—were at hand to lead the truncated, crushed nation.

The country's severe dismemberment caused serious economic and political problems and perpetuated its financial crisis. As a means of self-aid—psychologically quite understandably—the official cultural policy favored idealistic trends to save the national spirit from total collapse. As a consequence, the official line emphasized the promotion of the

17 Hutton, Graham: *Danubian Destiny*, London: Harrap, 1939, p.197

humanities over most of the branches of sciences. Yet the most outstanding cultural politician between the wars, Kunó Klebelsberg, minister of education, did much in organizing scientific research at universities and at independent institutes such as the Tihany Institute of Biological Research. He also revived the age old Hungarian custom of providing government stipends for university students to study abroad.

Even though the catastrophic set backs caused by the loss of World War I, the partition of the country and the economic and social collapse, Hungary has underwent a startling resurgence in science and humanities during the inter-war years. Just as the economics of the country had straightened out, the Great Depression hit. As things got better again, the winds of war stirred. For several years Hungary was a beacon of peace and freedom for refugees from the surrounding countries escaping Naziism. For example, Hungary maintained the only Polish university on the Continent, to serve the refugees from Hitler's attack on Poland. French POW's escaping from German prison camps were put up by the Hungarian government in a resort on Lake Balaton. But on March 19, 1944, German occupation commenced. Soon, the deportation of Jews began. The country was forced into all out war and the inevitable second catastrophe of the century occurred. Hungary lost almost ten per cent of her population by the end of World War II. She also lost her freedom.

Communism and Its Aftermath

Towards the end of World War II, President Roosevelt's enthrallment with Joseph Stalin at Yalta sealed the fate of the countries of East Central Europe. For 45 years Hungary was forced into the Soviet Union's sphere of influence and became one of its reluctant satellites. About 600,000 Hungarians, soldiers and civilians alike, were taken to Soviet prison camps, one-third of them perished there. The destruction caused by the war represented 40 per cent of the nation's wealth, calculated to be equal to 4,400 million 1938 U.S. dollars. The reparations paid to the Soviet Union (and in some part to Czechoslovakia and Yugoslavia) amounted to

$ 300 m.. Germany's wartime debt to Hungary, amounting to $ 280 million was canceled. However, Hungary's debt to Nazi Germany, $ 30 million, had to be paid back, to the Soviets. An additional $ 150 - 180 million damage to German properties located in Hungary had to be compensated, to the Soviets. These payments represented 17 per cent of Hungary's annual gross national product. The Soviets have disassembled and took home about 8 per cent of Hungary's factories. In addition the victorious Soviets stole entire contents of galleries and museums, some 100 thousand artifacts, paintings, Persian rugs, jewelry, gold and other valuables. Hungary was also compelled to feed the entire occupying Soviet Army. As a result in the years after the war the country could feed the citizens only 560 calories a day, compared to the 2700 daily calories before the war. It took until 1953 to make all the required payments. Hungary was not allowed to join the Marshall Plan that revived Western Europe.

President Roosevelt's consent to Eastern Europe's occupation by the Soviet Union not only determined the economic and political fate of the country but its intellectual orientation as well. Directives issued by the Central Committee of the Hungarian Communist Party have triggered political and cultural changes. Intellectual workers have been compelled to conduct their work accordingly.

At the onset of Communist rule Hungary's leading intellectuals underwent a painful adjustment. Many escaped the country and continued their scientific work in the West. Others were removed from their previous positions. Some, for example Simon Papp, the famous geologist of Hungary's oil fields, were forced to continue their scientific work in prison. For the fate of people in the humanities the life of some writers are characteristic. Writers József Nyirö, Sándor Márai and Albert Wass chose emigration, Gyula Somogyváry, another popular novelist and former head of Hungarian Radio, died in prison, the peasant writer Péter Veres became a powerless figurehead for the Communist Government. Many others 'wrote for their desk drawers', if they dared. The universities were filled with largely unqualified students from worker and peasant families (an early form of affirmative action). Those who made it through were sent to the Soviet Union for further education. The best of jobs in the scientific establishments were reserved for them upon their return. "Class warfare" became a dominant and painful mantra.

Life in Hungary achieved Orwellian overtones. The anniversary of the completion of Soviet occupation, April 4, when the last square meter of the country was conquered, was named Liberation Day. Hungarian POWs were kept in the Soviet Union for years. Meanwhile each village was adorned with a heroes monument, for Soviet ones, of course. Slavish adoration of anything Soviet and denunciation of the old became the rule. The common expression 'good old days' became 'cursed old regime' in Communist parlance. If someone has shown the slightest bit of hesitancy about the new faith, he or she may disappeared overnight, often never to return.

The reorganization of the Hungarian Academy of Sciences along Soviet lines in 1949 made possible the planning and coordination of all high-level intellectual activities under the guidance and supervision of the Academy. The Communist central planning and coordination of scientific research necessarily were closely associated with the country's economic plans. In line with this policy, research institutes were required to solve first of all those problems which are in one way or another connected with the topics of current economic demands and requirements. This utilitarian approach led to ignoring the primacy of basic research over industry-focused interests and applications. Meanwhile, during the Communist controlled decades the number and size of research organizations directed by the National Academy of Sciences increased tremendously. For example, the Central Research Institute for Chemistry operated with a staff that included over 220 highly trained researchers, in addition to a huge group of support personnel. Similar sized institutes dealt with physics, computer science and several other scientific fields.

Communist domination over all aspect of life extended over the scientific community led by the Hungarian Academy of Sciences. While giving lipservice to academic integrity, in reality the Academy became the hotbed of intellectual prostitution and the handmaiden of the authorities. The August duties of Soviet style scientific degree granting, research funding, approval of foreign travel and advising the government with "scientific expert" opinions were enlaced with covert personal interests, cronyism and greed.

The spontaneously triggered Hungarian Revolution in 1956 shook the Communist rule not only in Hungary, but throughout the world. To quote Yugoslav Communist politician and writer, Milovan Djilas, who received a prison sentence for voicing his opinion in 1957: "With the revolt of the Hungarian people a new epoch has began in the history of humanity. . . The Hungarian Revolution is perhaps no less important than the great French Revolution or the Russian Revolution. . . It marks the beginning of the End of Communism." British historian Hugh Seaton-Watson, no friend of Hungary and son of the virulent anti-Monarchy propagandist R. W. Seaton-Watson wrote[18], "Although Hungarians were often quoted in the past in England as a people of extremists composed of feudal landlords and slaves who served Hitler, the facts in 1956 have shown that Hungarians were among the first who, for a short time, destroyed a totalitarian regime, whilst the Czechs were standing applauding loudly with self-satisfaction and malicious joy at the brutal subjugation of Hungary by the Soviet forces."

Even though the fight against the Soviet tanks was lost in 1956, a slow liberalization began in Hungary, with gradually increasing freedom of scientific research, arts, and literature. The Communist authorities became increasingly free-handed while they borrowed enormous amounts of foreign loans to maintain the "goulash communism", "the happiest barracks in the camp."

18 *London Times, March 16, 1960:*

With the end of the Communist era much of the central financing of the bloated research organizations of the Academy of Sciences was reduced significantly. The institutes were forced to seek outside funding through industrial, applied research. Many of the most qualified researchers went out of the country seeking permanent or temporary assignments at universities and research organizations in Europe and in the United States. In 1998 there were 966 Hungarian researchers working abroad, according to a report by the Hungarian Academy of Sciences.

Ten years after the demise of Communism, by the end of the 1990's conditions in scientific research have stabilized. Recognizing the high level of technical education and the availability of well trained talent, scores of Western companies have built manufacturing plants and established research organizations in Hungary. Companies like IBM, Nokia, Ericson are a few examples. Governmental programs, notably a project initiated by the National Technical Development Council in March, 1998, aims at the increase of multinational firms' involvement in research and development based in Hungary. Giving back the control over research to universities is increasingly talked about. Such moves will assure that the nation's numerous scientists will be able to utilize their talents without resorting to emigration.

Presently there are about fifteen million Hungarians all over the world. Out of this total number approximately 10.222[19] million live in the Republic of Hungary (an area of 35,919 square miles—93,000 square kilometers). Over two and a half million live in the areas comprising the separated parts of Historic Hungary, in the neighboring countries, namely 5,000 in Austria; 567,000 in Slovakia; 155,000 in the Ukraine's Carpatho-Ruthenia; 1,598,000 in Romania and roughly 341,000 in Yugoslavia. Included in their total number are over 1,500,000 immigrants scattered over the five continents, the majority of them—that is about

19 From Gy. Daniss: Hányan voltunk, vagyunk, *Népszabadság*, Aug. 19, 1998.

1,000,000—dwell in the United States of America. Of course, these numbers are somewhat uncertain. There are many people living in minority status in the Successor Countries who claim that they belong to the ruling majority. Some even changed their surnames so that they blend in better. Numbers based on ethnicity are inherently pliable.

The Arts

Folk Art

by Christina Maria T. Wagner

Far from being merely a popular avocation or a charming and decorative pastime, Hungarian folk art is a multiform, high caliber manifestation of professional artistry.

Hungarian folk art embraces the fine arts of painting, sculpture, music and dance as well as the applied arts of metal work, including, gold-, silver-, iron- and coppersmithery; leather work; carving from stone, wood, bone and horn; the making of stained glass windows; embroidery, spinning and weaving and a multitude of others. Of them all it is textile work and ceramics that attained the highest degree of perfection.

As with every folk art, the diverse forms of Hungarian folk art mirror the emotions of its people. In the case of the Hungarians, an ineradicable sense of humor, an irrepressible *joie de vivre*, an enthusiastic love of ceremony and a profound appreciation of the aesthetic. The fusion of functionalism and aestheticism is a hallmark of the Hungarian artistic temperament. Again as with any folk art, Hungarian folk art is an outgrowth of the people's life style, which in turn is molded by the country's history. As such, the two historical factors leaving the deepest imprint on Hungary's folk art. These were the Turkish occupation of Hungary and the Italian Renaissance.

The Turkish influence was especially strong in embroidery. However, strong national tradition amalgamated with artistic ability made it possible to meld two such different artistic styles as Eastern and Western into a balanced, harmonious unity which was distinctly Hungarian in character.

As early as the ninth century decorative arts flourished among the Hungarian people—the Magyars—at a relatively high level. Although they were a semi-nomadic, equestrian people at the time, decoration of clothing was widespread. Contemporary eyewitnesses expressed amazement at the Magyars' proficiency and imagination in fabricating and embellishing armor and at their mastery of the decorative branches of the metal crafts and leather craft. Ninth century bridles, trappings, harnesses, stirrups, arrowheads, sword blades and other artifacts bear witness to the Hungarian philosophy that what is functional need be simultaneously aesthetic.

Without doing a comprehensive, in-depth survey of the Hungarian folk arts, so let us touch upon a few specific art forms. As to folk music, it behooves us to point out that such internationally renowned giants as Ferenc Liszt, Zoltán Kodály and Béla Bartók are indebted to the ancient folk melodies and harmonic patterns of their homeland, which form the basis of their compositions.

Among the wealth of folk dances the internationally best known and loved is the national dance of Hungary: the regal, dynamic and explosively passionate csárdás (pronounced Char'dahsh).

Painting embraces, among other representatives, the exquisite freehand adornments of the interior as well as the exterior walls of peasant homes. These cheery, vividly multicolored works of art are especially evident in the town of Kalocsa, south of Budapest and near the Danube.

The designs in decorative folk art are predominantly floral, the most favored being tulips, lilies and carnations, with profusion of petals as space-fillers. Other motifs include fruits, such as the pomegranate and animals, with birds, especially the peacock, being the most popular. Human figures are rarely depicted. Other characteristic is the preference for certain colors, especially red and the rare use of others, such as yellow and purple.

Carving is a versatile art. It is the herdsman's art. The materials he employs are generally wood, bone and horn. He embellishes countless objects of his metier as well as personal use, including the handle of his herdsman's whip, his pipe, matchbox and flute. Herdsmen excel at carving because the long, uneventful hours spent minding their flocks afford the opportunity for much practice. But carving is by no means restricted to the herdsman or the media he utilizes. Cases in point are furniture, buildings—including details on peasant cottages such as arcaded porches, gables, roofs—ceilings and belfries of churches, gates and other structures which exhibit elaborate carvings. Indeed, in Transylvania the very shovel used for digging graves is splendidly decorated with carvings, not to mention grave markers. Also, it is a matter of record that in a prison of old a peasant carved on a laundry mangle board the story of how he had clobbered a tax collector and the malice of the judges had landed him in the pokey.

Embroidery is one of the most interesting of the folk arts. Its origins can be traced back to the eleventh century when Queen Gisela, wife of Stephen I, the first king of Hungary, maintained a workroom for embroidery. As early as the fourteenth century professional craftsmen were producing embroidery which was renowned throughout Hungary and abroad. As a matter of fact, the master embroiderer of the king of France between 1384 and 1417 was a man named Aden de Hongrie, which is translated Stephen of Hungary. In the sixteenth century Hungary created a new style of embroidery which was a merger of Eastern and Western motifs, yet characteristically Hungarian.

Items embroidered are endless, including bookmarks, saddles, boots, pillows and bedclothes, cloaks and mantels, tablecloths and aprons. As a matter of fact, in the seventeenth century, Hungarians were ardently embroidering practically everything they could get their hands on, including ladies' lingerie and gentlemen's underclothing.

Embroidery and native costume-making are interdependent and perhaps the most symbolic and expressive of the Hungarian way of life. A symmetrically arranged flower cluster or vine constitutes the dominant motif of Hungarian embroidery, with a different flower usually growing from every branch of the stem. There are many variations on this motif, some including fruits. About 25 stitches are known. Among the materials used for embroidering are gold and silver threads, coral, pearls, lace, silk, taffeta, satin and brocade.

Depending on the colors, fabric, style, embroidery and the particular article of clothing, the observer of the Hungarian native costume was able to ascertain the wearer's sex, age bracket, socioeconomic status, possibly his occupation, the region of the country he hails from, marital status and the occasion for which he is attired. For example, older women wear more sparsely embroidered clothes and more somber colors than younger women, the fiery red of youth gradually giving way with the passage of time to green, blue, then finally black. Unmarried girls generally go bareheaded but on festive occasions wear a wreath-like headdress called a *párta* (pahr'tuh). Older women wear coifs or kerchiefs, while young married women without children sport the most sumptuously ornate headdresses of all. Another example of the story native costume tells is the wearing of a certain handkerchief to reveal that a young man is engaged. Called a betrothal handkerchief and made for him by his fiancee, each of its 4 corners is embroidered in a different pattern and each Sunday the young man wears it to church he will display a different corner.

Hungarian lace makers, especially those of the town of Halas, have raised their exquisite art to the level of the internationally acclaimed Belgian lace.

In style there is no difference between the garb of the rich and poor. The only variance is that a wealthy person would have a greater quantity of costumes and they would be fashioned of more expensive and richly decorated materials. Unfortunately, the wearing of folk costumes has gone out of style as industrialization became universal. Today, folk dresses are made for commercial purposes, to be sold to tourists.

Pottery is one of the most varied and colorful branches of folk art. The Great Hungarian Plains (Alföld) is the seat of pottery-making. There are two basic types of pottery: multicolored, glazed ceramics and unglazed, smoked black earthenware. Design and shape, of course, vary according to occasion and use.

The widely known Zsolnay Factory began as a small china maker's shop around the middle of the nineteenth century. In just a few years, under the artistic leadership of Vilmos Zsolnay (1828-1900), this little shop was transformed into a top notch factory. The Zsolnay Factory used the eosin formula invented by Vince Wartha in decorating its objets d'art. This innovation made the Zsolnay products famous in most European countries by the last quarter of the nineteenth century. Since the Zsolnay porcelains were awarded the Grand Prix at the Paris World Exhibition in 1900 they gained popularity the world over. The roof of Budapest's Coronation Church (Mátyás templom) is tiled with Zsolnay porcelain tiles. The artistic achievements of the Zsolnay Factory have resulted in a continuous chain of international successes which are well documented in *The Zsolnay Family*[1] written by Teréz Zsolnay and Margit Zsolnay Mattyasovszky.

It would be sacrilegious to speak of Hungarian folk art, much less of pottery, without mentioning the world-famous porcelains of Herend. They are the crowning glory of the folk art of pottery. Because of its exceptional craftsmanship, beautiful and numerous hues and imaginative wealth of designs, it became sought after by international connoisseurs of art and those with exquisite taste.

The Herend factory has been in existence since 1839. Herend porcelain won acclaim at many international and national exhibits. Here in America at the 1853 New York Exhibition of Industrial Art the director of the

1 *A Zsolnay Család*, Budapest: Corvina Press, 1974. 240 p., 48 illus.

Herend factory was awarded a diploma and a medal in recognition of the porcelain's superb quality. At the 1855 World's Fair in Paris, every single piece of Herend porcelain was sold.

Queen Victoria of England ordered a very large Herend table service for Windsor Castle. Needless to say, the English aristocracy flocked to follow suit and ownership of Herend became all the rage. The 14th president of the United States, Franklin Pierce, also joined the ranks of the many illustrious owners of Herend. King of Hungary and Austrian Emperor Franz Josef, still another customer, presented his mother, the Archduchess Sophia, with a tea set. Other celebrated figures in the course of history to own Herend china include the Russian czar, Alexander II; King Victor Emmanuel of Italy; King Edward VII of England; and one of the Rothschild scions whose family name is now borne by the famous design made especially for him.

Herend porcelain is increasingly prized today, a major reason being that it continues to hold out as the only major porcelain factory in the world which has refused to tarnish its artistry by "going commercial", so to speak and adopting assembly line methods and fully mechanized production. On the contrary, one has the assurance that every piece of Herend china is hand painted by individual artists and masters, each specializing in a respective technique.

Although the second half of the nineteenth century saw the golden age of folk art, it is far from stagnant today. The characteristic features of ancient Hungarian folk art live on to be enriched by ever-evolving new materials, new objects and new styles to meet the demands of the times.

Architecture

by Francis S. Wagner

Inspirations for medieval architecture in Hungary came from several centers of the West. The Romanesque style was most closely linked with South Germany, Austria and Northern Italy. The Italian style is reflected in the grand Cathedral of Pécs with its four towers, whereas the abbey churches of Ják, Lébény and Zsámbék reveal the German Romanesque influence.

The construction in the Gothic style of the Coronation Church (Mátyás templom) in Budapest, shown on the inside cover of this book, began in the second half of the thirteenth century and was completed during the reign of Matthias Corvinus (1458-1490). Internationally speaking, the reign of King Matthias and the decades following boasted the most outstanding phase of the country's architecture. The King was a patron of famous Italian masters and preferred the new style in architecture. In church art, the beautiful Bakócz Chapel (1507) in Esztergom Cathedral (Basilica) also shows the Italian influence.

A number of churches were built in these centuries which now deservedly are tourist attractions. Among them are the 14th century Church of St. Michael in Kolozsvár, (now Cluj, Romania), the similarly 14th century Parish Church of the Inner City of Budapest (Belvárosi templom), and the impressive early 15th century St. Elizabeth's Cathedral of Kassa, (now Kosice, Slovakia).

In the sixteenth and seventeenth centuries the monuments of the Turkish occupation (mosques, minarets, baths, etc., at Pécs, Eger and Budapest) appeared and presented a vivid contrast to Western art. Although during this period some fortresses were erected (at Györ and elsewhere) after the new Italian models, following the Turkish occupation, it was the Austrian and Bohemian Baroque which dominated the stage in architecture. Among the most representative of the Baroque style are the Esterházy Palace at Kismarton (now Eisenstadt, Austria) across the Austrian border built between 1663 and 1672, the huge Esterházy Palace at Fertöd (1764) and the Lyceum at Eger (1765-1785).

Very soon Neo-Classicism triumphed over the Baroque style. The remarkable Cathedral at Vác (1763-1777) is one of its masterpieces. The motifs of Neo-Classicism culminate in the strikingly beautiful Cathedral of Esztergom (1822-c. 1850) built by János Packh (1796-1839) and József Hild (1789-1867). A creation likewise representative of neo-classic style is Mihály Pollack's (1773-1885) Hungarian National Museum (1836-1845) in Budapest. Mihály Pollack was the leading classicist of his age. He studied in Milan under his brother, Leopoldo Pollack (1751-1806), who was assistant to Piermarini. Mihály Pollack built several private and public buildings, completing the Theater and Assembly Room in Warsaw in 1832 and building the Royal Army Officer School, Ludoviceum in Budapest from 1829 through 1836.

The richly embellished Italianate Opera House in Budapest (1875-1884), a supreme artistic achievement of Miklós Ybl (1814-1891), marks the peak of eclecticism. Similarly, the world-renowned Parliament Building in Budapest (1885-1902)—built for a country three times its present size—a work of Imre Steindl (1839-1902), is the apex of nineteenth-century eclecticism and the late revival of Gothic architecture. After a while the movement of Art Nouveau revolted against eclecticism. Ödön Lechner (1845-1914) was one of the most brilliant craftsmen of Art Nouveau architecture. He also advocated the creation of a national (Hungarian) architecture. The attractive Postal Savings Bank in Budapest (now called the Hungarian National Bank) is one of Lechner's many artistic designs.

Fishermen's Bastion on Budapest's Castle Hill (Halászbástya, 1901-1902), built in a highly picturesque style of architecture, was designed by Frigyes Schulek (1841-1919), who was influenced by medieval art so deeply that he applied his craftsmanship primarily to the restoration of historic monuments.

In postwar years, the country's leading architects conformed their art to the eclectic style then to Classicism, which trends have gradually disappeared. As of now, the most interesting work is being done in the realm of industrial architecture. The newly erected buildings of the Research Institute for Iron and Metals designed by Jenö Lauber and József Szendröi, the Warehouse of Pharmaceutical Products at Köbánya (1954-1957) designed by Jenö Juhász, the Hotel "Aranyhomok" at Kecskemét built after the designs of István Janáky, the Office Block of Chemolimpex in Budapest designed by Zoltán Gulyás and the monumental People's Stadium designed by Károly Dávid demonstrate that the country's architecture has embraced the universal ideas of modern architecture.

Biographical sketches of some of the outstanding master builders may help elucidate the progressive traditions characteristic of the Hungarian methods of training architects.

László Warga (1878-1952) was brought up in Kolozsvár and studied at the Technical University of Budapest. While an employee of the city of Budapest from 1902 to 1927, he was invited to become the first professor at the newly created chair for urban design at the University. He retired from that position in 1934, but for two years subsequently he contributed his full-time service without pay. As a young man he was an employee, later the leader, of the section for urban design at Budapest. His plan for the Tabán (an old section of Budapest) won general acclaim at the International Exhibition for Urban Design in Berlin (1910). Those of his plans dating from 1912-1913 already clearly evidence his independent approach. In 1913 in his plans for Kelenföld (a then newly developed area of Budapest) he applied for the first time, and years in advance of anyone else, the garden city concepts of city development. This later became generally accepted by modern city planners all over the globe. His plans were noted for their balance between requirements of traffic flow and economics on the one hand and aesthetic and health considerations on the other. Warga emphasized the well-proportioned distribution of parks and even insisted that these areas form a continuous chain of green areas, later generally referred to as "green belts". His plans allowed every part of the whole to have a direct link to "open nature" parks or water bodies. His ideas had a determinative effect on city planning all over the world.

László Warga participated with great success in urban design competitions within Hungary, for instance plans for Kassa (now Kosice, Slovakia), Miskolc, Székesfehérvár, Szombathely, Salgótarján). He was also successful abroad, for example in the international competitions for the redevelopment of the inner city in Canberra (Australia) and Birmingham (England), the fortress area in Antwerp (Belgium, 1910), the city of Brassó (now Brasov, Romania, 1911) and the city of Belgrade (1922). Warga mailed his plan for Belgrade from Paris instead of Budapest in order to avoid the anti-Hungarian prejudice rampant in Belgrade after World War I. When he won first prize and his identity was finally revealed, it caused a sensation. His plans were acclaimed at the International Exhibition for Urban Design in London (1924) and in Tokyo (1925). His new approach motivated several large cities—New York, Tokyo, Milan among them—to send a group of experts to study the methods of city planning employed in Budapest. Warga prepared with special care and love the plans for Kolozsvár. He donated his time for this work, even after this overwhelmingly Hungarian-inhabited city came under Romanian rule after World War I and again after World War II.

Marcel Lajos Breuer (1902, Pécs,- 1981) left Hungary to become one of the best-known architects of our age. He went to London in 1935 and then to Harvard in 1937. Prior to his coming to the United States, Marcel Breuer worked in the Bauhaus workshop, which represented a movement initiated in Germany having as its aim the integration of art and technology. Breuer's independent practice in the United States gained momentum only after World War II. One of his masterpieces is the Whitney Museum in New York City. Later, his practice spread to several other countries (Bijenkorf, Rotterdam, 1953; UNESCO, Paris, 1953). His New

York office was a world center for widely accepted architectural innovations. Breuer designed several buildings throughout the world which are considered as true reflections of his genius.

Sculpture

Among medieval Europe's artistic movements, Hungarian sculpture with its bronze human figures and equestrian statues, occupied a special place. In the second half of the fourteenth century the Kolozsvári brothers, Márton (Martinus) and György (Georgius), created several such bronze figures. In 1373 they sculpted the world-famous mounted figure of St. George which now stands in the courtyard of the Hradcany in Prague. Both the human figure and the horse are distinguished by vivid realism. The concept of realism being altogether unknown in that age, the two brothers introduced an entirely new mode in the universal history of sculpture.

Excavations in the last decades at the one time royal castles of Buda and Visegrád unearthed a lot of outstanding stone carvings from the fourteenth and fifteenth centuries. At the Royal Court of King Matthias I mythological figures, fountains from which wine flowed, red marble ornaments, etc., represented a transition from the Gothic to the Renaissance style. The immense devastation of the Siege of Budapest in 1945 allowed archeologists to excavate at the site of bombed out seventeenth century buildings, finding valuable treasures in fifteenth century and older ruins underneath. Huge numbers of stone art work were found as well in parish churches, chapels and in the mansions of wealthy aristocrats and of the bourgeoisie. But the Turkish invasion nearly put an end to the large-scale artistic evolution. As a result Romanesque, Gothic, Renaissance and Baroque sepulchral monuments are the main representatives of the various stages of sculptural development in the sixteenth and seventeenth centuries.

In mediaeval times Hungary's mines supplied a large share of Europe's gold. Hence Hungarian goldsmithery assumed the lead in Europe during the Gothic period, that is, in the fifteenth and sixteenth centuries. Every kind of technique flourished. The world-renowned *Calvary of King Matthias I* is an important sample of the goldsmith's art. The *Calvary* is exhibited at the Christian Museum in Esztergom.

Miklós Tótfalusi-Kis (1650?-1702) studied theology in Reformed schools in Transylvania and was the school master in Fogaras when he was invited by Bishop Mihály Tófeus to travel to Holland and supervise the printing of the first Hungarian Bible. He went there in 1680, planning to learn the printing trade as well as attending a university. However, wartime conditions caused the loss of all contacts with his Hungarian superiors. Being left alone, he concentrated on printing the Bible. After arduous work in correcting the translation, he rented a small print shop and printed the Bible, followed by the Psalms and the New Testament. In the process he learned the design of typefaces—probably learning his trade in Holland from the master type founder Dirk Voskens—and by 1684 he became sought after for his excellent font designs. His fonts were introduced in England, Germany, and Italy. He even created fonts for the Greek, Hebrew, Armenian and Gruzian languages. In 1689 he returned to Transylvania. His fonts are still popular today. Actually, Kis designed the type faces that were previously attributed to Anton Janson, a Dutchman working in Leipzig from 1668 to 1687. These sturdy Dutch types were the examples from which British type founder William Caslon developed his incomparable designs. The fact that Kis was the original designer was uncovered by Englishman Harry Carter, with the aid of György Buday, in 1954. In remembrance of Tótfalusi Kis, the body text of this book is set in his type faces.

Parallel to the revival of patriotism in the first decades of the nineteenth century, István Ferenczy (1792-1856) carved busts in stone or marble of eminent public figures of the national revival movement. Perhaps the most artistic of these carvings is the bust of *Ferenc Kazinczy,* a leading figure of the Hungarian literary revival. Beginning his studies in Vienna, Ferenczy continued in Rome under the masters Canova and Thorwaldsen, the greatest sculptors of that period.

Miklós Izsó (1831-1875) learned the rudiments of sculpture in the studio of István Ferenczy and continued his studies in Vienna. Partly as a reaction to the Habsburg rule, Izsó revolted against the rigid academic forms. Rural themes derived from the simple life of peasant people were frequent features in his art. *His Shepherd in Grief*, is one of his many carvings exemplifying his life-like style.

The Austro-Hungarian Compromise of 1867 helped nourish intellectual life in Hungary. The demand for art grew. The newly founded Budapest Academy educated many a young sculptor. Alajos Stróbl, János Fadrusz and György Zala were the most gifted among them, but Alajos Stróbl (1856-1926) was the greatest of them all. Stróbl produced many of the best monuments in Budapest—for instance, the statues of famous musicians and writers, *Ferenc Liszt, Ferenc Erkel, János Arany* and *Mór Jókai*. He also carved the sculptural decorations for the Kossuth Mausoleum at the Kerepesi Cemetery in Budapest.

The specialty of János Fadrusz (1858-1903) was the making of historical monuments. Commissioned by the city of Pozsony (now Bratislava, capital of Slovakia), Fadrusz carved the *Monument of Queen Maria Theresa* (1896) which, unfortunately, was destroyed after 1918. His chef d'oeuvre is perhaps the bronze *Monument of King Matthias* erected at Kolozsvár in 1902. The fact that it is still standing is owned to the Romanians claim that Matthias came from a Romanian family, which is not true. His father, János Hunyadi was allegedly the illegitimate son of Hungary's King Sigismund, Emperor of the Holy Roman Empire. The details are described by Stephen Pálffy in the appendix.

György Zala's (1858-1937) artistry lay in creating monuments for public squares. His *Equestrian Statue of Andrássy* was executed in the best traditions of sculptural art. Zala carved the majority of the statues on the

Millennium Memorial, which is a high priority in the sightseeing tours of Budapest.

Alongside monumental sculpture, the art of small sculpture started flourishing from the onset of the twentieth century. Having studied in Munich and Paris, Márk Vedres (1870-1961) spent the greater part of his life in Italy, where he attained perfection in the fashioning of small bronze figures.

Fülöp Ö. Beck's (1873-1945) plaques and medals commanded international appreciation.

Ferenc Medgyessy (1881-1958) became famous for his reliefs. Medgyessy was awarded the Grand Prix at the 1937 Paris World Exhibition for his allegorical figures which now stand in front of the Déri Museum at Debrecen.

Béni Ferenczy (b. 1890) studied sculpture in Bourdelle's studio in Paris, after which he lived in Vienna and in Moscow for a long period. In 1936 Ferenczy created his well-known bronze *Bartók Medallion*.

The self-trained Pál Pátzay (b. 1896) began his artist's career with small sculpture. In this stage of his artistic evolution Pátzay studied the relationships among space, planes and motion. Later he gradually turned to life-size figures and his career climaxed in the creation of the huge *Heroes' Memorial Monument* erected at Székesfehérvár in 1939. Pátzay also carved a mounted figure of *János Hunyadi* .

Zsigmond Kisfaludi-Stróbl (b. 1884) was considered by many to be the greatest artistic talent of this age. He studied in Vienna, Brussels, Paris and Italy. Many of his works are in private and museum collections abroad, for instance, *The Birth of Venus* in California and *The Lizard* in London. High valued are his commissioned portraits of George Bernard Shaw, Queen Elizabeth II of Great Britain, and others. Kisfaludi-Stróbl's famous monument of *Lajos Kossuth*, erected in 1952, is seen in front of the Parliament Building in Budapest. He also sculpted a 10 foot high bronze statue of the sixteenth century revolutionary leader *Ferenc Rákóczi II* for the Millennium Memorial in Budapest.

After World War II, sculpture, monumental as well as small, has evinced certain advances in as much as newly erected buildings, historic houses and squares been decorated by a rising number of gifted artists. In addition to the sculptors already noted, we should at the very least mention the names of Sándor Mikus (b. 1903), Jenö Kerényi (b. 1908), Miklós Borsos (b. 1906) and József Somogyi (b. 1916) as they have produced many sculptural works of lasting value.

József Ispánki's sculpture (b. 1906, Budapest) enjoyed great success in the United States and many countries abroad. Ispánki studied under Lajos Mátrai at the Budapest School of Applied Arts and was István Szentgyörgyi's student at the College of Fine Arts in Budapest. From 1931 to 1933 he was on scholarship in Rome. He was highly esteemed as a creator of statues for public squares (*St. Stephen and Gisella*, Veszprém, l938; *Petöfi* , Kaposvár, 1954; *Symbolic figure* , Kecskemét, 1965, etc.) as well as a designer of medals, having won many national and foreign prizes as a medalist. His art is distinctive for its search for innovation.

In relief sculpture, Amerigo Tot (b. 1909 at Fehérvárcsurgó, Hungary as Imre Tóth) was considered one of the leading artists of the world. He studied at the Budapest School of Applied Arts and from 1929 under László Moholy-Nagy in the Bauhaus at Dessau, then in Paris as a pupil of Maillol. From 1937 Amerigo Tot took an active part in Italy's artistic life, at the beginning belonging to the circle of R. Guttuso. In 1949 Tot won the contest to execute the facade reliefs for the Termini Railroad Station in Rome. His robust reliefs also decorate the Sports Palace and the Automobile Club in Rome.

Dóra Pedery-Hunt (b. 1913, Budapest) of Toronto, Ont., Canada, was a noted sculptress and designer who has won many international awards. Her works are exhibited in the National Gallery of Canada, The Art

Gallery of Toronto, The Penning Cabinet of The Hague, The Royal Cabinet of Medals in Brussels, etc.

Painting

The art of painting miniatures was in vogue in Western and Central Europe throughout the Middle Ages. Hungary was no exception. Its codex literature preserved beautiful samples of miniature painting. Ecclesiastical art as well, such as panels of altars in churches demonstrated a high artistic level of this genre. No wonder that the country's greatest Gothic painter, known only from his initials, Master M.S., appeared on the scene and enjoyed success as early as the onset of the sixteenth century. His art was firmly rooted in Hungarian soil and was superior to that of most contemporary painters in craftsmanship, richness of imagination and realistic approach. One of his paintings (*Visitation*, 1506) is housed in the Budapest Museum of Fine Arts and four others (*The Agony in the Garden; Christ Carrying the Cross; Crucifixion* and *Resurrection*, 1506) are in the Christian Museum at Esztergom.

It was a custom, chiefly during the years of Turkish occupation, for gifted young men to leave Hungary to complete their studies abroad. As in the case of Jakab Bogdány (1660-1724). Born at Eperjes (now Presov, Slovakia), he studied in Vienna and in the Netherlands. From 1690 Bogdány lived in England; he died in London as a court painter. Bogdány excelled in painting birds and still lives of flowers and fruit. His paintings were bought by royalty the world over and are now exhibited in Hampton Court Palace, Kew Palace, the National Museum of Stockholm and the Museum of Fine Arts in Budapest, among others.

János Spillenberg (1628, Kassa-1679) was also a disciple of the Baroque school of painting. Although he spent most of his creative life abroad working in Venice and Bavaria he always called himself Pictor Hungaricus. *Vertumnus and Pomona*, a masterpiece of his, is in the Dresden Gallery.

One of the supreme talents in eighteenth-century Baroque portrait painting was Ádám Mányoki (1673-1757). Mányoki studied painting at Luneburg and Hamburg with the famous German painter Scheitz. Appointed official portrait painter of the Berlin Court in 1703, Mányoki worked in this capacity until 1707. In 1709 he returned to his native Hungary and was court painter to Prince Ferenc Rákóczi II until 1711, the year of the defeat of the Rákóczi-led War of Independence (1703-1711) [2], when he again left Hungary. The years 1713 to 1723 found him working in Dresden and Warsaw as court painter. In 1723 Mányoki once again returned to Hungary to paint portraits of Hungarian aristocrats. In 1731 the artist returned to Dresden where he resumed the position of court painter until his death. Ádám Mányoki's *Portrait of Ferenc Rákóczi* and his *Self-Portrait as a Young Man* bear the distinction of being ranked among the most prominent portraits of eighteenth-century Europe.

During the first half of the last century two characteristics of the development of art in Hungary were salient. Artists rallied behind the concept of patriotism. At the same time they caught up with the progress of the arts in the most developed countries of Western Europe. The most popular and visible artist of that age was Károly Markó the Elder (1791-1860), a highly successful landscape painter (*Visegrád*, oil painting, 1825-1830); *The Great Hungarian Plain* (Alföld), oil painting, 1853, whose pictures turned up in collections in Europe and the United States.

Miklós Barabás (1810-1898) specialized in portrait painting (*Ferenc Liszt*, oil painting; *Mme István Bittó*, oil painting, 1874), likewise József Boros (1821-1883), whose *National Guardsman* (Nemzetör, 1848) was the most popular picture of that time.

2 For all historical references, please consult Stephen Pálffy's *The Kings of Hungary* in the Appendix.

Bertalan Székely (1835-1910) and Viktor Madarász (1830-1917) set an entirely new tone in the country's art movement. With outstandingly great talent both immortalized tragic scenes from the nation's past. *The Bewailing of László Hunyadi* by Viktor Madarász was exhibited in France at the famous Paris Salon and in 1861 was awarded the highest French artistic prize, the Gold Medal of the State. His *Zrinyi and Frangepán in Prison* is regarded by some critics as the most representative work of Hungarian historical painting. Bertalan Székely also devoted his talent to historical scenes (*Ladislaus V and Czilley*; *The Women of Eger*, etc.) and garnered great success. Historical painting in this superior tradition was continued by Sándor Wagner (1838-1919), who was a master of the Munich Academy. His most famous painting is *The Self-Sacrifice of Titus Dugovics.*

Károly Lotz (1833-1904) drew his inspiration and subjects from quite different sources, as illustrated by his *Sunset* (oil painting) and *The Muse* (oil painting from the 1890's). His versatile talent is evident in Lotz numerous murals in churches and public buildings (*Aurora and Apollo*, murals on the ceiling of the Budapest State Opera House, 1882- 1884).

Mihály Zichy (1827-1906) had the most colorful career among Hungarian painters. He was among the first pupils of painter Giacomo Marastoni (1804-1860) in Pest. In 1844 Zichy left Pest for Vienna where he joined Waldmüller's private art school. In 1847 his oil painting, *The Lifeboat,* scored such spectacular success that Zichy was invited immediately to St. Petersburg, Russia as the drawing master of Princess Jelena Pavlovna. Then from 1859 on, with the exception of a few years which he spent in Paris and Budapest, Zichy was the official painter to the Russian Imperial Court. He worked primarily in watercolors and favored pencil sketches. Zichy brilliantly illustrated the works of the literary giants Goethe, Lermontov, lmre Madách, János Arany and Sándor Petöfi. His graphics and paintings housed in Hungarian and Russian galleries still attract those visitors who enjoy works of the Romantic style.

The group of the first really modern Hungarian painters includes such masters as Mihály Munkácsy, László Paál, Pál Szinyei Merse and Géza Mészöly.

Mihály Munkácsy (1844-1900) was the country's most famous painter in the nineteenth century and one of the world's most gifted artists of his time. His tremendous success is owed mainly to his prize-winning oil paintings. At the age of twenty-six, in 1870, his painting entitled *Death Row* (1870) exhibited in the Paris Salon won the French Gold Medal. Years later another of his great compositions, *Milton,* was awarded another Gold Medal at the Paris Salon. Munkácsy's subsequent visit to the United States in November and December of 1886 forged numerous ties between him and American intellectuals and philanthropists. Munkácsy was one of the most celebrated painters in America at the time. More than sixty paintings of his were sold in the United States to various private and public collections. Of these paintings, *The Pawn Shop* is housed in the New York Metropolitan Museum of Art, *Milton* in the Lenox Library, New York City, while two of his biblical themes, *Christ before Pilate* (1881) and *Calvary* (1884) were acquired by John Wanamaker of Philadelphia for the highest prices ever paid in history to an artist up to that time. According to John Wanamaker's instructions these two Biblical compositions are exhibited every year during the Lenten and Easter seasons in the Grand Court of the huge Wanamaker department store in Philadelphia. [3]

Munkácsy's art was highly esteemed in contemporary opinion. Let us cite two such views on his famous painting *Calvary*: *The Times* of London (January 24, 1884) wrote: "This picture is certainly one of the most perfect which have been produced for many a year, combining all the majesty of classic schools with the modern and personal stamp that marks it of the nineteenth century. When one gazes on this picture and hears Munkácsy speak, one realizes the feelings which the contemporaries of Rubens, Murillo, or Veronese must have experienced when they con-

3 Cf. Tribute of U.S. Congress to Mihály Munkácsy entitled *"The 125th Anniversary of the Birth of Michael Munkácsy, Hungarian Artist-Painter"* in the Congressional Record. Proceedings and Debates of the 91st Congress, First Session. February 19, 20, March 20, 25, 1969.

versed with those great masters who were destined to be handed down to the admiration of posterity.” Furthermore, the *New York Times* in the March 16, 1885 issue we read the following meditative words: “The *Calvary* of to-day, over which not only the world of art but the world of fashions, of thought and of religion is at present wondering, is indeed a marvelous picture. Taking all things into consideration, it is a strange subject to offer in this century of unbelief, of scepticism and of scoffing. Who has time now to think of the Man of Sorrows? What artist living in Christian England ever dares to offer such scenes to the critical public and who could imagine such a subject coming from a Paris studio, where even the last rags and shreds of religion are cast scornfully to the winds?” Munkácsy was granted nobility by Emperor Francis Joseph I, as King of Hungary and he received the prestigious Legion of Honor twice, France’s highest tribute rarely awarded to a foreigner. Munkácsy received countless other decorations from various countries of Europe.

László Paál (1846-1879), Munkácsy’s close friend, is known as one of the best landscape painters of nineteenth-century Europe. He died at the age of thirty-three leaving posterity a legacy of only about seventy paintings. Paál followed Munkácsy to Paris and settled down at nearby Barbizon to paint landscapes. He was one of the founders of the Barbizon School.

Géza Mészöly’s (1844-1887) style of representation favored minute details and small canvases depicting the landscapes of Western Hungary (the Dunántúl), the Tisza region, the Lake Balaton. and the Lake Velence. Mészöly‘s best known oil painting is the *Fishermen’s Cottage at Lake Balaton* (1877).

Lajos Deák Ébner (1850-1934) studied in Munich and Paris. He excelled in depicting village scenes. After returning from Paris, Deák Ébner worked in Budapest, then in Szolnok where he helped reestablish the local artists’ colony. One of his most famous oil paintings is entitled *Harvesters Homeward Bound.*

Sándor Bihari (1856-1906) also studied in Paris. Returning home, Bihari followed the same course as Deák Ébner. Bihari’s *Before the Justice of Peace* and his *Sunday Afternoon* are his oil paintings most characteristically representative of rural life.

László Mednyánszky (1852-1919), also a great landscape painter, learned the academic style of painting in Munich and Paris. The first stage of his development was characterized by his rare use of human figures in his admirably well-composed sceneries (*Marshy Landscape*, oil painting, etc.). Later he turned to portrait painting and created an impressionistic style of his own.

Pál Szinyei Merse's (1845-1920) oil paintings frequently feature human figures in perfect harmony with the landscape. Szinyei Merse also studied in Munich, though its fashionable trend of historical painting failed to inspire him. On the contrary, he preferred nature's beauties over historical canvases. The psychological explanation for his orientation towards nature was that, his father being a landowner in a beautiful countryside, Szinyei Merse as a young artist spent much of his time outdoors. This is why his masterpiece, *Picnic in May* (oil painting, 1873), reflects the dazzling colors of nature together with the exuberant atmosphere of a sunny May. This masterfully designed setting and the picnicking human figures form a coherent unity. In the opinion of art critics, this bold initiative, as manifested in the vivid coloring and audacious structural forms, is a unique solution which had never before been attempted by any artist in this genre. The same artistic harmony can be enjoyed when viewing his other major composition, *Woman in Purple* (oil painting, 1874), in which the painter's mother, a figure dressed in purple, blends perfectly with the picturesque background of this masterpiece.

Interestingly, the public from the beginning understood and accepted the bold initiative of Szinyei Merse's art, while art critics started viewing the innovation favorably only after the turn of the century, when French impressionism made quite an impact upon them.

Simon Hollósy (1857-1918) was the head of the Nagybánya group of artists. Besides him, his pupils István Réti (1872-1945), János Thorma

(1870-1938), Béla Iványi-Grünwald (1867-1942) and Károly Ferenczy (1862-1917), all eminent painters, belonged to the founding members of the Nagybánya school of art. Hollósy, like most of the members, studied in Munich. Though he never visited France he later became affected with the French artistic style. While in the incipient stage of his career he selected themes from rural life and he settled into portraiture. While at Nagybánya Hollósy occupied himself with producing the first sketch to the Rákóczi March and with book illustrations for a book of poetry by József Kiss (1843-1921). Then he left Nagybánya for Técsö, where he created his fine paintings (*Trees on the Bank of the Tisza River; Técsö*) in the simple and sincere spirit of naturalism. Hollósy trained a generation of eminent painters. In 1886 he opened his famous private art school in Munich, which became a center for young artists from countries all over Europe. In 1896 Hollósy decided to move his school to Nagybánya for the summer months. This was the beginning of the Nagybánya art colony and movement which educated many hundreds of gifted young artists and opened new vistas in the art of Central Europe.

It took time for the Nagybánya movement to change the course of art history because Munich academicism still exerted a heavy influence upon the majority of painters who concomitantly enjoyed government subsidization. Munich academicism also remained an influential factor for a long time because Gyula Benczúr (1844-1920), an extraordinary talent, was himself a student there. After the exhibition in 1875 of his *The Baptism of Vajk* (oil painting, Hungarian National Gallery, Budapest) Benczúr was elected professor of the Academy of Munich. It was understandable, since Benczúr has always been regarded as one of the luminaries of European historical painting. Benczúr held his distinguished position in Munich until 1883 when he accepted the appointment to be the head of the Masters' Department of the School of Model Drawing (Mintarajziskola) in Budapest. Since his early youth Benczúr painted historical themes (*The Farewell of László Hunyadi* , 1866; *The Capture of Ferenc Rákóczi* (Bucharest Gallery, Romania). *The Recapture of Buda Castle* , created for the Millennial (1896) celebrations is esteemed by art critics as a masterpiece of European academic historicism.

Gradually the Nagybánya movement succeeded in overcoming obstacles and the Szinyei Merse method of plein-air painting, the principle of art nouveau. The widely popular European Impressionism triumphed over the rigid, tradition-bound academicism. In 1906 Károly Ferenczy was appointed professor of the Budapest Academy of Fine Arts and very shortly thereafter other members of the Nagybánya group followed him in professorships: István Réti, Oszkár Glatz and after 1920 István Csók, Gyula Rudnay and János Vaszary. This signified the end of the sway of Munich academicism over the training of artists. In line with the pattern of the Nagybánya movement, several other art colonies (in Szolnok, Kecskemét, Szentendre, Hódmezövásárhely, etc.) came into being as important centers of the fine arts.

Of all schools up to the present the members of the Nagybánya group had the greatest impact on Hungarian painting especially János Thorma (1870-1938), Béla Iványi-Grünwald (1867-1942), Károly Ferenczy (1862-1957), Oszkár Glatz (1872-1958), Aurél Bernáth (b. 1895), but above all István Szönyi (1894-1960) who was the most gifted among them. Various foreign and domestic influences can be detected in István Szönyi's work at the beginning of his career. But in time he arrived at an independent style and reverted to a direct observation of nature. *The Bend of the Danube at Zebegény*; *Evening*; *In the Village*; *The Calf is for Sale* are highly successful products of Szönyi's plein-aire color tempera painting.

There are several artists who followed a more or less independent line and cannot be identified with any contemporary art centers, though they had some contact with them—above all with the Nagybánya school. Among them József Rippl-Rónai, János Tornyai, János Vaszary, Gyula Rudnay, but foremost Istvan Csók, merit being dealt with in further detail.

József Rippl-Rónai (1861-1927) studied painting in Vienna, Munich and in Paris where he apprenticed at Mihály Munkácsy's studio. Shortly afterwards Rippl-Rónai became personally acquainted with distinguished French artists, including Maillol and Cezanne and exhibited his works together with that of these French masters at the Paris shows of the "Nabis" group. Rippl-Rónai's paintings are part of the collections in many galleries of Europe. *The Portrait of Aristide Maillol* is in the Musée de Jeu de Paume, Paris. Experimenting with several artistic trends throughout his career, Rippl-Rónai after World War I returned to plein-aire coloring and Impressionist technique (*Self-Portraits; Portrait of Mihály Babits*, etc.). His oeuvre is internationally known.

János Tornyai (1869-1938) worked as Mihály Munkácsy's student in the master's Paris studio. Munkácsy's influence proved to be of a lasting nature, much stronger than Tornyai's experience at the Nagybánya school. Born at Hódmezövásárhely of peasant parents, Tornyai chose the quiet atmosphere of this town of the Alföld to work in. János Tornyai did a series of paintings depicting the monotonous yet picturesque scenes of Hungary's Great Plain and its peasantry (*Sad Hungarian Fate*, oil painting, 1908; *The Draw Well*, oil painting, 1912). In addition to pictures representing peasant life, Tornyai painted historical portraits (*Rákóczi at Rodostó*, 1904; *Miklós Bercsényi*, 1908). His oeuvre has always been judged very positively, mainly for its simplicity in structure and natural coloring.

József Egry (1883-1951), another painter of peasant origin, settled down on the shore of Lake Balaton and painted the scenic lake and its surroundings.

János Vaszary (1867-1937), like Rippl-Rónai, was to a certain extent a representative of French orientation. Vaszary depicted rural life in the spirit of naturalism (*Old People*, oil painting in Museo Maragoni, Udine, Italy). *The Portrait of Primate Kolos Vaszary* (Christian Museum, Esztergom) shows the artist's superb craftsmanship. Almost each and every year János Vaszary made a study tour of a foreign country to become acquainted with new trends in order to enrich his own work and to utilize them in his curriculum as a professor of the Academy of Fine Arts in Budapest.

Gyula Rudnay (1878-1957) was also a professor of the Academy of Fine Arts. Although he studied the older masters (Goya, Rugendas, Simon

Hollósy), the application of the Nagybánya principles and several other art concepts, none of them exerted a lasting influence upon him because from the outset of his career Rudnay cherished the heritage of Munkácsy. Rudnay's portraits (*The Fugitives; Attila's Feast; Man with Violin*) and his landscapes (*Street at Nagybábony; Landscapes*) are brilliantly composed and convincingly prove his high-level of individual taste.

Many art critics are of the opinion that the greatest Hungarian painter of our century and one of the world's best is István Csók (1865-1961), a born painter. Csók attended the Budapest School of Model Drawing (Mintarajziskola) under such masters as János Greguss, Bertalan Székely and Károly Lotz, furthering his education at the Munich Academy in 1886 and 1887, then at the Julian Academy in Paris under Bouguereau and Robert-Fleury in 1888 and 1889. Afterwards he resided in Munich for a number of years, during which period he won several international grand prizes with his oil paintings (*Do this in Commemoration of me*, 1890; *Orphans*, 1891). In 1903 István Csók settled down again in Paris. His work increasingly approached that of the French post-impressionists. But Csók never became a true impressionist, those pictures of his which depict nudes being generally in the studio style (*Thamar*, oil painting, 1918, in the Galleria D'Arte Moderna, Rome). He left Paris for Budapest in 1911, where his *Portrait of Tibor Wlassics* was awarded the Gold Medal. His portraits (*Godfather's Breakfast; Züzü*)—a series about his little daughter and landscapes (The Balaton-series) are bravuras of brush technique. István Csók is one of those very few non-Italian painters whose self-portrait, as an avowal of his excellence, hangs in the famed Uffizi Gallery. Csók was twice awarded Hungary's prestigous Kossuth Prize (1948, 1952) and in 1952 the title of "Outstanding Artist."

Hungarian painters have been part of and influenced by all the major artistic trends of the world. But regardless of their affiliations, most of them broke free to evolve more or less independent or individual styles, a fact doubtless rooted in the national character. Be it the Group of Eight, the School of Rome, or the artists' movement in which social themes dominate over any other, the art of the followers of these trends is nonetheless imbued with the stamp of individualism.

Vilmos Aba-Novák (1894-1941) started his career under the influence of István Szönyi. Later the Nagybánya style and his being the most talented member of the School of Rome some Italian influence, German expressionism and even Cubism, had an effect on his works. But in essence, Aba-Novák followed a strikingly individual course in compositions *(The Maker of Masks,* tempera, 1935) and primarily by his large-scale works in the Votive Church of Szeged and other places. We are indebted to him by the latter for thoroughly modernizing ecclesiastical art.

Individuality of style is very much evident in the case of Jenö Barcsay (b. 1900) who taught artistic anatomy at the Budapest Academy of Fine Arts from 1945 up to his retirement. Graphic art has become the country's most advanced form of fine arts through his works. Barcsay, who has won several national and international awards (Venice, 1964, for instance), is among the world's foremost designers of mosaics (*The Miskolc mosaic*, 1965; *The Szentendre mosaic*, 1970). Barcsay's beautifully illustrated monographs[4] on artistic anatomy, drapery and on forms and space have been translated into several languages and won him world fame.

Marcel Vértes (1895-1961) is known throughout the world as a political cartoonist and designer of posters.

Artúr Halmi (1866-1933) as a painter of portraits became very popular in the United States, while Philip de László (1869-1939) received a title in Great Britain in honor of his celebrated portraiture.

4 *Müvészeti anatómia*. Budapest; *Ember és drapéria*. Budapest, 1958; *Forma és tér*. Budapest, 1964, 1966, 1967.

László Moholy-Nagy (1895-1946), painter and architect, the renowned representative of the Bauhaus movement, founded the "New School" in Chicago.

János Kass' (b. 1927) activity as a graphic artist is significant. As a book illustrator he won the Silver Medal at the 1958 Brussels World Exhibition and at the 1966 Leipzig book art exhibition. Kass was awarded not only the Gold Medal but "The World's Most Beautiful Book" Prize.

With the work of Endre Domanovszky (b. 1907) and others, the course of the country's fine arts took a new turn after 1945. Artists were forced to grab happy worker-peasant themes along the Stalinist line of socialist-realism. Domanovszky's *Furnacemen* (oil painting) and his large-scale murals (the frescoes of Dunaújváros, for example) aptly represent this new direction of art.

Joseph Domján (b. 1907, Budapest), the master of colored wood-cuts, made his home in the United States for many years. His unique style is inspired by Hungarian decorative peasant art. Domján's works can be found in the world's important museums and galleries: the Victoria and Albert Museum, London; the National Museum, Stockholm; the Johansen Gallery, Copenhagen; and the Academics and Artists' Federations of Peking, Shanghai, Hangchow, Canton, Wuhan, Senyang, for instance. Domján was awarded the rare honor of the title, "Master of the Coloured Woodcut", in China, the classical home of this art, where this title had never before been bestowed upon anyone except the native Chi Pai-shi, the greatest authority on wood-engraving in modern times.

One of the greatest figures of twentieth century painting, Victor Vasarely is considered the founder of the op-art movement. Born in Pécs (as Gyözö Vásárhelyi) in 1908, he was trained in the Bauhaus tradition in Budapest under Sándor Bortnyik. He left Hungary for Paris in 1930. Beginning of his Parisian stay he worked for years as a commercial artist doing illustrations and graphics. In his inimitable style Vasarely developed a new process of ornamentation. His pictures are a harmony of geometric forms and interacting colors. In 1963 the Musée des Arts Decoratifs featured a grand exhibition of Victor Vasarely's works. He willed his personal collection to Hungary, where his art is now permanently displayed in the Vasarely Gallery in Budapest.

Gyula Vásárhelyi is the most prolific postage stamp designer of the world, according to the Guinness Book of World Records. He designed stamps for 155 countries, and by 1998 he also designed eight thousand first day covers.

Literature

Hungarians are a nation of writers. As of 1998, there were over 130 registered writers' guilds in Hungary, all receiving financial subsidy from the government. Characteristically, the president of Hungary during the 1990's, Árpád Göncz himself is a writer.

József Katona's (1791-1830) *Bánk bán*, a national tragedy, which in parts rises to Shakespearean heights has inspired Hungarian playwrights. Written at the time when Hungarian intellectuals opposed Habsburg absolutism, he wrote about mediaeval times when Hungary's nobility fought against foreign usurpers.

Playwright Imre Madách (1823-1864) is a distinguished member of this community of writers. His *The Tragedy of Man* (1859-1860) has since been translated into several dozen languages and is considered one of the greatest creations in world literature. *The Tragedy of Man* unfolds in its historical scenes the perennial and universal problems of the individual and of mankind, a really unique literary experiment to this day.

Prior to the first half of the nineteenth century, Hungarian literature did not meet the contemporary European level. Consequently it received little recognition from the, at that time, more cultured West. Only with the appearance of the Hungary's Big Three—Mihály Vörösmarty, Sándor Petöfi and János Arany—did this situation change.

Sándor Petöfi's (1823-1849) literary creations constitute a summit in the world's lyric poetry. In addition Petöfi is rightly held the foremost representative of the national and universal ideals that are such dominant colors in the canvas of Hungary's history. His poem, *National Song*[5], was foremost of the intellectual, emotional sparks that initiated Hungary's liberal revolution in 1848. He died on the battlefield during the revolutionary war.

Mihály Vörösmarty (1800-1855) earned the title of being the greatest Hungarian artist of romantic verse. He was born into a family of impoverished gentry. He supported himself from the meager income he received from his publications. He wrote narrative poetry using the classical Graeco-Latin hexameter like no one else before him. He wrote major epics, dramatic works and initiated the translation of the complete

5 The first stanza, in Adam Makkai's translation:

Rise up, magyar, the country calls!
It's 'now or never' what fate befalls...
Shall we live as slaves or free men?
That's the question—choose your 'Amen'!
  God of Hungarians, we swear unto Thee,
  We swear unto Thee—that slaves we shall no longer be!

works of Shakespeare into Hungarian. His verse, *Appeal*[6], was set into music and became the second national anthem of Hungary.

János Arany (1817-1882) came from a poor family. He supported himself as a tutor and a teacher, while learning several languages, Latin, German, French and English, excelled as the supreme creator of epic poetry. Translator Anton N. Nyerges[7] rightfully says about Arany that "Although he wrote much more, the extent of Arany's greatness will be measured by his epics. His role as a great contributor to this literary form is secure, if not widely familiar in the world."

Vörösmarty, Petöfi and Arany helped refine a language which became as powerful a means of expression as any other great language in world literature. In the same century several prose writers also found themselves in the forefront of the European elite. Among them were novelist and political philosopher József Eötvös (1813-1871) and Mór Jókai (1825-1904) whose scintillating imagination and inexhaustible narrative talent pro-

6 The first stanza, translated by Watson Kirkconnell:

Oh Magyar, keep immovably
Your native country's trust,
For it has borne you and at death
Will consecrate your dust!
No other spot in all the world
Can touch your heart as home -
Let fortune bless or fortune curse,
From hence you shall not roam!

7 *Epics of the Hungarian plain from János Arany*. Translated and introduced by Anton N. Nyerges, (Cleveland. Ohio: Classic Printing Corp., 1976. p. 217.

duced exceptionally popular historical and social novels. Jókai was often compared to Charles Dickens, Sir Walter Scott and Jules Verne. A prolific and highly popular writer, Jókai's novels include *A Hungarian Nabob* (1853-54) and *Black Diamonds* (1870).

Kálmán Mikszáth (1847-1910) combined sparkling humor with a realistic portrayal of human characters in his still very popular novels and short stories. These literary notables paved the way for the next generation of prose writers, including Zsigmond Móricz (1879-1942), one of the greatest Hungarian writers in the 20th century.

Endre Ady (1877-1919) was borne into a gentry family of limited means. He studied law but took no degree. Full of energy and rebelliousness, he carried on the tradition of Petöfi's revolutionary poetry in line with social, historical and artistic requirements of the twentieth century. He became the most significant poet of his generation. He attacked feudalism, the Monarchy and Hungary's agricultural backwardness[8]. Ady has influenced most of the contemporary and later poets and even prose writers with his radical tone.

The new trend introduced by Ady surfaced in the poetry of Gyula Juhász (1883-1937), Attila József (1905-1937) and, in somewhat other forms, in the poems of Lörinc Szabó (1900-1957) and Ferenc Juhász (b. 1928) who are the most gifted poets in this group.

8 The first stanza of *The Magyar Fallow* was translated by Anton N. Nyerges:

I walk on medows run to weed,
On fields of burdock and of mallow.
I know this rank and ancient ground -
This is the Magyar fallow.

Poet Gyula Illyés (b. 1902) was perhaps the most important in the country's modern literature. Illyés won the Kossuth Prize three times, in 1965 he won the International Grand Prize of Poetry and the Herder Prize in 1970. In addition to poetry, he was also outstanding as a dramatist and prose writer.

Sándor Weöres (b. 1913) and Géza Képes (b. 1909), besides being fine poets, were both exceptionally gifted translators and interpreters of foreign poets. Weöres translated into Hungarian a long series of poetry from ancient Indian texts to the works of Thomas Steams Eliot, while Géza Képes was the artistic interpreter of Finnish, Arabic, Persian and other poets in their original forms.

There are two Hungarian poets who were regarded by their foreign critics as being among the greatest artists of religious lyric poetry. János Pilinszky (b. 1921) is one of them. Pilinszky's *Selected poems*[9] was recently translated into English by Ted Hughes and János Csokits. The other one, László Mécs (b. 1895), received the approbation of the world-renowned French poet, Paul Vakry, in the preface to Ladislas Mécs: *Poèmes*[10].

Ádám Makkai (b. 1935) a multilingual Hungarian poet and professor of linguistics at the University of Chicago has published a monumental anthology of Hungarian poetry entitled *In Quest of the Miracle Stag: The Poetry of Hungary*[11]. It contains almost eight centuries of Hungarian poetry from 1230 to the present in English translation. This work is remarkable from the standpoint of the quality of translations. Using the technique initiated by Ladislas Gara in France (editor of the *Anthologie de la poésie hongroise*, 1962), the translators, several for each poem, first were provided

9 Manchester: Carcanet New Press, 1976. 67 p.

10 Paris: Horizons de France, 1944. Pp. XI-XVIII

11 Chicago: Atlantic-Centaur, 1996

a word-for-word translation to English, then a free prose translation and a series of mock stanzas to indicate the rhythm of the poem in the original Hungarian. In addition, the translators were given a tape recording of the poem in Hungarian original. Roughly a hundred editors and translators of Britain and other English speaking countries contributed to this project.

In prose writing several authors captured a readership outside Hungary, like Mór Jókai or Géza Gárdonyi (1863-1922), who won international literary contests. Gárdonyi wrote about peasant life and historical topics[12].

Ferenc Móra (1879-1934) also described peasant life but in a more realistic vein than did Gárdonyi. Móra's historical novel, *The Gold Coffin* (1932), delineates the last days of the Roman Empire focusing on the struggle between Christianity and heathendom. Móra's historical novel is a true masterpiece in which an artistic level of the writer's craft is combined with a scholar's subject knowledge. Móra had an international reputation as an expert archaeologist.

István Fekete (1900-1970) was also an outstanding portrayer of village life. His descriptions of the beauties of nature are unexcelled.

Sándor Márai (b. 1900) gives us an insight into the life of the middle class. Márai infused his novels with intellectualism and his peculiar philosophy of life in such a way it leaves the reader's aesthetic pleasure unimpaired. After World War II, in his last several decades, he lived in the United States and Italy.

Dezsö Szabó (1879-1945) and László Németh (1901-1975) both belonged to the populist writers movement (népi irók mozgalma) and re-

12 *The Stars of Eger*, 1901; *The Invisible Man*, 1902; *The Captives of God*, 1908, etc.

garded the peasantry as the alpha and omega of the nation's existence. Both were extraordinarily talented as fiction writers and essayists. In addition, Németh excelled as a playwright.

Áron Tamási (1897-1966) through both short stories and novels depicted the life of the Seklers of Transylvania in his very unique and essentially romantic style.

József Nyirö (1899 Székelycsombor - 1953 Madrid) wrote romantic novels and short stories about the Sekler mountaineers of Transylvania. His lyric prose was exceptionally beautiful. Some of his books were turned into successful films. He escaped from Hungary in 1944 at the end of the war and died in Spain.

Albert Wass (1908, Transylvania - 1998, Florida), son of an aristocratic family from Transylvania, also selected his themes from the life of the middle class and village folks of Transylvania. His first book of poetry was published in 1927, at the age of nineteen. Later he included more general subject matter in his widely read novels. Wass was one of the founders of the Transylvanian Literary Guild. He has won several prestigious literary awards, among them the Baumgarten Prize. After the war he emigrated to the United States. From the Romanian authorities he received a death warrant *in absentia* that remained in effect until his death. In the United States he continued writing both in Hungarian and in English. He was also active as a publisher.

Lajos Zilahy (1891-1974) in his best-selling novels analyzed social and moral problems of the Hungarian middle class, then turned to depicting the world of the Hungarian and other European aristocracy. Prior to his death Zilahy lived in the United States for decades, writing several books in English (e.g. *The Dukays*).

Unlike our previous fiction writers, Tibor Déry (b. 1894) presented rather urban stories and figures, himself being the son of a well-to-do, big city family.

All of the above discussed prose writers were well known—some of them enjoying overwhelming popularity—in foreign lands.

The greatest literary figure during the inter-war years was Mihály Babits (1883-1941), poet, novelist, essayist, translator and editor of the *Nyugat* (The West) periodical, the most important literary journal in Hungary at the time. He was also director of the Baumgarten Foundation which annually awarded the nation's highest literary prize. Since Babits was a middle-of-the-roader, he was attacked by Left and Right alike.

Dezsö Kosztolányi (1885-1936), likewise multi-talented, was important as a lyric poet, essayist, translator and journalist.

Following Madách's philosophical drama, *The Tragedy of Man*, no play of international note was written for decades to come. Then suddenly, in 1908, a spectacular "Hungarian invasion" of the American theater began. In New York City alone, the adaptation and production of 53 Hungarian plays written by 21 authors could be seen between 1908 and 1940. Twenty-nine Hungarian plays opened on Broadway between 1923 and 1933.

The number of produced plays from each Hungarian author during the period 1908-1940 is as follows: Ferenc Molnár (1878-1952), 16; Ernö Vajda, 5; Menyhért Lengyel, 5; László Fodor, 5; Lajos Biró, 4; Ferenc Herczeg (1863-1954), 3; László Bús-Fekete, Gábor Drégely (1883-1944), Lili Hatvany, László Lakatos, 2 each; Árpád Pásztor, Jenö Heltai (1871-1957), Imre Földes, Lajos N. Egri, Lajos Luria (Pseudonym), Imre Fazekas, Attila Orbók, Ádám Gosztony, Lajos Zilahy, János Vaszary, Dezsö Szomory, 1 each. Altogether these represent fifty-seven plays on American stage written by Hungarian writers.

Ferenc Molnár's plays totaled 2,148 first run performances; one reached 326 performances, four exceeded 200 and five exceeded 100 nights. The thirty-seven other plays totaled 2,900 first run performances; one exceeded 300, one 200 and eight 100 performances. The record run, however, was scored by Gábor Drégely's *A Tailor-Made Man* with 398 performances. [13]

The success of Hungarian playwrights was not limited to America. In the same period (1908-1940) most European capitals similarly adapted and produced plays written by some of the these authors.

On the subject of plays Edna Ferber (1886-1968) should be mentioned. American born of a Hungarian father, her novels were made into popular movies like *Cimarron, Show Boat, Saratoga Trunk and Giant*. Her best-selling novel, *So Big*, brought her a Pulitzer Prize in 1924.

In addition to plays, many other forms of literature have been translated into foreign tongues. Tibor Demeter's excellent multi-volume bibliographical tool entitled "Hungarian *belles lettres* in foreign languages"[14] demonstrates that the Hungarian language in essence is not so isolated, since its products have always been translated into foreign languages, at a very impressive rate. Between the wars, for example, many works of a series of Hungarian authors have appeared in Italian, among them the novels of Mihály Földi, Jenö Heltai, Mór Jókai, Sándor Márai, Kálmán Mikszáth and Ferenc Molnár. [15]

English translations of Hungarian belletristic works published in Great Britain between 1830 and 1968 were listed in Magda Czigány's useful bibliography, *Hungarian literature in English translation published in Great*

13 Emro Joseph Gergely *: Hungarian drama in New York;* American adaptations, 1908-1940. (Philadelphia: University of Pennsylvania Press, 1947. Pp. 3, 10, 141.) .

14 *Magyar szépirodalom idegen nyelven* (Budapest, 1957-)

15 See the Bibliografia" section in Antonio Villetti's *Novelle ungheresi* (Roma: Sandron, 1945) .

Britain, 1830-1968[16].

As an campaign for cultural survival, under Soviet occupation Hungary promoted the export of her cultural goods even more than previously. Between 1962 and 1967 several works of 128 Hungarian writers were translated into 36 languages. In a number of translated items, the German language took precedence, followed by English, Polish and Slovak. Interestingly, the most popular writer, ranked quantitatively according to the number of translations, is Magda Szabó (b. 1917), a highly gifted and prolific prose writer. One of her novels was translated into Bulgarian, Danish, Dutch, Latvian, Italian, Spanish, Swedish, Slovak and Ukrainian languages; 2 of them into Czech, Finnish, Croatian, Lithuanian, Russian, Romanian and Slovenian; 3 into English and Polish; 4 into French, while 8 of Magda Szabó's novels were translated into German. Endre Ady, Tibor Déry, Endre Fejes, Géza Gárdonyi, Mór Jókai, Attila József, Kálmán Mikszáth, Ferenc Móra, Zsigmond Móricz, László Németh, and Sándor Tatay are among those writers whose works have been most frequently translated into foreign languages in the period of 1962-1967.[17] It is encouraging that the number of Hungarian translations into some 40-50 languages has shown a definitive increase.

In the past fifty years Sándor Petöfi has been the most popular among foreign poets read in China. Most of his works have been translated into Chinese and many articles in Chinese newspapers, periodicals and anthologies have reviewed Petöfi's life and poetry. The most recent edition of Petöfi's *Selected poems* (a total of 104 poems) appeared in the People's Republic of China in 1954. This single edition has was reprinted be-

16 London: *Szepsi Csombor Literary Circle*, 1969. 117p.

17 *Idegen nyelven megjelent magyar szépirodalmi müvek listája 1962-1967 között.* Budapest: Magyar Irók Szövetsége, 1968. 60 p.

tween 1954 and 1962 seven times and sold in more than 100,000 copies. [18]

Even from this very brief survey it is undeniable that Hungarian *belles lettres* is now a measurable constituent of world literature.

Important contributions to American intellectual life came with the large waves of immigration. Joseph Pulitzer (1847, Makó, Hungary - 1911, Charleston, SC), the father of modern journalism, was one of many immigrants. Reared in Budapest, he was recruited in Hamburg by a U.S. agent in 1864 to emigrate to be a soldier for the Union Army in the Civil War. After the war, Pulitzer went to St. Louis, Missouri, where he gained control of the *St. Louis Dispatch* (founded 1864) and the *Post* (founded 1875) and merged them as the *Post-Dispatch*. In New York City Pulitzer purchased the *World*, a morning paper and founded its counterpart, the *Evening World*. Both newspapers prospered under his direction. He endowed the Columbia University School of Journalism, which opened in 1912. With a gift of $ 500,000 he established the Pulitzer Prizes awarded annually in May since 1917 for fiction, poetry, biography, history, drama, music (since 1943) and various branches of newspaper work.

Besides the field of journalism, Joseph Pulitzer was influential in the political arena. He was elected to the Missouri state legislature in 1869. In 1871 and 1872, Pulitzer helped organize the Liberal Republican Party in his state. He became one of its secretaries at its Cincinnati convention in 1872 which nominated Horace Greeley (1811-1872) presidential candidate for the Democratic Party. In 1885 Pulitzer was U.S. congressman from New York.

World renowned photojournalist Robert Capa (1913-1954) was born as Endre Ernö Friedmann in Budapest. In 1931 he left Hungary for Berlin. Short on language skills at the time, he chose photography as a career. He

18 See Endre Galla, *Világjáró magyar irodalom; a magyar irodalom Kinában (*Hungarian literature in China. Budapest: Akadémiai Kiadó, 1968. p. 93).

was first noticed in 1932, when he photographed Trotsky in Copenhagen. With the rise of Hitler, he moved to Paris. He became a war photographer in the Spanish Civil War in 1936 where he took his famous *Falling Soldier*. His pictures were carried by many leftist papers and even *Life* magazine, under the assumed name of Robert Capa. He covered the wars in China, World War II in North Africa, D-Day, Liberation of Paris, Israeli War of Independence (1948) and the French Indo-China War. He was killed there on May 25, 1954 when he stepped on a land mine.[19]

Music

Composers

Judging from written sources, Hungarians must always have had a special love for music, song and dance. Such arts played an important role not only in their special events but in their daily lives. According to musicologists, Oriental and Finno-Ugrian traditions are preserved in ancient Hungarian folk music based on the five-tone, pentatonic scale.

Medieval Hungary retained its original heritage, which was later colored by the musical culture of the neighboring peoples and the West. Unfortunately, their secular music prior to 1500 was not preserved in written notes, but there is ample authentication for the existence of liturgical music. Although this liturgical music cannot be identified as an independent Hungarian version of Gregorian style, it was interspersed with elements of popular melody and rhythm.

19 Böhm, Ágnes: *Közelkép a halálról, a Friedman - Capa legendák;* HVG, June 6, 1998, pp. 95-99.

Already in the sixteenth century two composers and instrumentalists appeared on the scene: Sebastian (Sebestyén) Tinódi (1505?-1556) and Bálint Bakfark (1507, Brassó -1576, Padua). Tinodi was a wandering musician—his middle name was Lantos, lute player—who sang the praises of heroic deeds of Hungarian soldiers fighting the Turks, going from manse to chateau along the borderlands. His twenty-three melodies survived as popular church songs. One of them was even published in a contemporary Czech songbook. Bakfark's fantasias are listed among the best of lute compositions of that century. Educated in Buda, Bakfark served as a court musician in France and Poland and was active as a musician in Vienna, Transylvania and Italy.

At the outset of the second half of the eighteenth century the "verbunkos"—a recruiting dance music—appeared. The verbunkos consisted of the elements of Hungarian folk music colored with Slavic and Levantine motifs. Through the compositions of János Bihari (1764-1827), János Lavotta (1764-1820) and Antal Csermák (1774-1822), the verbunkos style achieved great popularity in the nineteenth century both in Hungary and abroad. Even the giants of Western music were inspired by the rhythmic and melodic characteristics of the verbunkos. Haydn, Mozart, Beethoven, Weber, Schubert, Berlioz, Brahms and many others used verbunkos music in their compositions: Mozart, for instance, in his *Violin Concerto in A major*; Beethoven in his *König Stephan* and in some parts of the *Third* and *Seventh Symphonies* and, above all, Brahms' *Hungarian dances*. József Ruzitska's opera *Béla's Flight* (Béla futása), first performed in 1821 was considered a representative Hungarian national opera at that time due to its verbunkos style. Undoubtedly, the verbunkos enriched the country's musical treasury. Even the *csárdás* of today developed slowly but directly from the verbunkos. It reached its peak in the compositions of Márk Rózsavölgyi (1789-1848) who was, incidentally, an outstanding violin virtuoso.

The verbunkos style to varying degrees influenced the work of many composers of the Romantic school, including Ferenc Erkel (1810-1893), Mihály Mosonyi and Ferenc (Franz) Liszt. Erkel's two best operas, the highly successful *Hunyadi László* (1844) and the long-popular *Bánk bán*

(1861), are imbued not only with Italian and French motifs but above all with the music of the verbunkos. Erkel was the first composer to consciously develop a distinctively Hungarian musical style for his eight operas. He was an influential musician: he helped to found the Budapest Philharmonic Society in 1853 and was the director of the Budapest Academy of Music.

Mihály Mosonyi (1815-1870), while at first adhering to German musical traditions, after 1856 joined those composers who embraced Hungarian Romanticism. His operatic work, two symphonies, four masses, etc., were written in the German style, while post-1856 works were built upon Hungarian folk tunes. The verbunkos reached its highest peak in Mosonyi's works. When Mosonyi died in 1870 Liszt composed a funeral march in his memory.

Notwithstanding the popularity of the verbunkos, international appreciation and knowledge of Hungarian music as a whole, sidestepped the art form until the appearance of Ferenc Liszt (1811-1886). Liszt was the father of modern church and piano music, himself one of the greatest pianists of all time. Liszt enthralled his audiences with his expressive, dramatic playing. He originated the symphonic poem (e.g. *Les Preludes*) and thereby changed the sonata form. He influenced Richard Wagner and Richard Strauss. Though Liszt and his contemporaries had not yet become acquainted with the archetypal forms of Hungarian folk music, he composed the famous *Hungarian Tunes* and twenty *Hungarian Rhapsodies* (1840-1886) and several other works based on the verbunkos and popular (but not folk) melodies. This musical style permeated the music of Liszt in his *Hungaria* (1856), *The Legend of St. Elizabeth* (1865), the *Mass of Esztergom* (1855) and especially in the *Coronation Mass* (1867). With Liszt, the leading concert pianist of his age, performing its most representative pieces everywhere on the continent, Hungarian music became popular overnight across Europe. Thus Liszt's appearance on the musical scene represented a landmark in enhancing the foreign image of Hungarian music. Interestingly, Ferenc Liszt has later become the most popular foreign composer in the United States. Bedrich Smetana (1824-1884), father of the Czech na tional school of com po si tion, was an ar dent ad mirer of the mu sic of Liszt. Liszt was an un usu ally pro lific ge nius. His col lected works amount to ap prox i mately 40 vol umes, his writ ings to 6 and his cor re spon dence to over 10 vol umes. It can rightly be said that as a re sult of the ef forts of the three Hun gar ian Ro man tic com pos ers—Erkel, Mosonyi and Liszt—Hun gar ian mu sic emerged from iso la tion and turned into a "uni ver sal art" ap pre ci ated all over the world.

Károly Goldmark (1830 Keszthely, - 1915) fol lowed the con tem po rary Vi en nese mas ters in his op er atic (*The Queen of Sheba*, 1875), cham ber and sym phonic works, although his mu sic bears much of the Hun gar ian char ac ter in mel ody and con cep tion alike. This is all the more un der stand able be cause, as he re lates in his mem oirs, Goldmark's first de ter mi na tive mu sical experience occurred as a child at Keszthely, when he first heard strains of mu sic com ing from the lo cal Cath o lic church. It was then he de cided to make mu sic his life. Goldmark was one of the most pop u lar com posers around the turn of the 20th century. Liszt was instrumental in help ing him gain ac cep tance by the of fi cial Vi en nese cir cles, which for a lengthy period of time opposed the performance of *The Queen of Sheba.* They re lented only af ter Liszt's fa vor able in ter ven tion.

Ow ing to the pop u lar ity of the verbunkos, many Hun gar ian com pos ers even in the twentieth cen tury cul ti vated that mu si cal style to some de gree, as did Jenö Hubay (1858-1937) in his op eras, sym phonies and vi o lin com po si tions, though he was more in flu enced by con tem po rary French and Ger man mas ters.

In ter na tionally ac claimed com pos ers Ernö (Ernst von) Dohnányi, Béla Bart ók and Zoltán Kodály fur ther en riched mu si cal life by their ca pac i ties as educators and musicologists. Composer, pianist and educator Dohnányi (1877, Pozsony-1960, New York) notwithstanding his influ ence by Ger man Ro man ti cism he of ten em ployed Hun gar ian mo tifs in his compositions, such as *Ruralia Hungarica* (1924). Dohnányi became well-known for his *Vari a tions on a Nurs ery Song for pi ano and or ches tra*. Be sides be ing a ge nius of a com poser and a pi ano vir tu oso, Dohnányi also ranked among the best as a con duc tor. His works in clude the bal let, *The*

Veil of Pierrette (1910), *The Tenor* (1929), as well as symphonic, choir, chamber, piano and church music. Dohnányi was appointed director-general of the Academy of Music in Budapest to succeed Jenö Hubay after his death. After the war Dohnányi left Hungary for Argentina. From 1949 he was composer-in-residence at the Florida State University in Tallahassee. At Florida State Dohnányi wholeheartedly devoted himself to music education and in turn was idolized by his students. Dohnányi[20] created several compositions in the United States including his *American Rhapsody for orchestra.*

In the genius of Béla Bartók (1881-1945, New York) and Zoltán Kodály (1882-1967) Hungarian tradition harmoniously merged with a universal language. Bartók composed around 100 works. The *Kossuth Symphony* (1904) was his first major work. His six string quartets (1910-1939) are considered so phenomenal that they are frequently compared with Beethoven's quartets. Bartók's sonatas and violin and piano concertos are also regularly performed selections throughout the world. His stage works, the one-act *Duke Bluebeard's Castle* (1911) and two ballets, *The Wooden Prince* (1916) and *The Miraculous Mandarin* (1919), were first performed in the Budapest State Opera House. They now grace the programs of the world's outstanding musical institutions. As to the influence Bartók exerted upon composers let us quote William W. Austin's words[21]: "More than Schoenberg or Stravinsky, Bartók left a source of possible pervasive influence, unsystematic, open to every direction, rooted in the many-layered past, always fresh, energetic, precise and personal."

Zoltán Kodály (1882-1967) drew much more inspiration from Hungarian folk music than any other composer. His otherwise individual style

20 Cleveland Orchestra's musical director Cristoph von Dohnányi is his grandson.

21 *Music in the 20th Century from Debussy through Stravinsky* (New York: W. W. Norton & Co., 1966. p. 329)

was tinged with contemporary French influences and the religious music of the Italian Renaissance. Among his major works is the *Psalmus Hungaricus*, a monumental piece for tenor, chorus and orchestra completed in 1923. The *Sekler Spinning Room* (Székelyfonó), based entirely on folk tunes, was first presented a year later. Both compositions reaped much acclaim. In 1926, when his comic opera, *Háry János*, was performed, Zoltán Kodály became an international celebrity. The *Háry János Suite* has since been assimilated into the repertoire of most of the world's major symphony orchestras. Kodály's suite consists of six movements, all of which are imbued with the ebullient spirit of Hungarian folk song and dance. It was specifically Kodály's *Dances from Marosszék* (1930) and *Dances from Galánta* (1933), as well as his *Te Deum* (1936); a concerto for orchestra (1941); *Missa Brevis* (1942); an opera *Cinka Panna* (1948) also interwoven with threads of folk music and the *Symphony in C Major* (1961) which clinched his worldwide popularity and success. Like Bartók, Zoltán Kodály was an international authority on both ethno-musicology and the methodology of music education. Kodály made several trips to the United States.

In classical chamber music Leó Weiner (1885-1960) was a leading influence, followed by many composers of the contemporary younger generation. Weiner's works are, by the way, close to the Bartók and Kodály-initiated style.

Most Hungarian composers of the younger generation, before developing their independent styles, imitated Bartók and Kodály, along with the best foreign models. Present-day Hungary has several dozen outstanding composers whose works have already reached foreign audiences in Europe and elsewhere. Among operatic composers Ferenc Farkas (b. 1905), Jenö Kenessey (b. 1906), Pál Kadosa (b. 1903), György Ránki (b. 1907) and Tibor Polgár (b. 1907), to mention only a few, put Hungarian music in the context of European development. Tibor Polgár from the 1950's lived in Toronto and composed, in addition to his operas, chamber, string quartet, symphonic, film and dance music, songs, etc. and was an accomplished conductor, pianist and educator as well.

Composer of operas and other genres, Erzsébet Szönyi (b. 1924) from 1960 has been head of the chair of music education at the Budapest Academy of Music. Szönyi also enriched Canada's music life as guest professor.

Tibor Serly (b. 1900) was brought to the United States as a small child. In 1931 he returned to Budapest and studied composition under Zoltán Kodály. Serly graduated from the Budapest Academy of Music in 1934. He became known to the general public in 1937 when the Philadelphia Orchestra played his *First Symphony.*

Following the footsteps of the older generation, Emil Petrovics (b. 1930) and Sándor Szokolay (b. 1931) achieved world renown by their operatic works, which revived in modern forms the best traditions of their native land.

Sándor Veress (b. 1907) has also achieved success as composer, pianist and educator in Hungary and abroad, including Switzerland and the United States, where for years he was a guest professor at the prestigious Peabody School of Music in Baltimore.

Ede Poldini (1869, Budapest - 1957, Switzerland) like Sándor Veress, he lived for decades in Switzerland. He composed the comic operas *The Vagabond,* the *Princess* (Budapest, 1903) and *The Carnival Marriage* (Budapest, 1924). Poldini's forte consisted of piano works which brought him much popularity abroad, especially in Great Britain and the United States.

Hungarian style has had an impact on universal music since the sixteenth century. Certain pieces of dance music in sixteenth century Europe, for example, were named "Ungaresca" while "All'Ongarese" referred to the verbunkos style at the end of the eighteenth century. It would be interesting to trace the chronological and geographical journey of the most frequently used Hungarian motifs in foreign compositions. For instance, the *Rákóczi March,* which evolved from the motifs of the eighteenth-century *Rákóczi song*, complete with the bugle calls used in Prince Rákóczi's army camps from 1703 to 1711, was revived by violinist János Bihari and military band leader Miklós Scholl. The *Rákóczi March* in its next stage of development, the famous Hector Berlioz version (1846), conquered the world. It is incorporated into the *Fifteenth Rhapsody* of Liszt and its motifs have since been used in several other compositions.

In 1942 a noteworthy attempt was made by Margit Prahács of the Budapest Academy of Music to make a quantitative survey of Hungarian motifs occurring in foreign musical compositions. In her work *Hungarian themes in foreign music*[22], she listed several hundred composers of 15 nations, whose works revealed a Hungarian influence. In her far from complete survey she enumerates 550 German and Austrian composers with 852 works among them who adopted Hungarian themes; 77 French composers with 98 works; 73 Czech with 115 compositions; 60 Englishmen with 81 works; 60 Italians with 74 works; 25 Poles with 30 works; 23 Russians with 35 works; 8 Swedes with 11 works; 7 Norwegians with 9 works; and 2 Spaniards, 2 Finns and 2 Dutchmen numbering 9 compositions each.

Hungarian style has been systematically adopted by foreign composers since Joseph Haydn (1732-1809). No foreign composer has drawn so much and so often, from the wellspring of Hungarian music than did Johannes Brahms (1833-1897). Among the hundreds of composers influenced by Hungarian music are such names as Ludwig van Beethoven (1770-1827), Wolfgang Amadeus Mozart (1756-1791), Karl Maria von Weber (1786-1826), Franz Schubert (1797-1828), Hector Berlioz (1803-1869), Johann Strauss (1825-1899) to mention just a few.

The popularity of Hungarian music has not declined since. On the contrary, it can safely be stated that since the sixteenth century *Ungarescas* ris-

22 *Magyar témák a külföldi zenében*, Budapest: Magyarságtudományi Intézet, 1942. 88 p.

ing numbers of authentic Hungarian folk tunes have appeared in foreign compositions. In a parallel phenomenon, Hungarian composers have enjoyed an upsurge in foreign popularity. In 1966, for example, 31 contemporary Hungarian composers' 91 works were broadcast by 164 radio stations abroad[23].

Operettas

The verbunkos style infiltrated popular and folk music throughout the country. In the second half of the nineteenth century and afterwards a lot of popular plays were written featuring popular songs. Such a popular song was Elemér Szentirmay's (1836-1908) composition entitled *Csak egy kislány van a világon* (There is but one little girl in the whole world), an ever-popular song today, played under varying titles by radiostations throughout the world, including the United States. Another memorable Hungarian song was *Sorrowful Sunday*, written by Rezsö Seres, which precipitated a rush of suicides worldwide in the 1930's.

Operetta music consisted of three different roots—Viennese, Hungarian and international. All of them, in varying degrees, borrowed from the well-known motifs of popular songs.

Major representatives of the Viennese style were Victor Jacobi (1883-1921, New York), Imre (Emerich) Kálmán (1882-1953, Paris) and Ferenc Lehár (1870, Komárom, Hungary-1948, Ischl, Austria). Jacobi achieved fame especially through the performance of his *Szibill* in Central Europe, Great Britain and the United States. Imre Kálmán was one of the greatest masters of this genre. He studied with Bartók, Kodály and Weiner at the Budapest Academy of Music. In his youth Ká1mán had composed prize-winning sonatas, symphonic poems and other forms of serious music. But suddenly, for unknown reasons, he shifted his excep-

23 *Information Hungary*. Oxford: Pergamon Press, 1968. p. 648.

tionally great talent to the composing of light music. Having left Budapest, Kálmán resided in Paris until 1940, then came to the United States, settling in New York City and Hollywood until 1949 when he returned to Europe. Kálmán composed a series of melodious and highly successful operettas, among them the *Tatárjárás* (1908), *Cigányprimás* (1912), *Csárdás Princess* (1915), *Countess Marica* (1924). Kálmán's last work, *Arizona Lady* was performed posthumously in Bern in 1954. His music and that of Lehár, has entertained hundreds of millions on five continents.

Ferenc Lehár (1870-1948) studied at Prague Conservatory and began his career as a conductor of military bands in Losonc, Pola, Trieste, Budapest and Vienna. His interest turned to operettas in 1902 and Lehár wrote more than 30 such stage works, which were performed primarily in Vienna, Budapest, London and New York. His most resounding success, *The Merry Widow*, has had more stage performances than any other operetta in the twentieth century. Among his most famous pieces are *The Count of Luxembourg* (1909), *Gypsy Love* (1910), *Frasquita* (1922). *The Land of Smiles* (1923) has been a standard selection in the repertoires of the world's musical performing centers.

The Hungarian-type operetta is best represented by Jenö Huszka (1875-1960; *Prince Bob*, *Gül Baba*, etc.), Ákos Butykay (1871-1935) and Pongrác Kacsóh (1873-1923) whose *János vitéz* has been a permanent selection on the annual program of the State Opera House in Budapest.

Pá1 Ábraham (1892-1960, Hamburg) cultivated the international style in his operetta compositions. Graduating from the Academy of Music in Budapest in 1928, he assumed conductorship of the Municipal Operetta Theater there. His *The Rose of Hawaii* (1931), *The Ball at the Savoy* (1932) and *Victoria* scored international successes.

Sigmund Romberg (1887, Szeged-1951, New York) upon arriving in the United States, did a stint playing piano in local Hungarian orchestras. From this he soon catapulted to a star-studded career as composer of light music for the stage. Romberg composed over 70 operettas, including such familiar favorites as *The Midnight Girl* (1914), *The Blue Paradise* (1915), *May*

Time (1917), *The Rose of Stamboul* (1922), *The Student Prince* (1924), *My Maryland* (1927) and *Up in the Central Park* (1945).

Conductors

For decades it seemed to be a custom that noted composers also participated in the country's musical life in the capacity of conductors. Ferenc Erkel, for instance, helped found the Budapest Philharmonic Society in 1853 and conducted its concerts until 1870. Ernö Dohnányi was also the conductor of the Budapest Philharmonic between the world wars and was also guest conductor throughout Europe. It can be said that the best conductors have been members of the Budapest Opera House. In several instances, that was their stepping-stone to achieving world fame.

Hungary's first contribution to American musical life was Anton Seidl (1850, Budapest - 1898, New York) led the New York Philharmonic from 1891 until his death. He was a famous interpreter of Wagner's music.

János Ferencsik (b. 1907) started his career at the Budapest Opera in 1927, where he has been conductor since 1930. Ferencsik worked as a musical assistant at the Bayreuth Wagner Festivals in 1930 and 1931. From 1936 he has made tours to Europe, the United States and the Far East and was twice (1938, 1950) a guest conductor of the Vienna State Opera House.

György Lehel (b. 1926) has been the chief conductor of the Symphonic Orchestra of Hungarian Radio and Television since 1964 and made several foreign tours during two and a half decades.

Lajos (Ludovit) Rajter up until the very end of World War II was associated with the Budapest Academy of Music and the Hungarian Radio. After 1945 Rajter was instrumental in reorganizing Slovakia's musical culture and became the chief conductor of Slovenská Filharmónia.

Ferenc Fricsay (1914-1963) received his music education at the Budapest Academy of Music, where Kodály and Bartók were among his teachers. First he conducted at Szeged (1936), then at the Budapest Opera from 1945. Between 1945 and 1949 he made several guest appearances in Vienna, Salzburg, the Netherlands and in South America. In 1947, during the Salzburg Festival, when sudden illness made it impossible for Otto Klemperer to conduct the world premiere of Gottfried von Einem's opera, *Danton's Death*, Fricsay took over at the last moment and saved the performance. This proved to be his golden break and gave Fricsay a scintillating world reputation overnight. For years Fricsay remained in Berlin as principal conductor of the RIAS Symphony Orchestra and until 1958 as general music director of the Berlin City Opera. From 1956 to 1958 Fricsay was general music director of the Bavarian State Opera House in Munich. He made his American debut with the Boston Symphony Orchestra on November 13, 1953. In 1954 he was engaged as conductor of the Houston Symphony Orchestra, but due to serious disagreements on musical policy Fricsay resigned after only a few concerts and returned to Europe. In his last years he conducted the Berlin Radio Symphony Orchestra and was guest conductor and artistic adviser of the new German Opera in Berlin. Fricsay was a great interpreter of the masterworks of Haydn, Mozart, Brahms and especially that of Kodály and Bartók. Fricsay made many recordings and was in great demand at most of the great musical festivals in Europe, due to the precision and brilliance of his conducting.

One can hardly find a single country on the globe without Hungarian conductors and the United States seems to be their favorite gathering place. Let us open our review of the long line of American-Hungarian conductors with Fritz (Frigyes) Reiner (1888, Budapest - 1963, New York). After his diploma from the Budapest Academy of Music he conducted in Budapest, Ljubljana, Dresden, Hamburg, Berlin and Vienna. In the United States Reiner was conductor of the Cincinnati Symphonic Orchestra (1922-1931) and several other orchestras. In 1949 he became conductor of the New York Metropolitan Opera. Reiner's last permanent post was as conductor of the Chicago Symphony Orchestra (1953-1963).

George Széll (1897, Budapest - 1970, Cleveland) conducted at the Metropolitan Opera House from 1942 to 1946. In 1946 he was engaged as permanent conductor of the Cleveland Orchestra.

A child prodigy, Eugene Ormándy (1899, Budapest-1985) entered the Budapest Academy of Music at the age of five and began studying violin with Jenö Hubay receiving an artist's diploma for violin in 1914. He came to the U.S. in 1921 and subsequently held positions as concertmaster then as conductor. In 1936 Ormándy became associate conductor of the Philadelphia Orchestra (with Leopold Stokowski) and from 1938 on as music director until 1980. Noted for his romantic interpretations, Ormándy was a brilliant interpreter of the works of Beethoven, Schumann, Richard Strauss, etc. He conducted all his scores from memory. He recorded innumerable singles and albums.

Antal Doráti (1906-1988) studied with Bartók and Kodály at the Budapest Academy of Music and at the age of 18 conducted at the Budapest Opera House. Then he conducted opera in Dresden (1928), in Münster (1929-1932) and was the conductor of the Ballet Russe de Monte Carlo (1934-1940) with which he toured Australia. He made his American debut with the National Symphony Orchestra in Washington, D.C., in 1937. Following the war Doráti was appointed conductor of the Dallas and Minneapolis Symphony orchestras. In later years, he was the music director of the National Symphony Orchestra and then he was appointed conductor of the Detroit Symphony Orchestra. Doráti has frequently appeared as guest conductor in Europe and the United States. In addition to being a leading conductor, he is known to have composed at least one major work each year.

George Solti (1912, Budapest - 1997) studied at the Budapest Academy of Music with Ernö Dohnányi (piano) and Zoltán Kodály (composition). From 1933 to 1939 he conducted at the Budapest State Opera House, then in Zürich, Munich, as well as in Frankfurt. In 1953 he made his American debut with the San Francisco Opera. For a long period Solti was the musical director of the Chicago Symphony Orchestra.

Violinists

Because violin is the principal orchestral instrument of verbunkos music, this boosted violin playing throughout Hungary. This atmosphere produced first-rank virtuosos very soon, among them Ede (Eduard) Reményi (1828, Miskolc - 1898, San Francisco). From 1852 to 1853 Reményi toured Germany, together with Johannes Brahms. The *Hungarian Dances* by Brahms were composed under the influence of Reményi. In 1853 Reményi visited Liszt in Weimar, who became his friend and promoter. Next year Reményi was appointed solo violinist to Queen Victoria. In 1855 he came to the United States, where he stayed until 1860. Then he obtained amnesty for his participation in the 1848-1849 Hungarian Revolution and returned to his native land. Repeated tours in Germany, France, England, the Netherlands and Belgium spread his fame. In the autumn of 1878 Reményi permanently settled in America. In 1887 he undertook a world tour, during which he received many distinctions as a leading virtuoso of the world. Ede Reményi died in 1898, during a concert he was giving in San Francisco.

József (Joseph) Joachim (1831, Pozsony - 1907, Berlin) began playing violin at the age of five. His extraordinary talent was immediately recognized, soon affording him a series of concert appearances with ever-mounting success in Germany and England. In 1853 Joachim accepted the post of concertmaster and solo violinist to the King of Hanover. In 1868 became the head of a newly founded department of the Royal Academy of Arts in Berlin. He was admired for his technique by the musical world and received many distinctions, among them orders of knighthood from German and other royal dynasties. In 1877 he received the honorary degree of Doctor of Music from the University of Cambridge. His most important composition is the *Hungarian Concerto for violin and orchestra* (Op. 11). In expansion of the vistas of his musical endeavors, in 1869 he founded a string quartet (Joachim Quartet) in Berlin.

Shortly afterwards, the time became ripe for the establishment of a Hungarian school of violin playing. This was done by Jenö Hubay (1858-1937) who studied violin under his father and from the age of thirteen for five consecutive years under Joachim in Berlin. In 1878 Hubay appeared with great success at the Pasdeloup concerts in Paris and made a lifelong friendship with Vieuxtemps. In 1882 he accepted a position to teach violin at the internationally famous Brussels Conservatoire. In 1886 he returned to Budapest and accepted a professorship at the Budapest Academy of Music. He toured most European countries as a soloist and was acknowledged as one of the world's greatest performers. Both in Brussels and Budapest, Hubay formed quartets. As a quartet leader, he was enthusiastically praised by Brahms. Highly successful as educator, his pupils included Joseph Szigeti, Ferenc Vecsey, Ernö Rubinstein, Eddy Brown, Emil Telmányi, Stefi Geyer and Ede Zathureczky.

Franz (Ferenc) von Vecsey (1893, Budapest-1935, Rome) received his first instruction from his father and at the age of 5 became Hubay's pupil. Vecsey made concert tours from his tenth year on, appearing in Berlin (1903), London (1904) and New York (1905) and touring Italy, Scandinavia, Russia, Germany and the Far East. He composed brilliant violin pieces, *Valse triste* among others.

Joseph Szigeti (1892, Budapest-1973) studied with Jenö Hubay at the Academy of Music and started concert tours at the age of 13. Szigeti was an internationally appreciated interpreter of classical and modern works, especially of those of Bartók, Ravel, Stravinskii, Prokofiev. He made two world tours during which he performed with all the great symphonic orchestras of the world. Szigeti's autobiography (*With Strings Attached—Reminiscences and Reflections.* London, 1949) reveals the development of his talent and says much about the vitality of his playing.

Another pupil of Hubay, Emil Telmányi (b. 1892) toured Europe and America in 1911. In 1919 he settled in Copenhagen and from 1940 was on the staff of the Aarhus Conservatory. Telmányi created a special "Bach bow" for use in playing the violin music of Bach.

Ede Zathureczky (1903-1959, Bloomington, IN) toured Europe and the United States. Between 1929 and 1956 he was associated with the Budapest Academy of Music, first as professor then as its general director. Zathureczky was an outstanding performer of romantic and modern (especially Bartók's) works. He escaped Hungary during the Revolution in 1956 and immigrated to the United States. From 1957 he taught at Indiana University.

Sándor Végh (b. 1905), a graduate of the Budapest Academy of Music, won the Hubay and Reményi prizes in Hungary and was one of the winners at a Viennese competition for violinists. As a solo virtuoso, Végh toured Europe and the United States. In 1935, he was one of those who formed the Hungarian String Quartet. The quartet successfully toured most of Europe. In honor of its excellence, several modern composers dedicated their works to it. In 1940 he established his own, the Végh Quartet.

Róbert Virovai (b. 1921), after finishing his studies with Hubay, commenced concert tours. In 1937 Virovai won first prize at the International Contest in Vienna for violinists and cellists. In 1938 he made his American debut with the New York Philharmonic-Symphony Orchestra playing the *Violin Concerto No. 4 in D Minor* by Vieuxtemps.

Johanna Martzy (b. 1924, Temesvár—Timisoara, Romania) at the age of sixteen won the Reményi Prize and at seventeen the Hubay Prize. In 1943 she was soloist with the Budapest Philharmonic Orchestra. In 1947 Martzy captured the First Prize of the Concours International d'Exécution in Geneva. She subsequently toured Europe, then performed in the United States in 1957.

Martha Hidy, also a graduate of the Budapest Academy of Music, started her career in her teens. Her wide repertoire included classical as well as modern compositions. She was a follower of the best traditions of violin playing. For several decades she lived in Toronto.

Dénes Kovács (b. 1930) studied under Ede Zathureczky at the Budapest Academy of Music. From 1951 to 1960 he was the concert master of the Budapest State Opera. In 1955 Kovács won the Flesch Contest in London. From 1957 he has taught violin at the Budapest Academy of Music, where from 1968 he has been director general. He has widely toured Europe and China, as outstanding interpreter of Bach, Mozart, Beethoven and Bartók compositions.

János Starker (1924, Budapest), following the death of Pablo Casals, has been hailed as the greatest living cellist of his time. He first performed as a soloist at the age of ten. Having graduated from the Budapest Academy of Music, he became the first cellist of the Budapest Opera Orchestra. In the United States Starker has held the position of first cellist with the Dallas Symphony Orchestra, the Metropolitan Opera Orchestra, the Chicago Symphony Orchestra and elsewhere. In 1958 he was appointed professor at Indiana University. János Starker has widely toured Europe and the United States as solo recitalist.

Pianists

In addition to being one of the greatest composers of all time, Ferenc Liszt as a piano virtuoso was recognized as the unequaled master of his instrument. In 1875 Liszt undertook not only the presidency of the newly founded Budapest Academy of Music but, simultaneously, heading its piano department. Thus Liszt was in a position to exert influence upon generations of Hungarian musicians, above all pianists.

Among Liszt's first disciples was Géza Zichy (1849-1924). Zichy lost his right arm in an accident in 1863. Despite such a staggering handicap, Zichy industriously pursued left-handed exercises on the pianoforte to become a unique phenomenon: the most distinguished one-handed virtuoso in the history of piano playing.

Ernö (Ernst von) Dohnányi (1877-1960) toured Europe and America and cemented a reputation as one of the best piano virtuosi of his day. His brilliant technique, pure style of interpretation and unparalleled memory were highly appreciated by the musical world.

Concert pianist Andor Földes (b. 1913, Budapest) studied with Dohnányi at the Music Academy in Budapest. He won the International Liszt Prize at a piano contest in Budapest in 1933. Földes gave concerts in Europe and the United States.

Annie Fischer (b. 1916) widely toured Europe and gave several concerts in America. She was a well-known performer of Beethoven and Mozart compositions and has made many recordings.

Gyula Károlyi (b. 1914) made several tours in Europe. The American debut of Károlyi took place at Carnegie Hall in New York City, in the early fifties.

Béla Böszörményi-Nagy was already an established concert pianist in Europe when he arrived in Canada in 1948 for a concert tour. Afterwards, he settled in the United States and has been engaged in teaching piano at the college level.

Géza Anda (1921, Budapest-1976, Switzerland) was Dohnányi's favorite pupil at the Budapest Academy of Music. Simultaneously, he attended the Budapest Teacher's College. Anda was recognized to be so outstandingly gifted that Dohnányi was allowed to arrange for Anda to spend the whole of every Thursday for years at the Music Academy, under his sole instruction, although there was neither legal basis, nor precedent, to absolve a college student from compulsory daily attendance. He received his artist's diploma a few weeks earlier than his teacher's diploma. During this same period, he won the Liszt Prize. Géza Anda appeared with major symphony orchestras throughout Europe and the United States and made innumerable recordings. In 1955 Anda made his American debut with the Philadelphia Orchestra. From the middle of World War II Anda lived in Switzerland. Subsequently, he gave numerous recitals in Europe and America. He excelled as an interpretative musician and virtuoso and was especially successful in the works of Brahms, Liszt, Mozart, Grieg and Bartók.

György Cziffra (b. 1921) was a child prodigy. He studied at the Budapest Academy of Music with Dohnányi and György Ferenczy. He has done concert tours since 1950. Boasting a versatile repertoire, Cziffra was most successful in interpreting romantic compositions, especially those of Liszt. He was one of the most highly esteemed pianists of his time. From 1957 he lived in Paris.

Tamás Vásáry (b. 1933, Debrecen) was encouraged by Dohnányi to continue his studies at the Budapest Academy of Music and shortly thereafter won the Liszt Prize. In 1956 he settled in Switzerland and within a short time he began giving concerts in Belgium, the Netherlands, Great Britain, Italy, Brazil and the United States. He played with the Berlin Philharmonic for the first time in 1959 and rendered his debut performance at London's Royal Festival Hall in 1961. Tamás Vásáry's interpretations and the bravura quality of his piano playing garnered the unanimous accolades of his critics.

Among organists Dezsö Antalffy-Zsiros (1885-1945, Monticello, NY) and Sebestyén Pécsi (b. 1910) were internationally highly esteemed. Antalffy-Zsiros taught from 1910 on at the Academy of Music in Budapest. In 1921 he toured the United States and joined the staff of the Eastman School of Music in Rochester. After this, he was commissioned by Max Reinhardt to be his composer and conductor. From 1935 to 1942 he was the organist and composer of the Radio City Music Hall in New York and member of the New York Philharmonic.

Sebestyén Pécsi also taught at the Budapest Academy of Music and from 1945 has been giving concerts all over Europe.

Singers

In the early 19th century the teaching of singing in Hungary did not reach the level of Italian and German or Austrian methodology for decades. For this reason the majority of outstanding singers learned their art from foreign, especially Italian, masters in the first half of the nineteenth century and afterwards. Coloratura soprano Kornélia Hollósy (1827-1890) studied in Vienna (under M. Salvi) and Milan (under F. Lamperti). She sang op er atic roles in Corfu, Torino, Bu cha rest, Vi enna and War saw. She has per formed the role of Melinda at the 1861 pre miere of *Bánk Bán* at the Hun gar ian Na tional The ater.

So prano Aurelie Révy (1879, Kaposvár-1957, To ronto) stud ied in Bu dapest and Lon don. She sang at Covent Gar den (1898-1900, 1902, 1904). In 1900 she became an operetta singer at the Theater an der Wien. Révy made guest ap pear ances in Berlin, Zu rich and in Rus sia.

Maria Basilides (1886-1946) had a beau ti ful con tralto voice. A grad u ate of the Bu da pest Acad emy of Mu sic, she was a mem ber of the Hun gar ian State Op era House from 1915 un til her death. As an out stand ing in terpreter of Schubert, Mahler, Bach, Glück, Handel, Wagner, Bartók and Kodály, she was regularly invited to Berlin, London, Paris, Vienna, Dresden, Co pen ha gen, Prague and Mu nich and else where be tween 1923 and 1946.

Soprano Anne Rosel le (b. 1894, Budapest as Anna Gyenge) came to Amer ica as a child and com pleted her study of sing ing here. In 1920 she made her de but at the Met ro pol i tan Op era as Musetta in *La Bohème* . She ap peared as guest singer at the Dresden State Op era, the Bu da pest State Op era and sang at Covent Gar den, etc. She made sev eral re cord ings.

Ro sette (Piroska) Anday (mezzo-soprano, b. 1903, Bu da pest) first studied vi o lin with Jenö Hubay, then be gan tak ing sing ing les sons with noted teachers, among them Gino Tessari. Her first professional appearance was at the Bu da pest Op era in 1920. In 1921 she sang *Carmen* at the Vi enna State Opera. She became a member of this Opera, remaining so until 1961. Anday was very suc cess ful at the Salzburg fes ti vals. She ap peared as guest singer at Milan's La Scala, London, Munich, Budapest, Berlin and toured North and South Amer ica and Af rica. Her voice eas ily mastered both op era and con cert rep er toires.

The voice of coloratura soprano Lujza Szabó (1904-1934) was extraordinary. She graduated from the Budapest Academy of Music and in 1927 made her debut at the Hungarian State Opera. As a guest artist she sang the role of the Queen of the Night in *The Magic Flute* under the conductorship of Bruno Walter at the Berlin City Opera in 1931 and scored a magnificent success. The same year she repeated this success in Amsterdam and on the German radio. Unfortunately, Lujza Szabó died during an operation at the age of 30, before reaching the peak of her already splendid career.

Soprano Ester Réthy (b. 1912, Budapest) studied in Budapest and Vienna. Her first performance was at the Hungarian State Opera in 1935. In 1937 she joined the Vienna State Opera, where she sang until 1949. Réthy became an international celebrity at the Salzburg Festivals in the role of Susanna in *Le Nozze di Figaro* and of Sophie in *Der Rosenkavalier* (1937-1939).

Soprano Astrid Várnay (b. 1918) was an outstanding singer of Wagnerian operas. In 1941 she was featured at the Metropolitan Opera. Várnay has been permanent guest artist at the Bayreuth Festivals from 1951 on.

Hungarian men have also scored international successes in the art of singing. János Halmos (1887-1961), the virtually self-taught first tenor of the Hungarian State Opera, was exceptionally successful in guest appearances at Milan's La Scala, Florence and Breslau. Having one of the most beautiful tenor voices of his day, Halmos was remarkable in heroic parts (e.g. *Bánk bán*).

Imre Palló (b. 1891) studied at the Budapest Academy of Music and in 1917 became baritone soloist of the Hungarian State Opera, remaining there until his retirement. Palló made guest appearances on most of Europe's operatic stages singing in *Rigoletto, Háry János, Bánk bán*, etc. He was one of the best interpreters of Bartók and Kodály.

Zsigmond Pilinszky (b. 1891, Budapest) studied at Budapest, Leipzig and Berlin. Between 1913 and 1927 he was a member of the Budapest Opera. Pilinszky became internationally well-known as one of the best Wagnerian tenors when he joined the Berlin City Opera. In 1930 and 1931 Pilinszky sang the title role in *Tannhäuser* at the Bayreuth Festivals. He was eminently successful as guest artist in Vienna, London, Chicago and San Francisco.

Kálmán (Koloman) Pataky (1896-1964, Los Angeles) graduated from the Budapest Music Academy. Between 1921 and 1926, he was a member of the Hungarian State Opera House, after which until 1938 he sang at the Vienna State Opera, always in leading roles. His brilliant career culminated in Vienna, from where he made frequent guest appearances at La Scala, Berlin, Munich, etc. As an outstanding Mozart tenor, Pataky was highly applauded at the Glyndebourne and at the Salzburg Festivals. In 1936 he sang Florestan in *Fidelio* at Salzburg, followed by an engagement at La Scala where he sang in 1939 and 1940, afterwards he moved to South America.

Hungary had two world-renowned bass singers: Mihály Székely and Endre Koréh. Mihály Székely (1901-1963) took private lessons in singing. At 22 Székely became a member of the Budapest State Opera and remained there until his death. His guest appearances, primarily in Mozart and Bartók operas, took him through most countries of Europe and the United States. He took part in the 1937 Salzburg Festival and in the Glyndebourne Festivals each year between 1951 and 1961. Székely was guest soloist of the New York Metropolitan Opera between 1946 and 1950. Perhaps his best fitting role was that of Bluebeard in Bartók's *Duke Bluebeard's Castle* in which he was warmly applauded at the Holland Festivals and throughout Europe.

Endre Koréh (1906, Transylvania - 1960, Vienna) was a leading bass singer of the Budapest State Opera and between 1946 and 1960 he was the first bass of the Vienna State Opera. Koréh was an international star in Mozart, Wagner, Verdi, Puccini and Richard Strauss operas. He sang leading roles in 1948 at the Salzburg Festival and in Florence at the

Maggio Musicale. He made frequent guest appearances throughout Europe, especially at La Scala, in London and in 1953, at the New York Metropolitan.

The best known Hungarian baritone was Sándor (Alexander) Svéd (b. in Budapest in 1906) who learned his art in Budapest, in Italy and in Germany. He became a member of the Budapest State Opera in 1927. Between 1935 and 1939 he starred at the Vienna State Opera and made guest appearances at the Berlin, Munich, Dresden, Milan, Rome, Paris, London and Buenos Aires opera houses. For years, until 1951, he was a celebrated baritone of the New York Metropolitan Opera. Sándor Svéd was exceptionally successful in Verdi, Puccini and Wagnerian operas.

Tenor Gábor Carelli (b. 1915, Budapest), another student of the Budapest Music Academy, started his brilliant career at the New York Metropolitan Opera in 1951, where he remained for several years.

Critics unanimously agreed that Sándor Kónya (b. 1923, Sarkad) was one of the world's best tenors. He studied singing in Budapest, Detmold (Germany) and in Milan. Kónya was a member of several German opera houses, including the Berlin City Opera where he made his debut in 1951. Kónya appeared at the 1956 Edinburgh Festival and at the 1958 Bayreuth Festivals in the title role of *Lohengrin* and subsequently on all the important stages of the world. Kónya has also appeared as guest singer at La Scala, the Paris Opera, the Rome Opera, in Budapest and many of the larger stages in Germany and elsewhere. He also made concert tours in Spain, Portugal and the United States. From 1961 Kónya has been a member of the New York Metropolitan Opera Company.

From about the middle of the 1920's, the level of music education in Hungary has gradually risen, with heavy emphasis being placed on the methodology of singing by Zoltán Kodály, Artúr Harmat (1885-1962), Zoltán Vásárhelyi (b. 1900). More recently, Erzsébet Szönyi laid the foundations of a very high-level choral culture and education. Their principles brought about the Singing Youth Movement and several other similar organizations with mass memberships, as well as in the public schools. In present-day Hungary, music (singing) education starts at the kindergarten level. There are several highly specialized secondary schools devoted exclusively to the art of music and singing, applying the Hungarian methodology developed by Kodály. It is touted by art critics as a model worthy of emulation.

The opening of the Budapest Opera House in 1884 has proven advantageous for ballet music and dance alike. Since the sixties, the ballet ensemble of the Budapest State Opera House and the Ballet Sopianae (of the National Theater of Pécs) have had tour engagements of many countries. The Budapest State Opera House ballet ensemble won the Golden Star Medal at the 1963 Paris International Festival. Its solo dancers have frequently guested on foreign stages in Europe and the United States. At the 1965 Varna (Bulgaria) competition Iván Nagy, one of the medal winners, was invited to join the National Ballet of Washington. After leaving the National, he was briefly associated with the New York City Ballet, before joining the American Ballet Theater, of which he was a star performer. According to Lillie F. Rosen's most recently (undated) published pictorial brochure entitled *Iván Nagy* (dance Horizons Spotlight Series): "In his steady development Nagy has earned plaudists around the world." (p.6).

It is fitting to mention here the work of Gusztáv Oláh (1901, Budapest-1956, Munich). For decades the stage manager and scenic designer of the Budapest State Opera House, Oláh also lent his talents as stage manager and set designer to many European theaters. His production of *Respighi* at the Maggio Musicale in Firenze drew international acclaim. Oláh also participated in the production of the first performances of the Szeged Open-Air Theater, a well-known pioneering enterprise.

Theater and Cinema

by Christina Maria T. Wagner

Prior to the Turkish occupation, Hungary's theatrical culture kept pace with European developments. But with the Battle of Mohács in 1526, the country's theatrical art fell behind that of the West. One exception, must be made, the theater in semi-independent Transylvania, where the influence of the Italian Renaissance and humanism remained alive. During the period of Turkish occupation—for about a century and a half—there were only school productions organized in Hungary.

Professional theatrical performances restarted in the eighteenth century when the Prince Eszterházy family built a theater at their castle at Eszterháza. It was a center of musical and theatrical life for three decades. There, among others, Esterházy protégée composer Franz Joseph Haydn (1732-1809) contributed to cultural enrichment. At least twenty more theaters were built by Hungarian aristocrats across the country in that same century and theatrical touring companies were organized nationwide.

The first really professional company was formed under the directorship of László Kelemen (1760-1814) and staged its first performance ln Buda on October 25, 1790. It is characteristic of the country's early Shakespearean cult, that *Romeo and Juliet* was being played as early as 1793 and somewhat later *Hamlet*.

With the financial aid of the Hungarian aristocrats of Transylvania, the second Hungarian company was set up in Kolozsvár in 1792. But the real progress in theater came with the establishment of the Hungarian Theater of Pest, precursor of the present-day National Theater, in 1837. The National Theater thrived under the management of Ede Szigligeti

(1814-1878), himself a noted playwright and Ede Paulay (1836-1894). Such actresses as Madame Déy (Róza Széppataki, 1793-1872), Mari Jászai (1850-1926) and Emilia Márkus (1862-1949) elevated the art of acting to a Western European level. As a consequence, Hungarian provincial theatrical troupes were provided with permanent homes in Kassa, Kolozsvár, Miskolc, Debrecen, Arad, Székesfehérvár, Szeged and Pécs.

István Vedres (1765-1830) who was the city engineer of Szeged between 1786 and 1921, was a true renaissance man. Known as "Szeged's Széchenyi" and mentioned also for his engineering and environmental accomplishments on page 251, he was also one of Hungary's first playwrights. In his first book (1790) he stressed the national importance of the teaching and use of the Hungarian language toward social and economic progress. As part of the new city hall, he designed the first heated, permanent, brick theater of the country. He personally designed the elaborate main curtain and other theatrical decorations. Vedres wrote a four part play, entitled *The love of the country, or retaking the noble city of Szeged from the Turks*, which was performed by his friend, László Kelemen's troupe in 1803 to great success, according to contemporary reports.

1884 brought the opening of the Budapest State Opera House which has since ranked among the best operatic ensembles on the continent. Around the turn of the century the Gaiety (Comedy) Theater (Vigszinház, 1896), the Magyar Theater (1897) and the first operetta theater, the Király Theater (1903)—the Budapest Operetta Theater was only founded in 1922—were all established in the nation's capital. This network of permanent theaters indicated the rising interest of theatergoers and guaranteed constant artistic improvement. In 1964 there were 16 permanent theaters operating daily in Budapest (among them two operatic companies) and 14 in the countryside, some of them with first-class operatic ensembles.

At the outset of the 20th century the short-lived Thalia Company (1904-1908) under the guidance of László Márkus and Sándor Hevesi (1873-1939) became a milestone in the history of Hungarian theater. László Márkus who in 1935 was appointed director of the Budapest State

Opera and Sándor Hevesi who directed the National Theater for a decade beginning in the early twenties, along with several of their contemporaries, purposefully strove to achieve realism on the stage. As a result, the rigid, declamatory style gradually disappeared from the stage.

Hevesi and subsequent directors of the National Theater, continued to stage Shakespeare dramas in the National Theater and elsewhere. Because of their success, Hevesi was invited by the University of London in 1929 to deliver a series of lectures about the vigorous Shakespeare cult in Hungary. This Shakespearean cult was all the more possible because high-level translations of the playwright's dramas had been prepared by Hungary's best poets: Mihály Vörösmarty (*Julius Caesar; King Lear*), Sándor Petöfi (*Coriolanus*), János Arany (*King John; Midsummer Night's Dream; Hamlet*), et al.

Very soon, entirely new names appeared on the scene. Budapest, along with Vienna and Prague, became a world center of theater. It seems quite impossible to even list all the names of those hundreds who have taken part in establishing Hungary's position in the theatrical world. The greatest artists of the new realistic style of acting were numerous. Among them, Gyula Csortos (1883-1945), a member of the National Theater, excelled in the plays of Shakespeare, O'Neill, Chekhov, lbsen and Hauptmann. Tragicomic roles best fitted his character.

Perhaps the greatest actor of that epoch and in Hungarian history was Artúr Somlay (1883-1951). For the most part a member of the Gaiety Theater (Vigszinház) and after 1945 of the National Theater, he performed leading roles in the dramas of Shakespeare, Schiller, Ibsen, Strindberg, Hauptmann, Gorkij and others. He was phenomenal in classical and modern roles alike. Between 1920 and 1922 Somlay toured Western European countries and worked as a film actor in Berlin. For years he was guest actor of the Kammerspiele in Vienna.

Gizi Bajor (1893-1951) was a member of the National Theater from 1914 up to her death. Her technique was so superb that, according to

Sándor Hevesi, who was mentioned earlier, '"she was capable of solving the unsolvable in stage acting". The repertoire of the National Theater under the directorship of Hevesi was built on the talent of Gizi Bajor. She was so jubilantly received by the audience that any play she had a role in was performed well over one hundred times.

Among the pillars of stage acting mention should be made of Anna Tökés (1898-1966), Klári Tolnay, as well as Éva Szörényi and Zita Szeleczky, both enormously popular members of the National Theater and both of whom performed leading parts in many motion pictures. In 1944, at the end of World War II, Éva Szörényi and Zita Szeleczky escaped from Hungary and eventually settled in the United States.

Kálmán Latabár (1902-1970) acquired international fame first as an acrobatic comedian, who between 1927 and 1933 with his brother Árpád, toured most of the European countries and America. Most of his career as an unsurpassable comedian and dancer was spent on the stage of the Budapest Operetta Theater. He also acted in many films.

Antal Páger (b. 1899) started his career as a comic actor then switched to modern dramatic roles. He became famous in the thirties as a stage and screen actor alike. After the war Pager emigrated to Argentina (1945-1956) then returned to Budapest's Gaiety Theater where he has been captivating audiences. For his extraordinary talent, Antal Páger received the country's highest award, the Kossuth Prize and the title of "outstanding artist." Páger received the prestigious Cannes Film Festival's (1964) award for best actor.

From about the thirties, but especially from the late fifties, there has been a frequent and growing trend in cultural exchange between Hungarian and foreign theaters. The ensembles of the Hungarian State Opera, the National Theater and the Madách Theater have appeared several times before foreign audiences with impressive success. The Budapest Operetta Theater has toured with enthusiastic reception in Austria, Czechoslovakia, Italy and in Russia.

In Hungary today, The College of Dramatic and Cinematic Arts is responsible for the training of young artists, while the Department of Theatrical History of the National Széchényi Library and the Institute of Theatrical Research (the Hungarian center of the International Theater Institute) help develop theatrical culture. The Institute of Theatrical Research is a member of the FIRT (Fédération Internationale pour la Recherche du Théatre). Hungary has also been an active participant in UNESCO's film exchange program. It is quite understandable that Budapest has become a hotbed of European theater where many great artists, directors and producers of foreign stages, including that of Hollywood, started their splendid careers.

Film Making

The history of the country's motion picture art goes back to 1896, the year of the Millennial Exhibition in Budapest, commemorating the founding of the Hungarian state. On this occasion a number of shots were made of King Francis Joseph I as he attended the celebrations, among them a shot of the King as he viewed Munkácsy's famous painting, *Ecce Homo*. It cannot be overemphasized that this was the very first attempt in the world to use films for documentation and to shoot current events (newsreels).

In 1898 a feature film, *The Adventure of Siófok*—a screenplay by Jenö Heltai—was made in Hungary by a French company.

The first original Hungarian film was shot in 1901 under the title, *A Tánc* (The Dance). Gyula Pekár's 500 mm illustrated lecture on the history of dance, featuring Lujza Blaha, Emilia Márkus, Irén Varsányi, Gyula Hegedüs and several other great artists of that time.

Hungary was the first in Europe to produce educational films. The first such film was made in 1913 at the Pedagogic Film Studio in Budapest.

The expertise of Jenö Janovics (1872-1946), director of the Hungarian National Theater in Kolozsvár, proved to be a turning point in the world of film-making. Feature film production in Hungary grew tremendously as a direct result of the successful motion pictures of Janovics. In 1914 he directed the *Bánk bán* starring Mari Jászai (1850-1926) and Mihály Várkonyi (1912-1976, California). Várkonyi in the twenties, under the name of Victor Varconi became a star of Hollywood silent films.

Several producers and directors, like Sándor Korda (Sir Alexander Korda), Mihály Kertész (Michael Curtiz), Márton Garas, cameraman Árpád Virágh and others, also launched their careers under the guidance of Jenö Janovics at the National Theater in Kolozsvár. As a result of the educational and inspirational work of Jenö Janovics, 45 directors produced motion pictures prior to 1918, in over 30 major and 7 smaller studios in Hungary.

Between the wars, partly because of the 1929 worldwide economic crisis, film production did not advance significantly. Naturally, there were several feature films which enjoyed sweeping success like *Hyppolit the Butler* (Hyppolit a Lakáj, 1931) directed by István Székely (known in the United States as Steve Sekely) with comedian Gyula Kabos (1887-1941), who later emigrated to the United States and Gyula Csortos (1883-1945). Like *Hyppolit the Butler,* the twenty-fifth Hungarian sound film, *The Dream Car* (Meseautó, 1934) directed by Béla Gaál, had extraordinary success, with Zita Perczel, Jenö Törzs, Gyula Kabos and Klári Tolnay in the leading roles. The success of *The Dream Car* boosted the import of Hungarian feature films to America. While in 1934, according to *Variety,* an American trade paper, only 4 Hungarian motion pictures were screened in the United States out of 147 European films, three years later 18 Hungarian motion pictures reached American shores, out of 240 imports, thereby raising Hungary to fourth place in America's film import. The 240 imported films included 67 German, 50 British, 23 French, 18 Hungarian, 17 Italian, 15 Soviet, 10 Polish, 10 Swedish products and 1 or 2 films from other countries[24]. The popular actresses of that era were Zita Szeleczky, Klári Tolnay, Éva Szörényi, Piri Vaszary (1901-1965), Lili Muráti and later Katalin Karády. During this time Antal Páger, Pál Jávor, Artúr Somlay, Gyula Csortos, Tivadar Uray (1895-1962) and comedians Gyula Kabos, Gerö Mály, Tivadar Bilicsi (1901-1981) and Kálmán Latabár also rose to tremendous popularity.

Film critics unanimously agreed that the *People on the Mountains* (Emberek a Havason) was the greatest interwar production. Directed by István Szöts, it was awarded the Grand Prize at the 1942 Biennale of Venice. The screenplay was based on the short stories of József Nyirö (1899-1953, *Kopjafák*), the famous Transylvanian writer mentioned before. The leading roles were played by Alice Szellay, János Görbe (1912-1968) and József Bihari (1901-1981)

In 1942, during World War II, the screening of American films was prohibited in Hungary, with French and British pictures being banned much earlier. In the early forties, Bulgaria, Scandinavia and the Balkans bought large numbers of Hungarian films. In 1940 Yugoslavia purchased 150 Hungarian films and Italy bought that year's entire production. Strange among comrades-in-arms, Germany almost completely boycotted Hungarian-made motion pictures during the second world war, as it had during World War I. [25]

In the height of Communism, between 1948 and 1965, Hungarian feature and full-length and short nature, films won more than 130 prestigious international awards at various film festivals—Locarno, Karlovy Vary, Venice, Moscow, San Francisco, Boston, Cannes, Edinburgh, Rome, Paris, Montevideo, Bucharest, Santiago de Chile, Oberhausen, Leipzig, Padua, Mannheim, Melbourne, Bergamo, Adelaide, Vancouver,

25 See István Nemeskürty, Op. cit.

Vienna, and others.[26] From 1968 to 1996 Hungarian cinematographers won a total of 122 international awards.

Critics ranked motion pictures that were directed by Géza Radványi (*Somewhere in Europe*, 1947), Zoltán Fábri (*Merry-Go-Round*, 1955; *Professor Hannibal*, 1956), Felix Máriássy (*Budapest Spring*, 1955), László Ranódy (*Abyss*, 1956; *Skylark*, 1963), Károly Makk (*The House under the Rocks*, 1958) and Miklós Jancsó (*Cantata*, 1962) among the highest artistic achievements. At the 1964 Cannes Film Festival the prize for the best actor went to Antal Páger for his part in *Skylark* (Pacsirta). Director Károly Makk's *The House under the Rocks* was awarded the prize for the best film at San Francisco in 1958. *Love*, another import directed by Makk, starring a cast of three headed by Lili Darvas, was acclaimed by the *New York Times* as one of the ten best films of 1973. The *Times* acclaimed *Love* as a "very precise, moving and fine-grained" film with "three superb performances". Lili Darvas, had three American films among her credits: *The Affairs of Maupassant* (1938), *Meet Me in Las Vegas* (1956) and *Cimarron* (1961). In the category of short films several Hungarian productions have won international awards, among them *Overture* (Nyitány) directed by János Vadász which won the Oscar, as well as the Grand Prix for short films at the Cannes Film Festival in 1965.

Among nature or educational films, István Homoki-Nagy's prizewinning *The Kingdom of the Waters* (Karlovy Vary, 1952, prize for best cinematography), *From Blossom Time to Autumn Frost* (Venice, 1953, 1st prize for popular science films) must be mentioned. Ágoston Kollányi's *Aquarium* won the film technicians prize at Cannes in 1954; and the prize for the best educational film in Karlovy Vary in 1954.

26 For details see the relevant tables showing all data about the prize-winning films between 1948 and 1965 in *Cultural Life in Hungary*, ed. Zoltán Halász. Budapest; Pannonia Press, 1966, pp. 208-214.

Gyula Macskássy was an eminent master of animated films. His cartoon, *Párbaj* (Duel) and other works have influenced a generation of young cartoonists in his years.

While Hungary's film industry received international awards during the Communist years, those who made those films often opposed the system. For example popular film stars László Mensáros and Iván Darvas were imprisoned after the 1956 revolution, Géza Halász, Endre Gellért producers and Imre Sarkady writer committed suicide, Gábor Földes theater director was executed by the Communists, to mention only a few. While many Hungarian producers and directors built successful careers in the West after escaping from Hungary, popular film stars like Violetta Ferrari and Marianne Krencsey chose freedom in the West at the price of sacrificing their careers. Hungary's film industry never really recovered afterwards.

Film Theoreticians

In the domain of film aesthetics or the philosophy of art there are several pioneering works by Hungarian authors. Sir Alexander Korda, about whom we will elaborate under the subheading of "Producers and Directors", was among the historic first to advocate the film theory that the motion picture is, above all, art. Korda edited three motion picture journals in Budapest during the formative period of film aesthetics: *Pesti Mozi* (Movies in Pest, 1912), *Mozi* (Movie; 1913) and *Mozihét* (Movie Weekly; 1915-1918).

Interestingly, a Benedictine monk, later turned educational philosopher at the University of Pécs, Cecil Bognár, published an article in the December 15, 1915 issue of the *Budapesti Hirlap* which argued that the film is not only an art, but a form of communication as well.

Béla Balázs (1884-1949), Bartók's librettist, ranks among the first developers of modern film theory by means of his widely quoted work *Der sichtbare Mensch* (The Visible Man, 1924). In recent literature much credit has been given to Béla Balázs for his theoretical work. A major portion of Dudley J. Andrew's book *The Major Film Theories: an Introduction*[27] is devoted to the analysis of the lifework of Béla Balázs.

Cinematographers

Cinematographers have long been unsung heroes of the motion picture art. Although space and scope of this work do not allow for exhaustive treatment, or even cataloguing of these neglected artists, we can nonetheless pay tribute to a few Hungarians who worked in this field in the United States, in Europe, and at home.

According to noted American film scholar, Leonard Maltin, one reason that cinematography in Hollywood sparkled at its zenith in the 1920's was "the European boom during the 1920's. Many homegrown film-makers were put to shame by such imports . . . of European cinema."[28] Furthermore, he wrote, this "foreign invasion spurred many domestic film-makers (often by 'request' of studio heads) to improve their own product, imbue it with the continental touch that audiences seemed to be enjoying so much. The competitive spirit asserted itself and was in large part responsible for Hollywood's own pictorial golden age."[29]. Thus, in yet another field Hungary contributed overwhelmingly more than its share to making motion picture history.

Ernest László ranks as one of the world's foremost masters of cinematography. His numerous credits include *Hell's Angels* (1930) starring Jean

27 London, New York: Oxford University Press, 1976

28 *Behind the Camera. The Cinematographer's Art* by Leonard Maltin, A Signet Book from New American Library, N.Y., 1971; p. 21.

29 Op. cit., p. 22.

Harlow, *Judgment at Nuremberg* (1961), *Ship of Fools* (1951), *Fantastic Voyage* (1966) and *Airport* (1970).

Andrew László, one of the contemporary generation of Hungarian-born cinematographers in Hollywood, was born January 12, 1926 in Zombor, in what is now Yugoslavia. A few of his achievements include *You are A Big Boy Now* (1966) with a cast featuring Geraldine Page and Julie Harris, *The Night They Raided Minsky's* (1968) starring Jason Robards, *Popi* (1969), *Lovers and Other Strangers* (1970), *The Out-of-Towners* starring Jack Lemmon and the 1970 *The Owl and the Pussycat* .

Highly prolific László Kovács (1933) is still another of the new breed of geniuses upholding the good name of the Hungarian dynasty in Hollywood. A refugee of the 1956 Hungarian revolution, he came to Hollywood where he has garnered rave reviews ever since. While associated with American International Pictures, he photographed several of their motorcycle gang films. They were resoundingly panned by the critics, but their poor quality with respect to acting and shortcomings of dialogue and plot, did not prevent recognition of Kovács' talented contribution. *Variety,* one of America's top three show business trade journals, in a review of one such films photographed by Kovács deplored that "the most depressing thing. . . is that such first-rate color camera-work was thrown away on such trivia . . ." The trades abounded in rave reviews of Kovács' cinematography. *Easy Rider,* the 1969 controversial motorcycle film hit, which catapulted actor Jack Nicholson to superstardom, is yet another case in point. Although the picture drew decidedly mixed reviews, *Variety* dubbed Kovács' work "brilliant". His *Five Easy Pieces* (1970, starring Jack Nicholson) moved the director to dub him "fantastic". Some of László Kovács' later accomplishments include *Paper Moon* (1973), starring Ryan and Tatum O'Neal and *What's Up, Doc?,* the 1972 Barbra Streisand and Ryan O'Neal picture.

Another prolific, contemporary cinematographer was Vilmos Zsigmond (b. 1930). He escaped from Hungary with Kovács in 1956. As in the case of László Kovács, Zsigmond's vehicles have not always attracted favorable reviews nonetheless reviews of his work triumphed unscathed. Among his credits are numbered *McCabe and Mrs. Miller* (1971) starring Julie Christie and Warren Beatty, *The Hired Hand* (1971) with Peter Fonda, *The Long Goodbye* (1973) with Elliott Gould, *Scarecrow* (1973), featuring Al Pacino and Gene Hackman, *The Sugarland Express* (1974) with Goldie Hawn and *The Girl From Petrovka* (1974) starring Hal Holbrook and Goldie Hawn. Vilmos Zsigmond is especially renowned for his spectacular nature photography, an especially notable example being the 1972 *Deliverance* , starring Jon Voight and Burt Reynolds.

Jean (János) Badal (1927) obtained his teaching diploma in 1949, followed by a diploma in the College of Dramatic and Cinematic Arts in 1951. His first film was *Rákóczi's Lieutenant* in 1953. In 1956 he escaped from Hungary and moved to Paris, where he studied at the Sorbonne. As early as 1959 he already won an award at the Cannes Film Festival with *Les Enfants du Courant d'Air.* With Swedish, American, British and French directors he made over one-hundred movies.

Gábor Pogány (b. 1915) first graduated as an architect, then he studied painting. In 1935 he switched to film making. First he moved to London, then to Italy, where he made movies with leading directors like Visconti, De Sica, Rosselini, Papst and Radvanyi. He made over 80 films, including *Romeo and Juliet*, *Europe di Notte*, *Escape to Freedom* and others.

Producers and Directors

Adolph Zukor (1873 - 1976) was orphaned at the age of 7. He ventured to the United States as a 16-year-old, with $ 25 stitched into the lining of his coat. He quickly exchanged his first job of sweeping floors for that of penny arcade entrepreneur in New York City. In short order he founded the Famous Players Film Company in 1913. In 1914 he has introduced the first vertically integrated movie company, that included everything from production to movie houses. Between 1919 and 1923 he built his company to 300 cinemas across the United States. He initiated the studio system of movie production. Zukor made films of successful books such as

The Count of Monte Cristo, *The Prisoner of Zenda* and *Tesse of the D'Ubervilles*. His first production, *The Prisoner of Zenda*, was the first feature-length film made in the United States.

In 1917 Zukor founded Paramount Pictures. He is responsible for introducing cinema immortals Mary Pickford, Douglas Fairbanks, Sr., William S. Hart and Pola Negri to audiences throughout the world. Other stars appearing under the Paramount symbol of the snow-capped mountain were Greta Garbo, Gloria Swanson, Rudolph Valentino and Maurice Chevalier. Zukor's production of *Wings* won the very first Academy Award for best picture in 1928, the year the American Academy of Motion Picture Arts and Sciences was founded. Among the early classics supervised by Zukor were the original *Ten Commandments*, *The Sheik* and *The Covered Wagon*. He was honored in 1949 with a special Oscar for having rendered inestimable services to the motion picture industry over a period of 40 years. Board chairman emeritus of Paramount Pictures, he put in a full days work every day well into his eighties. He died at the age of 103.

William Fox (1879-1952) was born as Vilmos Friedman in Hungary and was brought to America as a child. In 1915 he established Fox Film Corporation. In 1927 he created Movietone News Reel. His film production company which fell apart during the stock market crash in 1929. In 1935 his company merged with 20th Century Pictures to form 20th Century Fox, which grew into a huge film and TV empire we know today. Fox, however, declared bankruptcy in 1936.

Paul Fejös (1897-1963) worked as a medical orderly in the Austro-Hungarian Army during the first world war. During the war he was one of the first soldiers to pilot an airplane. After the war he worked for Mobil Studio in Budapest and created several films: *Pán* (1920) and *The Black Captain* (1921), a movie about police corruption in New York and the *Last Adventure of Arsene Lupin* (1921). In 1923 Fejös came to America and started to work as a scenarist in Hollywood. His first American films were *The Last Moment* (1927), *Lonesome* (1928) and *Captain of the Guard*

(1930). In 1932 he returned to Hungary and made *Marie, a Hungarian Legend* and *The Verdict of Balaton*. In 1933 he moved to Austria and made *The Golden Smile*. Subsequently, he worked in Sweden, Denmark, then he returned to New York and was employed as an ethnologist. His film, *Ethnology of the Yaqua* was released in 1943. Altogether he made some twenty-five movies.

Joe Pasternak was born in 1901 in Szilágysomlyó. His 30-year career as a top echelon producer included such greats as *The Flame of New Orleans* (1941) with Marlene Dietrich; the Deanna Durbin - Charles Laughton picture, *It Started With Eve* (1941); *Duchess of Idaho* (1950) with Esther Williams and Van Johnson; *The Great Caruso* (1951) starring Ann Blyth and Mario Lanza; *The Merry Widow* (1952) with Lana Turner and Fernando Lamas; *The Student Prince* (1954) starring Ann Blyth and Edmund Purdom; and the comedy, *Please Don't Eat the Daisies* (1960) starring David Niven and Doris Day.

Sir Alexander Korda (born in 1893 as Sándor Kellner in Turkeve and Magyarized his name to Korda. His departure from Hungary came after he made a propaganda film during the short but bloody Bolshevik revolution in 1919. He is perhaps known to most of us as a producer, although he directed films over the period 1927-1948. He directed Laurence Olivier and Vivien Leigh in the 1948 production, *That Hamilton Woman*. Among the pictures Korda produced are *The Scarlet Pimpernel* (1935) co-starring Leslie Howard and Merle Oberon; *Knight Without Armor*, a 1937 Marlene Dietrich picture; *The Thief of Bagdad* (1940) with Conrad Veidt; and the 1948 epic, *Anna Karenina* with Vivien Leigh and Ralph Richardson. A great deal of Alexander Korda's films were products of Great Britain. He is credited as the developer of the British film industry. He died in London in 1956.

Born Iván Törzs in Budapest on June 12, 1916, Ivan Tors emigrated to the United States in 1940 where he anglicized his name. He rose from Hollywood screenwriter (the memorable television series, *Sea Hunt*, starring Lloyd Bridges is one of the many feathers in his cap) to world-famed producer of masterful wildlife television shows and motion pictures.

Ninety per cent of all animal scenes in Hollywood were the domain of his animals. A few of his veteran motion picture stars beloved by a cross-section of audience generations are "*Gentle Ben*" the bear, "*Clarence the Cross-Eyed Lion*", "*Namu the Killer Whale*" and "*Flipper*" the dolphin. Other seasoned alumni and apprentice actors in his ensemble include monkeys, elephants, snakes and tarantulas, among other exotic talents. Ivan Tors trained his protegés with his special brand of "Affection training" at "Africa, U.S.A.", a 260-acre preserve he owned outside Los Angeles.

Michael Curtiz' (1898, Budapest - 1962, Hollywood) directorial career in America spanned five decades and embraced close to 100 pictures. In his native Hungary Curtiz (Mihály Kertész) was a director as well as a cinematographer. He was esteemed as a dynamic man with a superb artistic instinct, an ever-bubbling fountain of creative ideas. A partial roster of his films includes *God's Gift to Women*, the 1931 Joan Blondell-Frank Fay picture; *The Adventures of Robin Hood* (1938), *The Case of the Curious Bride* (1935), *Captain Blood* (1935) and *The Sea Hawk* (1940), all starring the then international heart-stopper of the silver screen, Errol Flynn; *Front Page Woman* (1935) starring the incomparable Bette Davis; *Angels With Dirty Faces* (1938) featuring James Cagney and Humphrey Bogart; *Yankee Doodle Dandy* (1942) with Cagney and Joan Leslie; *Casablanca* (1942)—for which he received an Oscar— with a star-studded cast including Bogart, Ingrid Bergman, Peter Lorre and Claude Rains; *Life with Father* (1947) featuring William Powell, Irene Dunn and Elizabeth Taylor; *White Christmas* (1954) with Bing Crosby, Danny Kaye and Rosemary Clooney; *The Proud Rebel* (1958) with Alan Ladd and Olivia de Havilland; and *A Breath of Scandal* (1960) with Sophia Loren and Maurice Chevalier.

Born in Budapest on April 1st, 1918, Jan Kádár was hailed as a brilliant director with an avid following in the United States. After the war he moved to Czechoslovakia where he turned out such works as the 1965 Oscar winner for best foreign film, *The Shop On Main Street* (sometimes referred to under the variant translation, *The Shop on the High Street*, (1964), *Kidnap* (1956), *Death is Called Engelchen* (1958), *The Accused* (1964), *The Angel Levine* (1969), *Adrift* (1971) and *Lies My Father Told Me* (1975).

Andre De Tóth was born in Hungary as Endre Tóth. His film career was launched in Europe in 1931 and his Hollywood affiliation in 1940. Like many other directors, the first rung in his career ladder was that of cinematographer. He was associated with Bavarische Piktura in Germany until 1931, then with Hunnia Films in Hungary until 1939. In 1940 he was assistant to Sir Alexander Korda. Andre De Tóth has directed films in Great Britain, Hungary and the United States. One of his earliest pictures was screened in the United States in 1939 under the title, *Wedding in Toprin*. Made in Hungary, it starred Pál Jávor, "the Magyar screens' matinee idol". De Tóth was ultra-progressive for his time—according to a *New York Times* review (November 6, 1939).

Among De Tóth's U.S. motion picture credits are: *Dark Waters* (1944) with Merle Oberon and Franco Tone, *Dishonored Lady* (1947) starring Heady Lamar, *Ramrod* (1947) with Joel McCrea and Veronica Lake, *Other Love* (1947) co-starring Barbara Stanwyck and Richard Conte, *Pitfall* (1948) with Dick Powell and *Slattery's Hurricane* (1949) with Richard Windmark and Veronica Lake. He directed several Westerns, including the Gary Cooper picture, *Springfield Rifle* and *The Man In The Saddle* with Randolph Scott and Joan Leslie, both 1951 releases. *His House of Wax* (1953) starring Vincent Price is most memorable for being the first 3-D (three dimensional) film ever produced by a major studio.

Some of De Tóth's later efforts include *Day of the Outlaw* (1959), *Morgan the Pirate* (1961) starring Hungarian-born muscleman Steve Reeves and *Play Dirty* (1968). The latter was reviewed in New York's *Village Voice* (March 6, 1969) as being exemplary of De Tóth's "directorial personality which has always revealed an understanding of the instability and outright treachery of human relationships." According to film scholar Leonard Maltin Andre De Tóth's films are the subject of a cult among the young generation of American directors and cinemaphiles.

László Benedek (1905-1987) was the Producer and Director of such notable films as *Death of a Salesman* and *The Wild One* .

Andrew Vajna (b. 1944) was a refugee of the Hungarian Revolution of 1956 who immigrated to the United States. He was the producer of such blockbusters as *The Rambo Series, Evita, Nixon, Total Recall, Die Hard and Angel Heart.*

John Kemény (b. 1924) also escaped from Hungary in 1956 and moved to Canada. Since 1969 he runs a production company. His best known films include *Atlantic City, The Blood of Others, Murderers among Us and The Josephine Baker Story.*

Up to this point Hungarian film producers working in the United States or Canada were discussed. Now successful film producers working in Hungary will be considered.

Imre Gyöngyössy (b. 1930) is a film director as well as writer. Between 1950 and 1956, during the peak of the Communist terror he was imprisoned on groundless charges. In 1961 he worked at the Hunnia Film Studio in Budapest. In 1978 he moved to Germany to be the director of Macropus Film Company. He produced a number of documentaries, among others: *Catholics in Vietnam, Catholics in Soviet Central Asia, Destruction of Villages* and *Refugees from Transylvania*. From 1991 his is the artistic director of the 2000 Company in Budapest. Two of his films, *Job's Revolt and Yerma* were nominated for Oscars.

István Gaál (b. 1933) graduated from the College of Dramatic and Cinematic Arts in 1958. Between 1959 and 1961 he studied at the Centro Sperimentale di Cinematografia in Rome, where, in 1978-79 and in 1980-81 he served as a teacher. In 1985 he offered a master's course in cinematography in Puna, India. As a movie director at Mafilm Film studio in Budapest he produced over 22 films. In 1991 he was awarded the Kossuth Prize.

Zsolt Balogh (b. 1949) studied agriculture and teaching before he en-
tered the Col lege of Dra matic and Cin e matic Arts. He pro duced a num-
ber of films for theater, as well as television. His films received several
international awards in Prague (1988), Paris (1990), Berlin (1991) and
elsewhere.

Ju dith Elek (b. 1937) grad u ated from the Col lege of Dra matic and Cin e-
matic Arts in 1961. Her films re ceived awards a num ber of in ter na tional
film fes ti vals; in Locarno (1968), Oberhausen (1968), Mannheim ((1975),
Locarno ((1979), Salerno, Montpellier, Mon treal and Créteil (all in 1990).

Ferenc Kása (b. 1937) made his first film in 1961. Grad u ated from Bu da-
pest's film acad emy he worked for Mafilm. In 1967 he won the best di rec-
tor's award at the Cannes Film Fes ti val. Af ter the de mise of Com mu nism,
Kása be came a mem ber of Hun gary's par lia ment.

István Tamás Szabó (b. 1938) grad u ated from the Col lege of Dra matic
and Cin e matic Arts in 1961. He worked at the Hun gar ian Mafilm com-
pany as first as sis tant. From 1985 he was a pro fes sor at the college. In 1991
Szabó be came the vice-president of the Eu ro pean Film Acad emy. Szabó
di rected nu mer ous films pro duced in Hun gary, Ger many and Great Brit-
ain. Four times nom i nated for Os cars, he won many awards in film fes ti-
vals through out Eu rope. He won an Oscar in 1981 for his film *Mephisto.*

Ildikó Enyedy (b. 1955) stud ied at the University of Montpellier in 1974
and grad u ated from the Col lege of Dra matic and Cin e matic Arts in 1984.
One of her films, *My 20-th Cen tury*, re ceived the Golden Cam era Award at
the Cannes Film Fes ti val in 1989.

Other no ta ble ac tive film di rec tors of Hun gary in clude Márta Mészáros
(b. 1931), Pál Sándor (1939), Pál Schiffer (p. 1939), János Szász (b. 1958),
who won the best di rec tor's prize at the Bo gota Film Fes ti val in 1992, Béla
Zarir (b. 1955), winner of many European film festival awards; and
István Dárday (b. 1940) who won several international awards for his
avant garde films. Gyula Gazdag (b. 1947) di rected nu mer ous films in

Hungary and heads the film department of the College of Dramatic and Cinematic Arts of Budapest, Ferenc Grunwalsky (b. 1943) and several others.

Producers working outside Hungary in various European countries include Ferenc Rofusz (b. 1946) who specialized in cartoons. He won an Oscar in 1981 with *The Fly*, a cartoon made in Hungary. He moved to Germany in 1984 and to Canada in 1988, where he heads his own studio. Peter Sásdy (b. 1936) escaped to Britain in 1956 and studied at the University of Bristol and worked at the BBC. His specialty is crime films, but he also produced classics for television. His film history on Sir Alexander Korda is notable. Andre Szöts (b. 1937) is another refugee of the 1956 revolution. He settled in Paris, then obtained an MBA at Columbia University. Since 1987 he produced several movies including *Laura, Cyrano, Predator* and others. Péter Medák (b. 1937) is another refugee of 1956. He studied filmmaking after work and made his first film in 1963. His most notable films include *The Ruling Class, Romeo Bleeding, The Changeling, The Men's Club.* Since 1981 he lives in California.

Film Music

There are at least two musicians who have achieved eminent success in this type of composition: Tibor Polgár and Miklós Rózsa (1907-1995). Polgár wrote music for over 200 motion pictures and for more than 500 radio plays.

Miklós Rózsa graduated from secondary school in Budapest (1925) and received degrees in chemical engineering, as well as in music. He studied composition and musicology at the Leipzig Conservatory, from which he received his diploma with honors in 1929. His first appearance before the public took place in Leipzig that same year. From 1932 on Rózsa lived a good portion of his life in Paris. His compositions appeared frequently in the repertoire of continental orchestras. He wrote many sorts of music: ballet, dance music (*Hungaria*, 1935), choral and orchestral works, rhapsody for the cello, chamber and pianoforte music and songs. But

Rózsa is known best throughout the world for his film music. He composed music for countless (over 100) motion pictures, among them such American productions and film classics as *A Double Life*; Kipling's *Jungle Book, The Lost Week-End, Madame Bovary, Quo Vadis, Spellbound, The Thief of Baghdad, El Cid, A Song to Remember, The Seventh Sin, Eye of the Needle, Adam's Rib, Song of Sheherezade, Ben Hur* and many others. In order to propagate his compositions and artistic views The Miklós Rózsa Society was formed in the United States, whose quarterly publication was issued under the title *Pro Musica Sana* in Bloomington, Indiana. He won three Oscars.

Screen writers

Born László Faragó on September 21, 1906 in the tiny town of Csurgó, Ladislas Farago was a multi-talented individual. In addition to giving us the fruits of his talent as a best-selling author and journalist, the motion picture industry is also indebted to him. He is discussed in more detail in the Theater-Cinema chapter of this book.

Subsequent to earning a degree from the Royal Academy of Commerce in Budapest, his positions included special Associated Press correspondent for Ethiopia, foreign editor of the *Sunday Chronicle* in London, editor of *Corps Diplomatique*, senior editor of *U.N. World* and the staffs of Radio Free Europe and of the *New York Times-Wide World Bureau* in Berlin.

Farago's string of best-sellers include *Palestine at the Crossroads* (1937), *Psychological Warfare* (1940), *Axis Grand Strategy* (1942), *Behind Closed Doors* (1950), *War of Wits* (1954), *Strictly from Hungary* (1962) and *It's Your Money* (1964). His *Patton: Ordeal and Triumph* (1964) was made into the 1970 Academy award-winning movie, *Patton*, starring George C. Scott. *The Broken Seal* (1967) was made into the 1970 *Tora Tora Tora* starring an international cast of Martin Balsam, Joseph Cotten, E. G. Marshall, Jason Robards, Yamamura, Takahira Tamura and Tatsuya Mihashi. Movie rights were also purchased to Ladislas Farago's *The Game of the Foxes* (1971).

Joe Eszterhas (b. 1944) was born in Hungary and was brought to America by his parents in 1950. He started as a reporter in Cleveland. His screenplay, *Basic Instinct* was sold for a then record $ 3 million. His most noted screenplays are *FIST, Flashdance, Betrayed, The Music Box, Silver, Nowhere to Run* and *Showgirls.*

Actors

Lya de Putti (appearing under the stage name of Lia Putty in Hungary) was one of the first silent film stars. Born in 1897 in Vecse, Hungary, she died in New York in 1931. She played lead parts in several early Hollywood pictures (*Variety,* 1926; *The Sorrows of Satan,* 1926; *The Prince of Tempters*, 1926; and *Manon Lescaut* , 1926.)

Vilma Bánky was a brunette sweetheart of the silent screen and the early talkies. She co-starred with Ronald Colman in *The Dark Angel* (1925), *The Night of Love* (1927), *The Magic Flame* (1927) and *Two Lovers* (1928). With Rudolph Valentino, she starred in *The Eagle* (1925) and *The Son of the Sheik* (1926). In *The Winning of Barbara Worth,* heading a cast featuring Ronald Colman and Gary Cooper. In *A Lady To Love* (1930) Edward G. Robinson shared billing with her, while in *The Rebel* (1933) she starred with fellow Hungarian, Victor Varconi. Her acting ability was always glowingly critiqued, even when the vehicle wasn't quite up to snuff. A *New York Times* review of the 1929 production *This Is Heaven* and entitled "*Vilma Banky's Voice* " reports that "Samuel Goldwyn's lovely Hungarian star . . . (who) for the first time speaks her lines . . . has a charming accent . . . Whether she is silent or talking, Miss Bánky is always radiant. She really gives a clever performance in this piece of fluff."

Victor Varconi (1891-1976), a protégée of American motion picture mogul, Cecil B. De Mille, masterfully relates his colorful Hollywood career in his posthumously released autobiography entitled *It's not enough to be Hungarian*[30] Performing in Hungary as Mihály Várkonyi, Victor Varconi's Hollywood career encompassed principal or lead roles in some 50 pictures including *The Volga Boatman* (1926), *The King of Kings* (1927), *Roberta* (1935), *Suez* (1938), *Strange Cargo* (1940) and *For Whom the Bell Tolls*, the 1943 adaptation of the Hemingway novel.

The career of lovely, elegant and blonde Ilona Massey (born Ilona Hajmássy) lasted nearly a quarter of a century. Her performances include *Balalaika* (1939) and *Invisible Agent* (1942) with Peter Lorre. She died in 1974.

The superb character actor who appeared in innumerable films in his native Hungary under the professional name, Szöke Szakáll, modified his stage name to S. Z. Sakall in the States where he amassed an equally formidable roster of credits: 39 films between 1940 and 1951 with nary a minor role among them. His performances were consistently praised—as a matter of fact, in discussing the casting of roles in a major picture he appeared in, the *New York Times* exclaimed "who else" but Sakall could have been satisfactorily cast in a particular part.

Paul Lukas was born Pál Lukács (1895, Budapest - 1971, Tangiers, Morocco). In America alone his career spanned 40 years and totaled 77 films—more than the prolific Peter Lorre—not to mention numerous television performances. On Lukas' list of credits we can enumerate *The Shopworn Angels* (1929), *Highway to Heaven* (1929), *Strictly Dishonorable* (1931), *A Passport to Hell* (1932), *Little Women* (1933), *The Three Musketeers* (1935), *Dinner at the Ritz* (1937), *Confessions of a Nazi Spy* (1939), *Strange Cargo* (1940), *They Dare Not Love* (1941), *Watch on the Rhine* (1943) for which he received an Oscar, *Berlin Express* (1948), *20,000 Leagues Under the Sea* (1954) and *Tender Is the Night* (1962).

Eva Bartók was born Márta Szöke in Kecskemét in 1929. She starred in such British films as *Her Crime Was Love*. Over the period from 1952 to 1965 her Hollywood credits included co-starring with Burt Lancaster in *The Crimson Pirate* (1952), with Gina Lollobrigida in *A Tale of Five Women* (1953), with Richard Todd in *The Assassin* (1953) and with Jack Hawkins in *Front Page Story* (1955). She was a smash success in *Ten Thousand Bedrooms*, the 1957 farce with Walter Slezak, Dean Martin and Anna Maria

Alberghetti. She also made two pictures with Curt Jurgens: *The Last Walz* (1958) and *Circus of Love* (1958).

Béla Lugosi was born in Lugos with the name Ferenc Blaskó (1882 - 1956, Hollywood). Today a Bela Lugosi cult flourishes in perhaps every corner of the world. Best known for his characterization of *Count Dracula*, he also played Frankenstein, not to mention the variety of straight dramatic and comedic roles he undertook. Lugosi's film appearances include *The Rejected Woman* (1924), *Murders in the Rue Morgue* (1932), *Chandu the Magician* (1932), *Best Man Wins* (1935), *The Mysterious Mr. Wong* (1935) and *Ninotchka* (1939).

Peter Lorre, born in Hungary as László Loewenstein (1904, Rózsahegy - 1964, Hollywood). He was a character of near legendary magnitude whose devotees included Error Flynn, Humphrey Bogart and still include director-actor John Houston. He was a highly individual character actor, who, already in 1935, was touted by Charlie Chaplin to be "the greatest living actor". In 1922, with a group of Viennese actors, he pioneered the technique of improvisational acting. He made his first films in Germany, attracting international notice with *"M"* (1933). After two films in Britain, he settled mainly in Hollywood where upon his arrival he vowed never to work rather than be type cast as a murderous character. As the cliche goes, "the rest is history ..."

One of the screens' classic criminals, offscreen the little 5' 3" Hungarian enjoyed popularity as a cordial fellow exercising a keen sense of humor. He was a good friend of Béla Lugosi, another delight off screen. Lorre's credits of some 70 films include eight *"Mr. Moto"* films, *Strange Cargo* (1940) with Paul Lukas and *Mr. District Attorney* (1941). He was a mainstay in the star-studded cast of the 1942 *Casablanca and appeared in The Maltese Falcon* (1941), *Invisible Agent* (1942), *Passage to Marseille* (1944), *Arsenic and Old Lace* (1944), *The Chase* (1946), *Casbah* (1948) and *The Buster Keaton Story* (1957). His last picture, *Torn Curtain*, was released in 1966.

Not a filmstar but certainly a very successful entertainer, Harry Houdini (1874-1926) the legendary escape artist and magician, was born in Hungary as Erich Weiss.

Many second-generation Hungarians became legendary actors and actresses on American cinema. Leslie Howard, born in London as László Steiner, (1893 - 1945) starred in the *Scarlet Pimpernel*. Johnny Weismüller, the original *Tarzan* (who was born in Transylvania to Saxon parents) and Mickey Hargitai were both muscle men in the movies. Peter Falk will be long remembered by his TV character *Colombo*. Paul Newman born in Cleveland to a Hungarian mother in 1925 became a legendary actor appearing in *Cool Hand Luke, Hud, The Hustler, The Verdict* and many other films. Ernie Kovács (1919-1962) the legendary comedian received three Emmy Awards in the 1956-57 TV season. His promising career was cut short when he died in an auto accident at the age of 42. Tony Curtis, born in 1925 in New York as Bernard Schwartz, appeared in numerous hits including *The Defiant Ones* (1958) for which he received an Oscar nomination, *Some Like it Hot* (1959) with Marilyn Monroe, *The Boston Strangler* (1968). His daughter, Jamie Lee Curtis is also a noted actress. Debra Winger appeared in *An Officer and a Gentleman.* Another well regarded actress of Hungarian origin is Goldie Hahn. Cartoonist George Pál won four Oscars.

According to the *Associated Press* (AP-NY-10-26-96) people with some claim to Hungarian ancestry have been nominated for Oscars 136 times since 1929, when the first ones were handed out and have taken home 30 of the golden statuettes.

History

Up to the end of the tenth century A.D., the movements of the Magyar tribes from the northern shore of the Black Sea to their present homeland in the Middle Danube Valley, their raids and campaigns all over Europe and their way of life, including their religion and their political and military system, were recorded by Arab, Persian, Greek, French, German, Italian and Slavic writers. Their interest in describing the Magyars stemmed in large part from the latter's military art, for the pagan newcomers posed a potential threat to the just established Christian order in the heart of Europe. Hungarian efforts to record the country's history started after the establishment of Christianity, from the year 1000 AD. Being one of the rather few European nations that possess a continuous history as a kingdom for a thousand years, Hungarian historical records are important source materials not only for the country but for her neighbors as well. Until 1918, all of Croatia and Slovakia and a large part of Romania and Serbia were integral parts of the Hungarian Kingdom. Historians of these neighbor nations could not practice their profession without knowing Hungarian history. In fact, their own history is one and inseparable from Hungary's.

This chapter is separated into two parts: Historiography, the scientific efforts toward collecting Hungary's historical records and their critical analysis and Literary History Writing, the comprehensive dissemination of Hungarian history.

For a chronological overview of Hungary's history Stephen Pálffy's *The Kings of Hungary* is included as an appendix.

Historiography

Early Historical Writing

This earliest phase of the country's history can be quite well reconstructed with the aid of medieval forms of writing such as chronicles, gestas (historias), annales, legends and like. Until the country's conversion to Christianity which started in the closing decades of the tenth century and climaxed during the reign of Stephen I the Saint (1000 - 1038), no native sources and writers had related national or even local events. Though the Magyars were keenly interested in their origins and heroic deeds and they even possessed an alphabet of their own[1], none of their records, if ever any existed at that time, survived.

Native history writings began in the first half of the eleventh century—approximately between 1019 and 1060—with very brief annalistic notes on epochal affairs and dates especially concerned with the Benedictine Order in Hungary. These notes prepared by an unidentified monk were preserved in the *Annales Posonienses* written around 1195 and reflect contemporary Western patterns.

The legends of Hungarian saints (*Legenda Minor S. Gerardi; Legenda Maior S. Gerardi; Legenda Minor S. Stephani Regis; Legenda Maior S. Stephani Regis*; Hartvic's *Life of St. Stephen; Legenda S. Emerici Ducis; Legenda S. Ladislai,* etc.) bore some relationship to contemporary narrative writings, chronicles, and in the light of textual criticism they occasionally complemented each other.

Because Christianity was disseminated in Hungary by foreign priests, there were many foreign scholars active in that country and some Hungarians attended foreign schools. But Western cultural influence came to

1 The so called *Sekler (székely) Runic* writing, see Pronunciation section.

fruition only around the turn of the twelfth and thirteenth centuries. The first narrative work at the Western level was written around 1091-1092 by an unnamed native writer. His *Gesta Ungarorum* is rightly regarded as the principal source for all later works during the Age of the Árpáds and even afterwards for the duration of the Middle Ages. Anonymous' *Gesta Hungarorum* is one of its continuations. The fact that his *Gesta Hungarorum* has come down in a single manuscript whose first leaf is missing is responsible for the uncertainty surrounding the date and identity of the author. Anonymous' *Gesta* was first published in 1746 and since then a continuing debate has mobilized a series of Hungarian and foreign historians to solve the many relevant questions. Anonymous was schooled at the University of Paris and was employed at the time of writing as a *notarius*, presumably in the court of Béla III (1173-1196). He made use of primary sources and to a certain degree even employed some form of source criticism when condemning "the false tales of peasants and the naive songs of joculators."

Simon Kézai's *Gesta Hungarorum* consists of a history of the Magyars from earliest times to the historian's day. His *Gesta* is dedicated to Ladislas IV (1272-1290) whose "faithful clerk" he styles himself. Two of the greatest narrative chronicles of the Middle Ages, the *Chronicon Budense* and the *Chronicon Pictum Vindobonense*, used Kézai's *Gesta* as their main source. The *Chronicon Budense* gives the country's history up to the middle of the fifteenth century. Printed by András Hess at Buda in 1473, the text is the first book printed in Hungary.

Among the successors of Kézai's *Gesta* under the name of Chronicle is the *Chronicon Pictum Vindobonense* written in 1358 by Márk Kálti, a canon of Székesfehérvár. This magnificently illuminated codex, which property gave the text its name, was made between 1374 and 1376. Following Kézai's pattern, Márk Kálti also divided the country's history into two parts: the history of the Huns and of Magyars, that is, *prima et secunda cronica Hungarorum.*

The last chronicler of medieval Hungary was János Thúróczy. His work also relied heavily upon the works of predecessors, including Kézai's *Gesta*. In the chapter following the death of Louis the Great of Anjou (1342-1382) the *Chronicle* is quite independent and is a very reliable, substantial source material with respect to the Age of the Hunyadis. The Thúróczy manuscript was printed twice in 1488, in Brünn and in Augsburg.

Renaissance

Antonio Bonfini's (1434 ?-1503) *Rerum Ungaricarum decades...* was first printed in Basel, in 1543 by Marton Brenner, its first complete edition having been prepared by Zsámboki (Sambucus), also in Basel, in 1568. In conformity with the new trend, Bonfini tried to prove in minute details King Matthias Hunyadi's Roman descent as well as Latinizing the country's personal and place names. Bonfini also searched for and found entirely new, heretofore never used source material thereby eliminating the naive, obsolete medieval practice of chronicles. Bonfini was the first historian who fully laicized the country's past to do service to his ruler, King Matthias I (Hunyadi) upon whose commission he undertook this task.

Another Italian humanist who affected Hungarian historical science was Petrus Ransanus (1420?-1492). As the envoy of Naples, Ransanus stayed in Hungary during 1488. Using a chronicle text, Ransanus rewrote, also in a humanistic style, Hungary's history up to 1485 and titled it *Epitome rerum Ungaricarum* (Pécs, 1558). This work comprised a part of his world history. These Italian-born humanists were instrumental in launching a systematic data gathering during the second half of the reign of King Matthias Hunyadi.

The central character of Miklós Oláh's (1493-1568)[2], main work, *Hungaria et Atila* (Vindobonae, 1763;[3], was also Matthias I, the Renaissance king.

The last and most significant representatives of humanistic historiography were Miklós Istvánffy (1538-1615) and István Szamosközy (1570-1612). No vestiges of either medieval ideology or methods existed in their works. Miklós Istvánffy sided with the Habsburg dynasty in the interpretation of events. He related especially those events which occurred between 1490 and 1606 giving a more detailed account of the post-1547 national affairs[4]. A prominent public figure, Miklós Istvánffy was Vice Palatine and secretary to Miklós Oláh in addition to being a relatively well trained, part-time historian.

István Szamosközy was the first professional historian who from his youth prepared seriously for his chosen profession and could not be diverted from his youthful aspiration. Szamosközy studied at Padova, Italy, where he wrote his first work, on Transylvania's Roman inscriptions [5]. This work merited for him the distinction of being the first archaeologist in Hungary. Returning home, Szamosközy was hired as the archivist of Gyulafejérvár (now Alba Iulia, Romania) and appointed as the court historian of István Bocskay, Prince of Transylvania. Szamosközy also researched the origins of the Magyars. He systematically buttressed his work with archival sources on the country's sixteenth-century history, applying a well-developed methodology truly advanced for his age.

Unfortunately, Szamosközy, presumably due to the adversity of wartime conditions, could not create a school of disciples. His research and objective critical work remained quite an isolated phenomenon. His

2 József Szemes, *Oláh Miklós* (Esztergom, 1936) and Pál Schleicher, *Oláh Miklós és Erasmus*. (Budapest, 1941).

3 Its newest critical edition appeared in 1938 under the editorship of László Juhász and Kálmán Eperjessy in L. Juhász, ed., *Bibliotheca scriptorum medii recentisque aevorum, XVI*

4 *Historiarum de rebus Ungaricis libri XXXIV* (Cologne, 1622)

5 *Analecta lapidum vetustorum et nonnularum in Dacia antiquitatum* appeared in 1593

valuable source collection was scattered throughout his homeland, but not before it was utilized by Farkas Bethlen in the seventeenth century.

Farkas Bethlen (1639-1679) was the chancellor of Transylvania and a historiographer who wrote Transylvania's history between the crucial years of 1525 and 1609. In his *Historia de rebus Transylvanicis* Szamosközy's lost manuscript was utilized.

János Bethlen (1613-1678) followed in his father's footsteps, becoming chancellor of Transylvania as well as a historian. His works can likewise be regarded as important sources[6].

The Principality of Transylvania enjoyed independence and relative peace while Hungary, the motherland, had been divided into parts and kept under constant military pressure by the Ottoman Empire. Transylvanian writers during the Age of Turkish Yoke, which lasted up to the end of the seventeenth century, excelled also in writing autobiographies, memoirs, diaries. Their correspondence can also be regarded as preeminent contributions to this early stage of historical scholarship. With the exception of a few, this age conspicuously lacked scholars whose aim would have been to conduct a systematic and organized research. Menyhért Inchofer, a Hungarian Jesuit living in Rome, was one of the few exceptions. Inchofer planned to compile the country's church history based on unpublished sources, but he completed only the first volume which related events up to the middle of the eleventh century. For this he relied heavily upon the collections of the Vatican archives[7].

6 *Rerum Transylvanicarum libri IV* (Nagyszeben, 1663) *and Historia rerum Transylvanicarum ab anno 1662-73* (issued by Elek Horányi in Vienna, 1782)

7 *Annales ecclesiastici regni Hungariae* (Tomus I, Roma, 1644)

Scientific Historiography

Gábor Hevenesi (1656-1715), the Rector of Pazmaneum in Vienna, Austria, was the first scholar to engage in full-fledged systematic and well-organized historical research. In his book[8] Hevenesi made use of the data and material relating to Hungary's past. It was through his handwritten guide[9] that Hevenesi carved his niche as the initiator and pioneer organizer of systematic historical research in Hungary. *Modus materiae* ... surveyed and condemned the backwardness in church history research and the destruction of archives by war. He exhorted scholars to participate in a systematic data-gathering service. The new enterprise was intended by him to be a synthesis of church as well as national affairs as reflected in unpublished sources. Hevenesi's plan was adopted by Count Leopold Kollonics, Archbishop of Esztergom. The Archbishop ordered the heretofore unaccessible official and church archives to be opened to researchers. Hevenesi's handwritten collection remained a treasury for historical research for two centuries. He succeeded in founding a school whose most important scholars were Samuel Timon (d. 1736), István Kaprinai (1714-1786), György Pray (1723-1801) and István Katona (1732-1811).

Kaprinai significantly enlarged Hevenesi's 140-volume handwritten collection of sources to 323 volumes and planned to publish at least a part of it accompanying it with critical notes.[10] In addition, Kaprinai was the first scholar who was interested in and laid down the foundation of a Hungarian numismatics.

8 *Ungariae sanctitatis indicia* (Nagyszombat, 1692)

9 *Modus materiae conquirendae pro Annalibus Ecclesiasticis regni Hungariae continuandis a P. Gabriele Hevenesi compositus et typis datus* .

10 Both the Hevenesi and Kaprinai collections are housed in the Budapest University Library (Egyetemi Könyvtár).

Sámuel Timon compiled a detailed index to Hevenesi's collection, continued his source-gathering activity and between 1714 and 1719 completed a work on the history of Hungary. Its second edition appeared in 1736[11]. Timon's lifework was of epochal significance since he redirected his disciples' attention from the domination of church affairs to the primacy of political history.

Mátyás Bél (1684-1749), studied in the Reformed academy in Pápa, then he studied theology, medicine and zoology at the University of Halle. During the Rákóczi revolution he was the rector of the highschool in Besztercebánya, where Austrian General Heister almost had him executed as a rebel sympathizer. Bél was one of the foremost scientists of his age. Incidentally, he was the first scientist who studied the Sekler Runic writing, that was mentioned in the beginning of this book.

Bél saw a relationship between history, public law and geography and wanted to write a work which would have included the universal knowledge (history, politics, physical geography, ethnography, linguistics, economics, medicine, etc.) of his country. In his main work[12], he became a world-renowned representative of the German polymath school. Bél also began recording Hungary's narrative sources in his book[13], which was the first important, well-arranged source publication in Hungary. Bél also prepared the Preface to the Austrian Johann Georg Schwandtner's substantial source collection. This is[14] the most vehemently debated source publication in the country's historiography.

11 *Epitome chronologica rerum Hungaricarum*.

12 *Notitia Hungariae novae historico-geographica* (Vienna, 1735-1742)

13 *Adparatus ad historiam Hungariae* (I. decas: Posonii, 1735, II. decas: 1745, 1746)

14 *Scriptores rerum Hungaricarum veteres ac genuini* (Tomi I-III, Vienna, 1746-1748) which included the first edition of Anonymus' *Gesta Hungarorum*

György Pray (1723-1801) already during his university years studied Hevenesi's source collection and became influenced especially by the works of Samuel Timon and Mátyás Bél. His great work[15] was based on well-selected primary sources whose authenticity was critically analyzed in the most important synthesis of Hungary's history written during the eighteenth century. Pray succeeded in grouping historians around himself and his school of critical historiography, which was substantially superior to the one-sidedness of the old church-affiliated historiographical trends. His correspondence was so prolific that it substituted at that time for periodical literature. The influence of Pray's school of historical criticism lasted about half a century.

The largest critical synthesis of this period was written by István Katona which was also an excellent source collection to be used for generations to come and is valuable even to the present[16].

Apart from the source-gathering activity of Márton György Kovachich (1744-1821), he proposed to organize a historical society with its own library and archives. After such preparations at the outset of the nineteenth century, several multi-volume national histories were written. Among these the most significant being Ignác Aurél Fessler's ten-volume synthesis.

It is worth mentioning that between 1711 and 1800, when scientific, critical historiography was founded, 509 volumes of historical works were published *in toto* in Hungary, an overwhelming 78 per cent of which (397 volumes) were the products of Hungarian printing houses.[17]

15 *Annales regum Hungariae ab A. 997 ad A. 1564.(* I-V, Vienna, 1763-1770)

16 *Historia critica regum Hungariae* (Vols. 1-42, Pest, 1779-1817)

17 Cf. Bálint Hóman, *Adalék a magyar nyomdászat XVIII. századi történetéhez,"* in his *Történetirás és forráskritika* . (Budapest: Magyar Történelmi Társulat, 1938), p. 381.

At the turn of the eighteenth and nineteenth centuries it became quite evident that Hungary had already entered the transition period from semi-feudalism to capitalism. Its intellectual life seemed to be interwoven more and more with the threads of the philosophy of the Enlightenment and the ideas that brought about the French and American revolutions. These foreign influences helped shape the concept of the nation as a historical entity and put it in the focus of scholarly as well as public attention. The first such works which reflected this new, bourgeois attitude were written by Ignác Aurél Fessler[18], who used the volumes of I. Katona's *Historia critica*; Johann Christian Engel[19]; and Benedek Virág (*Magyar Századok* (Hungarian Centuries) which was published in parts from 1808).

Age of Reform

Between 1825 and 1948, the central issue was the struggle for self-fulfillment of all ethnic entities across the Habsburg Empire and especially in Hungary. All nations and ethnic minorities happened to be more or less involved in these self-realization movements. And all wanted to materialize their political aims primarily through the promotion of their native languages and literatures. Naturally, emotional prejudices against each other came to the fore in public life. Even well-trained professional historians like István Horvát (1784-1846) and his friend György Fejér (1766-1851), director of the University Library in Pest, served illusory goals fostered by a national romanticism. It would have been urgent to rewrite the country's history in an objective and up-to-date manner. But scholarly research and publication had been at a standstill for decades . Far from doing so, István Horvát threw himself into solving the origins of the Magyars by inventing fantastic hypotheses in order to satisfy pub-

18 *Die Geschichte der Ungarn und ihrer Landsassen.* Leipzig. Vols. I-X, 1815-1825.

19 *Geschichte des ungarischen Reichs and seiner Nebenländer*, Halle. Vols. I-IV, 1797-1804.

lic demand. He fostered a self-centered and rapidly elevating fever of nationalism.

István Horvát's book[20] expressed the national pride of the masses. Shortly thereafter the historian himself became a symbol of national romanticism and consciousness for generations. Despite his errors, Horvát exerted valuable influence upon a series of his disciples, including such names as László Szalay, Ferenc Toldy and even József Eötvös. Horvát also affected Pál Vasvári whose essays on the philosophy of history revealed a prominent, historically-minded thinker.[21]

György Fejér collected and published with notes an enormous quantity of medieval sources[22]. Because of his uncritical approach to documents, Fejér's collection should be treated very cautiously.

Following the examples of the eighteenth-century pioneers, József Kemény began collecting sources relating to the history of Transylvania and Hungary, a small part of which was published between 1835 and 1845. Similarly, Antal Gévay collected and published important sources on the Turkish occupation. László István Endlicher issued the laws, statutory provisions and other sources pertinent to the early Middle Ages[23].

Before closing this chapter of the evolution of Hungary's historical thought, a brief reference should be made to József Teleki's accomplishment. His monumental portrait of the age of the Hunyadis seems to be

20 *Rajzolatok a magyar nemzet legrégibb történeteiböl,* Sketches from the oldest stories of the Hungarian nation, 1825

21 Emma Léderer, *A magyar polgári történetirás rövid története*. (Budapest: Kossuth Könyvkiadó, 1969), p. 26. See also B. Hóman's work already referred to.

22 *Codex diplomaticus Hungariae ecclesiasticus ac civilis* (Buda. Vols. I-XLIII, 1829-1844)

23 *Rerum Hungaricarum Monumenta Arpadiana* (Sankt Gallen, 1849)

the most scholarly work of the period. President of the Hungarian Academy of Sciences that was founded in 1825, József Teleki (1790-1855) wrote a multi-volume book[24] on the age of the Hunyadis in Hungary has proven to be of extraordinary value even for the researchers of today by virtue of its having been written on the basis of well-selected unpublished documents and in an amazingly objective manner. This monumental contribution was the first detailed portrait of an entire period in the country's historical literature.

Organized Science

The Revolution of 1848-1849 ended in complete defeat for Hungary. Hungarians became preoccupied with regaining their independence, until the Austro-Hungarian Compromise of 1867. Owing to the lessons drawn from this political struggle for independence, it dawned on the intelligentsia that the Academy's activity was one-sidedly philological. Now they saw clearly that the social and historical sciences had been neglected for decades.

Though the Academy of Sciences had its own historical division since its founding, it failed to mobilize individuals and existing organizations for systematic work. In 1854, the Academy finally organized its first permanent section, the Committee on Historical Sciences. The Committee launched the *Magyar Történelmi Tár* (Hungarian Historical Collection, later *Történelmi Tár*) which periodical served successfully for decades the cause of source-publishing and interpretation. The Committee also issued the well-edited volumes of *Monumenta Hungariae Historica,* by now the largest source publishing enterprise, following the pattern of *Monumenta Germaniae Historica*.

24 Hunyadiak kora Magyarországon.

Between 1855 and 1877 the periodical *Magyar Történelmi Tár* appeared in 25 large volumes. The Committee was instrumental in issuing many other source publications in these decades. Its organizational work surpassed all expectations. [25]

Not only well-arranged and edited source publications but some highly comprehensive and synthetic new works characterized this period: first of all, Ferenc Toldy's history of Hungarian literature[26], the first such synthesis and László Szalay's (1813-1864) truly scholarly synthesis of Hungary's history[27] —another first— for which he twice was honored with the Grand Prize of the Hungarian Academy of Sciences. Both of them used much unpublished material and applied up-to-date methodology. For its objectivity and structural excellence Szalay's masterpiece can largely satisfy even present-day scholarly requirements.

Mihály Horváth (1809-1878), like Szalay, prepared several important works while in exile after the 1848-1849 events. Horváth significantly enlarged the scope of research to embrace the history of the peasantry, economic conditions and made a masterful description of the Age of Reforms, 1825 - 1848.

Partly as a result of the work of the Toldy-Szalay-Horváth trio, scholarly organizations, churches, administrative units and many individuals set up a demanding objective: to continue and finish the great eighteenth-century enterprises by searching for and collecting and publishing a possible complete set of Hungary's historical sources, national and local alike and by compiling a new, modern synthesis of the country's historical past. These new truly challenging undertakings began to take

25 E. Léderer, Op. cit., p. 27 and Éva V. Windisch, Az OSZK könyvtárosai a reform korban *(Tanulmányok Budapest multjából*, 1961*).*

26 *A magyar nemzeti irodalom története* . Pest, 1851, 1852

27 *Magyarország története* . Vols. I-IV, Leipzig, 1852-1854, Vols. V-VI, Pest, 1857-1859

shape in the next epoch of rapidly increasing and multifaceted scholarly activities.

Positivism and Specialization

The founding of the Hungarian Historical Association (Magyar Történelmi Társulat) and its periodical *Századok* (The Centuries), both of which were established in 1867, proved to be the most decisive steps in the organization of historical sciences. It is singularly noteworthy that both the Association and its journal have successfully withstood all political crises to this day.

The new generation of historians made very careful preparations for their chosen profession and devoted full energy to it. They believed that a professional historian should be well-trained in methodology, should base his findings on a variety of archival sources and should be versed, among others, in critical philology and the like.[28] This group of historians through conscious division of labor became highly specialized. They pursued their research on the grounds of positive facts and data and not on theorizing as their predecessors were inclined to do. Through analytical criticism of sources, they tried to determine historical truth in an objective way. They published many volumes dealing in details with heretofore ignored topics of economic and social history.

Many a historian approved the philosophy and methodology of positivism. Their positivistic approach meant rather an untiring search for unpublished sources, new documentary evidence.

Gyula Pauler (1841-1903) ranked high among the positivists. Since he was the first in Hungary to advocate positivism, the historians' commu-

28 Gyula Szekfü, *"A politikai történetirás,"* in Bálint Hóman, ed. , *A magyar történetirás új útjai.* (Budapest: Magyar Szemle Társaság, 1931). Pp. 421-426.

nity has regarded him as the father of the Hungarian version of positivism. He investigated its effects on historiography[29] and stressed his widely accepted main thesis: "Our task, therefore, is not speculation but narration . . . In order to depict realistically and completely historical phenomena it is necessary to consider all aspects of historical life . . . Only through this practice can science attain its true objective: to be the picture of the past and key to the future. . ."[30] Pauler adhered to these precepts in his two-volume, well-footnoted main work—the history of the Hungarian nation under the House of Árpád[31] for which the Hungarian Academy of Sciences granted him its Grand Prize in 1895.

Positivism through the works of French philosopher and critic, Hippolyte Tame and English historian Henry Thomas Buckle greatly affected Hungarian historians in the last quarter of the nineteenth century. Buckle's main work, *History of civilisation in England,* was not only translated into Hungarian (1873-1875) but there appeared several affirmative reviews in contemporary literature. On the other hand many others severely criticized Buckle's work as dangerous for its materialistic approach.[32]

Undoubtedly, positivism helped pave the way to economic and social history writing as well as drawing attention to material culture in general. Henrik Marczali (1856-1940) already in 1881 emphasized the importance of economic and social studies and Ignác Acsády (1845-1906) focused his attention on historical statistics. Acsády's work on the his-

29 *Bálint Hóman. Történetirás és forráskritika* . (Budapest: Magyar Történelmi Társulat, 1938), Pp. 428-429.

30 "A positivismus hatásáról a történetirásra," *Századok,* 1871, Pp. 527-645. 624-641; "Comte Ágost s a történelem," *Századok, 18*73, Pp. 226, 391, 462.

31 *A magyar nemzet története az Árpádházi királyok alatt* . Budapest, 1893

32 For Buckle's effect on Hungarian bourgeois historiography see Ágnes R. Várkonyi's treatise *"Buckle és a magyar polgári történetirás," Századok,* no. 3, 1963. Pp. 610-646.

tory of serfdom is useful even now for its great quantity of data and its impartiality. Already in 1893, Károly Tagányi as editor-in-chief and Ignác Acsády as chief contributor, launched, first such work in Europe, a periodical dealing exclusively with economic history. It was entitled *Magyar Gazdaság-történelmi Szemle* (Hungarian Review of Economic History). Owing to the general political climate of in the Austro-Hungarian Monarchy between 1867 and 1918, the majority of scholars engaged themselves rather in constitutional matters and other topics with a political overtone—an orientation already clearly expressed in the proceedings of the First Congress of Hungarian Historians in 1885.

The 1885 Congress of Hungary's historians was to be the first survey of the country's historiography. Several lectures were delivered dealing mostly with methodology, auxiliary sciences, archivistship and the teaching of history at secondary and college level. Arnold Ipolyi (1823-1886), then President of the Hungarian Historical Association, in his opening address spoke about a new trend intended to raise historiography to the rank of exact sciences through enormously increasing the quantity of source materials. He stressed that historiography for educational purposes should reflect the national spirit.

This Congress indicated—perhaps for the first time—that German influence had made headway in the country's historiography. By contrast and prior to this, Voltaire, Rousseau and Montesquieu and similar thinkers exerted influence upon Hungarian intellectuals. In line with the rising German influence, Gyula Lánczy argued that spiritual-intellectual factors are of primary importance—so much so that without them there is no history at all. Lánczy made even more direct reference to German historiography when stating that Germans presented a rigorous political education in the context of their historical science. Lánczy's reasoning, like that of Ipolyi's, was interwoven with current nationalistic tendencies.

Lajos Thallóczy (1857-1916) spoke on the use of archival materials. Henrik Marczali—the author of *Hungary in the Eighteenth Century* (Cambridge, 1910)—spoke about teaching of history in colleges and universities. All lecturers at the Congress emphasized the significance of using source materials and of archival research.

The Millennium of Hungary's Conquest in 1896 provided an excellent opportunity for strengthening national consciousness by means of historiography. It also substantially accelerated book and periodical publishing in local history and stimulated the activities of local historical societies. Evidently, the Millennium by its nature served Hungarocentric purposes. And it is all the more interesting that its representative work proved to be a quite objective enterprise. Under the editorship of Sándor Szilágyi (1827-1899), who was perhaps the best organizer of that period, a ten-volume collective work appeared entitled *A magyar nemzet története* (History of the Hungarian nation) issued upon the commemoration of the nation's one thousand years' history in 1896. The work was rather moderate in tone. Although this multi-volume set is an uneven work of leading historians it should be regarded as the most important synthesis up to the publishing of the Hóman-Szekfü's *Magyar történet* (Hungarian history, 1929-1933).

In this period of time some branches of auxiliary sciences were in full swing. Nándor Knauz's *Kortan* (Chronology), even now can be considered as the best guide to Hungary's medieval chronology. László Fejérpataky (1857-1923) laid down the foundations for modern diplomatics and József Csoma did the same for heraldry, János Karácsonyi for genealogy and László Réthy for numismatics. The intensive source-publishing enterprise sponsored by the Academy and the Historical Association made this magnificent revival of auxiliary sciences possible, without which the up-to-date methods of textual criticism and critical philology could not have been employed.[33]

Positivism helped flourish auxiliary sciences and historiography in general. But starting at least with the Millennium, nationalism, as already indicated, clashed with historical thought and delayed scientific progress.

In the first two decades of the twentieth century, current politics deeply penetrated once again even in the fields of medievalists. László Erdélyi (1868-1947) and Károly Tagányi discussed medieval social history topics in the pages of *Történelmi Szemle* (1913-1916). Tagányi expressed an intransigent standpoint against Erdélyi's "Slavophile" opinion. Gyula Szekfü's (1883-1955) dispute with Aladár Ballagi (1853-1928) on the eve of World War I on the personality of Prince Ferenc Rákóczi divided the whole nation into two: the *kuruc* (Hungaro-centric) and *labanc* (Habsburg loyalists) camps. This famous debate was the first in the country to result in mass meetings passionately interfering with historiographic topics. Only the events of World War I could deviate the public attention from the Rákóczi debate.

In a few years, the same Gyula Szekfü published another book[34] which seemed to be a pro-German philosophy of Hungarian history. Despite all of its shortcomings, this book represented perhaps the highest achievement of historiography in this period and seemed to be an early earmark of the slowly evolving trend of *Geistesgeschichte*, the history of human spirit.

This chapter cannot be closed without a short mention of the work of Árpád Károlyi (1853-1940). Károlyi happened to be the first Hungarian historian trained in Vienna in Sickel's Institut für Österreichische Geschichtsforschung. He was admittedly a positivist and, as the director of the Austrian State Archives (1909-1913) and after 1920 as the director of the Hungarian Historical Institute in Vienna (Bécsi Magyar Történeti

33 For a fuller account see Albert Gárdonyi, *A történelmi segédtudományok története*. (Budapest: Magyar Történelmi Társulat, 1926), *36 p. (A magyar történettudomány kézikönyve*. II. köt. - 1. füzet) and Imre Szentpétery, *"Történelmi segédtudományok,"* in B. Hóman, ed., *A magyar történetirás új útjai*. (Budapest: Magyar Szemle Társaság, 1931), Pp. *321-352.*

34 *A magyar állam életrajza (The curriculum vitae of the Hungarian state,* German ed., Berlin, 1917, Hungarian translation, Budapest, 1918)

Intézet), he published documents relating to the history of Austria and Hungary. Mentor of Gyula Szekfü and many other Hungarian scholars attending Vienna institutions, he was directly responsible for issuing a series of source publications based on Vienna archival collections. Károlyi is a never-surpassed master of essay literature.[35]

Interwar Years

Between the wars not only Hungary but in all countries of Central and Eastern Europe dreaded the spread of the Marxist revolutionary ideas. The memories of the short-lived and bloody Hungarian Soviet Republic of 1919 determined above all the new historiographic orientation. This political climate, so characteristic of the interwar period, also encouraged historians to downgrade materialistic forces (Marxist concepts like the inevitability of class warfare, labor movements, etc.) as primary history-making factors. Rather, they emphasized the significance of the elite and wrote about the history of the human spirit. The keynote works in this spirit were written by Gyula Szekfü (1883-1955), the most talented Hungarian historian of all times. Szekfü was a methodologically well-trained scholar with an excellent command of several foreign languages. Having graduated from the Péter Pázmány University in Budapest (1904), he worked in the Hungarian National Museum, National Archives and the Austrian State Archives in Vienna. His most important works include *Familiárisok és serviensek* (Budapest, 1912), a brilliant study on medieval social stratification; *A számüzött Rákóczi* (The emigrant Rákóczi, Budapest, 1913) which incited, as already referred to, the most

35 For a more complete analysis of historiography in the period of 1867-1918, see Tibor Baráth, *L historie en Hongrie (* 1867-1 935). Paris, 1936. 170 p.; Emma Léderer, Op. cit., Peter Gunst, *Acsódy Ignác történetirása* . Budapest, 1961 (Tudománytörténeti tanulmányok, 2*); Ervin Pamlényi, Horváth Mihály.* (Budapest, 1954) *;* József Szigeti, *A magyar szellemtörténet birálatához* . (Budapest, 1964); Zoltán Varga, *A Széchenyi-ábrázolás fö irányai a magyar történetirásban 1851-1918.* Budapest, 1963 (Tudománytörténeti tanulmányok, 3); Ágnes R. Várkonyi *, Thaly Kálmán és történetirása.* Budapest, 1961 (Tudománytörténeti tanulmányok, 1)

emotional debate dividing the whole country into pro- and anti-Habsburg camps; and *A magyar állam életrajza* (Life history of the Hungarian state) delineating the evolution of the country's political philosophy in a pro-German, idealistic style. His *Three Generations*[36] which definitely set the tone for the new course and became the Bible for most historians up to the end of World War II. It expounded the standpoint that liberal theory meant progress only in the history of thought, but as a political practice it is detrimental. In Szekfü's reasoning, liberalism via the stage of radicalism led directly to revolutions, as in fact was Hungary's case during the proletarian dictatorship in 1919. This opinion alone can explain why Szekfü carved such a spectacular career during the inter-war period.

His *Three Generations* exerted an enormous influence upon the intelligentsia and public figures alike. Szekfü reevaluated the country's past and present in line with the Christian ethics of Count Stephen Széchenyi, the great leader of Hungary's Age of Reform. The acceptance of Széchenyi's moral philosophy prevented Szekfü from following the path of German chauvinism. On the contrary, Szekfü's attitude towards ethnic minorities was tolerant if not liberal. His vast knowledge of facts, his superb ability to keep enormous quantity of published and unpublished sources under his firm control, made his art of writing especially convincing. There was a period, namely, between 1925 and 1935, when Szekfü's views echoed, unchallenged, on all sides of the ideological spectrum. Szekfü's unique art of writing was instrumental in convincing the reader to accept his main thesis that progressive conservatism—and not liberal-radical revolutionary characteristics—is the driving force of a nation's history. His research methods, his unique art of reliving past events through data-based intuition, as well as his beautiful literary style, helped spawn a huge school of imitators. His influence can be perceived even in post-1945 publications.

36 *Három nemzedék.* First ed. publ. 1920

Many of his best disciples have filled key positions in the universities, research institutes, archives and libraries even during the Communist era.

The most significant accomplishment of the interwar period was written by Bálint Hóman (1885-1953) and Gyula Szekfü. Their joint work, the multivolume set on Hungarian history[37], an indisputably high-level synthesis, was heretofore unparalleled in historiography. It was the first synthesis in the country which fully utilized modern methods of source and textual criticism and to a lesser extent the up-to-date results of historical epistemology.

Bálint Hóman was minister of education between 1932 and 1938 and again, between 1939 and 1942. After the war he was jailed for 'rightist tendencies' in 1946 by the Communist regime and died in prison in 1953. In their joint book project with Szekfü, he prepared the medieval parts up to 1458, while Szekfü dealt with the modern age. Hóman succeeded in infusing the volumes of *Magyar történet* with the achievements of his oustanding research. Consider especially his pioneer research in Hungarian numismatics[38] and economic history[39] to mention only two of his numerous publications.

Szekfü's contribution to *Magyar történet* affected the professionals and the reading public alike. He believed that the only proper way of development is progressive conservatism and that in his nation's past class warfare and other Marxist concepts were reflexly excluded as decisive history-making forces. Both authors concluded that their country and its

37 *Magyar történet* (Hungarian history, first publ. in 1929-1933 in seven volumes, then in five volumes in many consecutive editions)

38 *Magyar pénztörténet 1000-1325.* Budapest, 1916.

39 *A magyar királyság pénzügyei és gazdaságbolitikája Károly Róbert korában,* the Hungarian kingdom's finances and economic policies in the age of Charles Robert, Budapest, 1921

peoples, Magyars and non-Magyars alike, chose the Western way of civilization and that Hungary for centuries fulfilled its mission of being "the bulwark of Christian civilization" against the pagan invaders from the East. Prodigious amount of data, including the use of heretofore unpublished documents, characterizes this monumental synthesis. It is interesting to note that since its first publication, *Magyar történet* has continuously been used as a reference tool.

One of the most gifted disciples of Bálint Hóman was József Deér (1905-1972) who more or less followed his master's ideology. In reevaluating the country's past in line with the requirements of Geistesgeschichte, Deér introduced the thesis of charismatic leadership which had not been a familiar topic in writings on the Middle Ages. Deér went even further by reasoning that charismatic elements played an important role in the medieval formation of the nation. For this and similar views Deér was viciously attacked after the war by Ernö Gerö, one of the Moscovite leaders of Hungary's post-war Communist regime, which forced him to emigrate to Switzerland. There he was appointed director of the Medieval Institute at the State University of Switzerland at Bern and continued his methodologically well-based research and prolific publishing activity dealing with Hungarian and universal medieval topics.

Sándor Domanovszky (1877-1955) dealt chiefly with economic and social history topics. In addition, Domanovszky wrote several detailed studies on chronicle and gesta literature. He edited, with moderate success for decades up to 1943, the *Századok*, the official journal of the Hungarian Historical Association, in addition to a useful monographic series entitled Studies on the History of Hungarian Agriculture[4)].

The political and intellectual climate did not favor any deviation from the official line of the philosophy of history embodied in Hóman-

Szekfü's *Magyar történet* . It can be said that István Hajnal (1892-1956), professor of modern world history at the Peter Pázmány University, alone opposed diametrically the official trend of spiritual history. His theory of historical knowledge *in principium* opposed any "philosophizing" in history. Therefore he explicitly rejected all theorizing efforts including spirituality and historical materialism. He took the stance that objective historical research can be based on primary sources only and its goal should be the concrete investigation into the forms of culture (civilization) so that in the center of inquiry would stand human labor (work). Thus in Hajnal's concluding remarks, the history of technical development (progress) and the comparative history of writing should be in the focus of investigation. Labor as the central concept of human evolution seemed to be the mainstay of his epistemology which he tried to illustrate in his highly interesting university lectures and foreign language publications. [41] Hajnal was deeply convinced that he had opened new vistas in historical research through giving a central role to human "work" in man's evolution. [42]

During this period two very significant organizations came to being: in 1920, the Hungarian Historical Institute of Vienna, Austria (Bécsi Magyar Törteneti Intézet) and in 1941 the Hungarian Institute of Historical Sciences (Magyar Történettudományi Intézet). The Hungarian Historical Institute of Vienna awarded scholarships to talented young historians, giving them an opportunity to use the rich archival and library collections of Vienna and to get acquainted with modern research methods and thus insuring the continuation of positivism in a time of flourishing idealism. Fortunately, all the directors of this Vienna institute (Árpád

41 See his *Vergleichende Schriftproben zur Entwicklung und Verbreitung der Schrift im 12-13 Jahrhundert*. (Budapest, 1943) and *L'enseignement de l'ecriture aux universités medievales* (Budapest, 1954), etc.

42 For more details see Károly Irinyi , *Hajnal István történetszemlélete* . A Debreceni Kossuth Lajos Tudományegyetem évkönyve, 1962.

Károlyi, Dávid Angyal, Gyula Miskolczy) represented the best traditions of historiography and were far removed from the sway of any one-sided approach.

The Hungarian Institute of Historical Sciences was the first institute of historical research in Hungary. It was a section of the Pál Teleki Scientific Institute. Its members, though prey to the censorship of the governments during World War II, succeeded in publishing some outstanding volumes in ethnic studies.

Several useful source publications were issued at this time. Under the editorship of Imre Szentpétery the exemplary *Scriptores rerum Hungaricarum* contained medieval narrative sources excellently edited and utilizing the latest accomplishments in the auxiliary sciences. A leading authority on medieval Latin, László Juhász founded and edited the *Bibliotheca scriptorum medii recentisque aevorum*, publishing late medieval and early modern narrative sources relating to Hungary and equipped with critical philological notes. Sponsored by the Hungarian Historical Association the volumes of *Fontes historiae Hungaricae aevi recentioris* focused on the first half of the nineteenth century, devoting several volumes to sources relating to Stephen Széchenyi, Louis Kossuth and the nationality question. Among monographic series, the volumes[43] edited by Bálint Hóman attained the highest peak in surveying such important fields as source publications, historiography, auxiliary sciences, the philosophy of history, etc.

The Communist Era

After the Soviet occupation at the end of World War II, the country's intellectual development followed the political changes taking place there and in the Kremlin-dominated area as a whole. Directives issued by the

43 *Handbook of Hungarian Historical Science* (A magyar történettudomány kézikönyve)

Central Committee of the Hungarian Communist Party have triggered all political and cultural changes and historians have been compelled to make research and rewrite history accordingly.

In order to eradicate the "bourgeois science" and to introduce in its place a Marxist-Leninist approach, the Communist Party's Central Committee from time to time has issued guiding principles to promote an all-out "Marxist-Leninist-cultural revolution". As a result social and historical sciences have undergone significant changes in four phases.

The first phase, the preparatory one, lasted approximately up to 1948-1949. It was the age of so called "salami politics": A gradual imposition of Communist rule. Book burnings, subtle threats against non-Communist authors and politicians were rampant. As mentioned earlier, historian and former education minister Bálint Hóman, for example, was jailed in 1946, and died in prison in 1953. His co-author of their monumental work discussed before, Gyula Szekfü, saw the light, got religion, and published articles in praise of the Soviet system.

The second period, known as the Stalinization or Rákosi period—after Hungary's Muscowite leader, Mátyás Rákosi—started in 1948 and culminated in 1953. This was the age of false trials on trumped up charges, followed by executions, wide scale imprisonments and mass deporations. Adoration of Stalin and the Great Soviet Union went along with the blatant falsification of the recent history. This, perhaps, is best characterized by the appearance of books such as *Miklós Horthy's Secret Documents* (Horthy Miklós titkos iratai), *The Last Act* (Utolsó felvonás), *Country Abandoned* (Elárvult ország) containing completely concocted "data" spiked with the basest lies regarding the previous regime.

The third stage represented a relative liberalization process reaching a peak during the Imre Nagy regime and the Petöfi-Circle debates preceding the October 1956 Revolution.

In the fourth phase, beginning with the crushing of the 1956 Revolution to the end of the Communist era in 1989, there appeared to be a gradual, slow liberalization. By the 1980's, books dealing with pre-1945 history were published with scarcely a trace of Communist ideology.

Research and interpretation in all four phases of the above-outlined historiographic development have suffered in varying degrees from the same simplistic vision of the past which stemmed from the coercive application of Marxist-Leninist concepts, the historical and dialectical materialism.

In 1949 and the years immediately afterwards, the whole of scientific life and within its framework the historical profession, was thoroughly reorganized in line to varying extents with the Soviet pattern. The Division of Social and Historical Sciences and the Institute of Historical Research, both affiliated with the Hungarian Academy of Sciences, were reshaped to become the country's top professional institutions.

From World War II, the reorganization of archives, museums and libraries has been geared to the practical needs of historians. The new Archives Law providing for uniform organization of the archives was enacted in 1950, its most important provision being the setting up of the National Center of Archives (Levéltárak Országos Központja) to supervise the archival network.

The Museum Act of 1949 (amended in 1963) made possible a large-scale development by creating a state-controlled network of museums. The largest and oldest among them, the Hungarian National Museum (founded in 1802) in Budapest, has five departments, its Department of Archaeology being the most important. It boasts a most rich and variegated collection of objects from the different cultures of the continent. All of Hungary's archaeological excavations are coordinated under the Museum's supervision. The Museum's well-edited *Folio Archaeologica* publishes papers in numerous foreign languages.

Valuable objects are deposited in the Christian Museum (Keresztény Múzeum) of Esztergom, the Museum of Contemporary History (Legujabbkori Történeti Múzeum), the Museum of Military History (founded in 1918) and the Museum of Theatrical History (founded 1952), all in Budapest.

The oldest library extant in Hungary is at Pannonhalma, a Benedictine Monastery, whose inventory dating back to 1090 has been preserved. The largest is the National Széchényi Library (founded in 1801), having about five million items. The Library of the Hungarian Academy of Sciences, the Library of Loránd Eötvös University, as well as the Library of the National Assembly, all seated in Budapest, possess valuable collections too, especially in their manuscript divisions.

Among ecclesiastical libraries, the Library of the Esztergom Cathedral (better known as the Bibliotheca of Esztergom) has world-renowned medieval collections.

The reorganized library system, also under state control, helped in many ways to promote the goals of the historical sciences. Source publications and interpretations issued by the Institute of Historical Research of the Hungarian Academy of Sciences are, in general, useful enterprises, as are the well-edited volume on Hungary and World War II[44] and the similarly well-prepared series on diplomacy[45]. They contain some startling revelations. However, its final conclusions are often in line with Marxist-Leninist ideology and flagrantly disregard some basic facts convincingly expressed in the sources.

44 *Magyarország és a második világháború* (Hungary and the second world war, Budapest: Kossuth, 1959

45 *Diplomáciai iratok Magyarország külpolitikájához 1936-1945* (Diplomatic documents relative to Hungary's foreign policy, 1936-1945)

Acta Historica, a foreign language quarterly issued also by the Hungarian Academy of Sciences is perhaps the most useful serial publication after *Századok*, a bimonthly and *Történelmi Szemle*, a quarterly publication of the Institute of Historical Research.

In Hungary, the science of bibliography has advanced enormously. Historical periodicals, almost without exception, carry well-edited book review sections and current bibliographies. The Budapest-based *Magyar Nemzeti Bibliográfia* (Hungarian National Bibliography) is an excellent tool for keeping the relatively huge book production under firm bibliographical control. There have been several bibliographical undertakings geared to the needs of historians. For example, the four-volume Hungarian historical bibliography[46], issued by the Institute of Historical Research of the Hungarian Academy of Sciences is a useful aid to scholars specializing in the whole Middle Danube Valley and even the Balkan Peninsula. Its contents: Volume 1, General Part, 5,654 entries; Volume 2, Economy, 15,855 entries; Volume 3, Politics, Law, Education, Science and Humanities, Press, Religion, 24,698 entries; and Volume 4, Non-Hungarian Peoples—Nationalities contains 26,682 entries, the largest bibliography ever compiled on the topic of ethnic minorities. References are made to monographs and periodical articles in Hungarian, Slavic and West European languages. Up to now this is the largest collective undertaking in historical bibliography in Hungary.

Thanks to the pioneer works of Elek Fényes, Károly Keleti and some others in the nineteenth century, historical statistics has advanced greatly in the post-1945 period. Similarly, great progress has also been made in historical geography. The most eminent contributor to historical geography has been György Györffy, whose multi-volume set [47], is the result of painstaking archival research. Regarded as an exemplary accomplishment in the methodology of historical geography in and outside of Hun-

46 *Magyar történeti bibliográfia 1825-1867* (Budapest: Akadémiai Kiadó, 1950-1959)

gary, Györffy's monumental undertaking indeed embodies the continuation and improvement of the best traditions since Dezsö Csánki's epochal work on Hungary's historical geography in the age of the Hunyadis[48].

Published in 1971, Kálmán Eperjessy's synthesis of the country's city history is all the more worth mentioning because it was done as a one-man project. Its singularly important feature is that it is absolutely free from nationalistic prejudice. Up to now very few authors in Central and Eastern Europe have been able to purge themselves of this traditional bias. Eperjessy and a few others, basing their stand on archival materials, have refuted the old school's dogmatic views and have proven that not only Germans and Hungarians but Slavs and several other ethnic elements had a hand in the establishment of cities in the Middle Danube Valley.

Among those historians who emigrated from Hungary were the world-renowned Károly Kerényi (1897-1973) and András Alföldi (b. 1895). Kerényi distinguished himself as an expert on antique civilization, mythology, humanism and the history of Europe's intellectual life, while Alföldi who was for years a member of the Institute for Advanced Study in Princeton, New Jersey, earned an international reputation in Roman history and archaeology and the culture of Eurasian nomads. József Deér (1905-1972), mentioned earlier, worked for years as the Director of the Medieval Institute at the State University of Switzerland, Bern. He broadened his previously Hungary-oriented research to include some medieval topics of the Holy Roman Empire.

47 *Az Árpádkori Magyarország történeti földrajza* (Historical geography of Hungary during the Age of the Árpáds. Budapest: Akadémiai Kiadó, 1963-)

48 *Magyarország történelmi földrajza a Hunyadiak korában.* Budapest: Magyar Tudományos Akadémia, 1890-1913. 7 vols.

Astrik Ladislas Gábriel (1907-) achieved international fame through his numerous articles and papers on medieval subjects, primarily on medieval universities. István Deák, Director of the Institute of East Central Europe, Columbia University, New York, N.Y., specializes in the Habsburg, German and Hungarian history. His major books include *Weimar Germany's Left-Wing Intellectuals* (1968) and *The Lawful Revolution: Louis Kossuth and the Hungarians, 1848—1849,* (1979). George Barány, University of Denver, Colorado, specializes in the political biography of Stephen Széchenyi.

Stephen Foltiny at Princeton has been active in the archaeological research of the Carpathian Basin, while Tibor Baráth (Montreal, Canada) has centered his activities on the origins of the Magyars. Francis S. Wagner's interests focused on the nationality problem and diplomatic history of World War II. Stefan Lorant (b. 1901, Budapest) achieved fame in America as an author popularizing U.S. history. His major publications include *Lincoln, His Life in Photographs* (1941); *F.D.R., a pictorial biography* (1950); *The Life of Abraham Lincoln* (1954); *The Life and Times of Theodore Roosevelt* (1959); *The Glorious Burden: The American Presidency* (1968).

Among Hungarian history professors at American universities three names stand out: Stephen Borsody (b. 1911) who wrote *The Tragedy of Central Europe: The Nazi and Soviet Conquest of Central Europe* (1960), *Triumphs and Tragedies: The New Central Europe* (1983), *Czechoslovak Policy and the Hungarian Minority, 1945—1948* (1984) and *The Hungarians, A Divided Nation* (1988). Béla K. Király (b. 1912), former Hungarian general who commanded of the revolutionary militia in 1956, wrote and edited several major books: *Tolerance & Movements of Religious Dissent in Eastern Europe* (1978), *War and Society in East Central Europe, Vol. VI: Essays on World War I: Total War and Peacemaking, a Case Study on Trianon* (with Peter Pastor, Ivan Sanders, et al.), *The First war Between Socialist States: The Hungarian Revolution of 1956 and Its Impact* (1984) and *Essays on War and Society in East Central Europe 1740—1920* (1987, with Stephen Fisher-Galati). John A. Lukács (b. 1923) was elected president of the American Catholic Historical Association in 1976. Lukács is a prolific writer. His nineteenth book, *A Thread of Years*, was published in 1998.

Literary History Writing

The first comprehensive summary of Hungarian literary history was written as early as 1851 by Ferenc Toldy (1805-1875) and this has earned him the title of "father of Hungarian literary history". But literary criticism in the form of essays had flourished even before 1851, especially in the works of József Bajza (1804-1858). Subsequently, literary criticism as practiced by Pál Gyulai (1826-1909), Jenö Péterfy (1850-1899), Frigyes Riedl (1856-1921) and some of their contemporaries attained a level of excellence meeting European standards. Some literary journals like the *Nyugat* (The West) along with the professors of literary history at universities helped advance literary scholarship in the twentieth century.

János Horváth (1878-1961) was the most important single factor responsible for the extraordinary progress the country's literary scholarship has made in the 20th century. Above all, János Horváth was an unsurpassable writer of literary essays which were based on modern textual criticism and aesthetics. In 1901 and 1902 he attended the École Normale Supérieure in Paris on scholarship. Between 1923 and 1948 János Horváth functioned as professor of Hungarian literary history at Budapest University and trained with impressive results the next generation of literary historians and critics. His monumental works he depicted the beginnings of Hungarian literary culture and masterfully analyzed the multinational character of the Middle Ages[49]. His last book, *Az irodalmi müveltség megoszlása* (Distribution of literary culture) is the best work ever written on poetry in Central Europe[50].

Mihály Babits (1883-1941) and Antal Szerb (1901-1945) surveyed European and world literature. Mihaly Babits' work *Az európai irodalom*

49 *A magyar irodalmi müveltség kezdetei: Szent Istvántól Mohácsig* (last ed., Budapest: Magyar Szemle Társaság, 1944. 330 p.)

50 *Magyar vers.* Budapest: Magyar Tudományos Akadémia, 1948. 314 p.

története, *1760-1925* (History of European literature, Budapest: *Nyugat*, 1935. 352 p.) has two German editions entitled *Geschichte der europäischen Literatur* (Zürich: Europa Verlag, 1949; Wien: Europa Verlag, 1949). Antal Szerb's *A világirodalom története* (History of world literature. Budapest, 1941, 1962, 1973. 1013 p.) is a brilliant synthesis of the history of world literature. Both authors discussed Hungarian literature as a part of European and world trends and currents. Szerb died at the hand of the Nazis.

János Hankiss (1893-1959) was educated in Budapest, Geneva and Paris and received his degree in education and doctorate in 1915. He became a professor of French and Hungarian literature at the University of Debrecen and served as such until 1950. He authored some 36 books in Hungarian, French, Italian and German, introducing Hungarian historical literature to the West. He organized the Summer University at Debrecen in 1927, which functions as the primary interpreter of Hungarian culture for foreign visitors ever since. In 1931 he organized the first International Congress of Literary History in Budapest. He founded *Helicon*, the international magazine on literary theory. From 1943 to 1944, March 19, until the German occupation of Hungary, he was secretary of state for education. In 1938 he was awarded the French Legion of Honor for his work on disseminating French culture in Hungary.

István Sötér (b. 1913) majored in Hungarian and French philology at Budapest University where he was professor of literature. In 1935 and 1936 Sötér received a scholarship to study at the École Normale Supérieure in Paris. Sötér was the director of the Institute of Literary History of the Hungarian Academy of Sciences and from 1970 to 1973 was the president of the International Comparative Literature Association. In 1973 he was awarded an honorary doctor's degree at the Paris University. He was a many-sided scholar, writing studies, essays, itineraries, novels and short stories. Sötér's monographs on French-Hungarian cultural relationships[51], are works of importance. István Sötér was one of the general editors of a colossal, six-volume synthesis of Hungarian literary history[52].

Gábor Tolnai (b. 1910) has been very active as literary historian and critic. His fields of specialization include twentieth century Hungarian and Spanish literature.

Tibor Klaniczay (b. 1923) has been the deputy director of the Institute of Literary History of the Hungarian Academy of Sciences since 1956. In 1967 he spent a year in Paris as a guest professor of literary history at the Sorbonne. From 1964 Klaniczay has been a member of the International Comparative Literature Association. He was an internationally recognized authority on the comparative literature of Central and Eastern Europe. One of his major works elucidated the character and literary significance of Miklós Zrinyi (1620-1664), a frequent topic in Central and Eastern European literature[53]. Tibor Klaniczay (in cooperation with József Szauder and Miklós Szabolcsi) authored a book[54] that was translated into English: *History of Hungarian literature*. London: Collet's, 1964. 361 p.; and several other languages including French and Russian.

Mihály Czine (b. 1929) was one of the best-trained literary critics in Hungary in the 1970's. Besides being associated with Budapest University, professor Czine worked in the Institute of Literary History of the Hungarian Academy of Sciences since 1956. His main field of interest was twentieth century literature[55].

51 *Francia szellem a régi Magyarországon.* Budapest, 1940*; Magyar-francia kapcsolatok.* Budapest, 1946.

52 *A magyar irodalom története*. Budapest: Akadémiai Kiadó, 1964-1966.

53 *Zrinyi Miklós*. Budapest, 1954, 1964

54 *Kis magyar irodalomtörténet* (Budapest: Gondolat, 1961. 493 p.)

55 *A magyar irodalom története* (History of Hungarian literature. Vols. 5, 6. Budapest, 1965, 1966) .

The best known Hungarian literary critic from a world vantage point was György Lukács (1885-1971). He was indeed a world authority on German literature, Shakespeare and Balzac. Lukács was one of the leading Marxist philosophers of the 20th century. Born in Budapest into a rich family Lukács was educated at the Budapest University. Later he studied under Georg Simmel at the University of Berlin and under Max Weber at Heidelberg. Between 1933 and 1944 Lukács worked at the Institute of Philosophy of the Soviet Academy of Sciences in Moscow and from 1945 to 1956 at the University of Budapest as professor of aesthetics and the philosophy of culture.

As an aftermath of the two world wars, a modern migration of nations has taken place on all continents. New states have been founded all over the world and we were witnessing a never before experienced rebirth of national consciousness. The study of inter-ethnic relations is now an important topic on the agenda of many countries. Literary research is capable of revealing the basic nature of ethnic entities and of helping solve the most complex problems of inter-ethnic relations. To this effect, a unique work has been done by literary historians, critics and writers of Hungarian descent who live in minority status in the succession states. These works of minority scholars and writers clearly mirror the varying degrees of symbiosis of co-existing ethnic entities, the assimilation and dissimilation and other essential facets which determine the quality of their coexistence. Let us single out just a few of the scholars who in the past decades have been engaged in this pioneering mission.

In Slovakia, Sándor Csanda[56] and Lajos Turczel[57] developed a new methodology for describing Hungarian-Slovak-Czech literary ties in a changing political climate.

In Romania, László Szabédi (1907-1959) published several books[58] and numerous essays in the service of Romanian-Hungarian coexistence in Transylvania. When the Hungarian university at Kolozsvár-Cluj (Transylvania) was abolished in 1959 by the order of the Romanian Communist authorities, Szabédi's reaction was suicide.

The literary activities of Edgár Balogh (b. 1906) are models for the analysis of a minority's behavior in inter-war and Communist Romania as well as in Czechoslovakia. He has embarked on a unique enterprise: a multi-volume encyclopedia to historically survey all facets of the life of the Hungarian minority in Romania (Transylvania). No such work has been initiated before in the field of ethnic studies.

Imre Bori in Yugoslavia was among the top literary historians of Central and Eastern Europe in the 1970's. In his methodology he was doubtless a follower of János Horváth. Bori was the best observer of literary interactions in the Danube Valley. He wrote several monographs on literary trends on a comparative basis[59].

No nation has devoted as much interest to Hungary's history as Ireland. Arthur Griffith (1872-1922), Irish politician, newspaperman, was the founder of Sinn Fein. In 1898 he has seen clearly that Ireland can be freed only through a negotiated settlement with the British. As early as 1902 he thought the Hungary's example after the 1848-49 revolution must be followed by the Irish: revolution, defeat, oppression, passive resistance, negotiated compromise was the Hungarian way. In 1904 he has written a highly popular series of articles in his newspaper, *United Irishmen*, which in 1906 was published as a book under the title: *Resurrection of*

56 *Elsö nemzedék; a szlovákiai magyar irodalom keletkezése és fejlödése*. Bratislava, 1968. 305 p.; *Harmadik nemzedék; kritikák, tanulmányok.* Bratislava, 1971. 246 p.; *A törökellenes és kuruc harcok költészetének magyar-szlovák kapcsolatai*. Budapest, 1961. 223 p.)

57 *Két kor mezsgyéjén; a magyar irodalom fejlödési feltételei és problémái Csehszlovákiában 1918 és 1938 között*. Bratislava, 1967. 311 p.

58 *A magyar ritmus formái*. Bukarest: Allami Irodalmi és Müvészeti Kiadó, 195?, 231 p.; *Szabédi László legszebb versei.* Válogatta, az elöszót irta Kántor Lajos. Bukarest: Albatrosz, 1972. 147 p.

59 *A szecessziótól a dadáig...*, Ujvidék: Forum, 1969. 322 p.; *A szürrealizmus ideje* ..., Ujvidék: Forum, 1970. 302 p.)

Hungary. The book became a bestseller in Ireland. In three months thirty thousand copies were sold. Later it was republished several times. The historicalprecision of Griffith's text, both in terms of Hungary's thousand years of history, as in the details of the 1848-49 war and its aftermaths is most remarkable. Griffith became the first prime minister of the Free Irish State in 1922 and died in office in the same year.

There are a few foreign historians who have specialized in Hungarian history. The British Carlile Aylmer Macartney (1895-1964), the Czech Josef Macurek (b. 1901) and the Slovak Daniel Rapant, occupy unique places among the foreign historiographers of Hungary. All three have devoted a lifetime to study this country's past.

Macartney embraced several topics ranging from medieval historiography and social history to the nationality question (*Hungary and Her Successors*). He also authored a historical synthesis[60].

Josef Macurek's main work[61] immediately aroused the interests of his Hungarian colleagues, chiefly for the reason that he tried to prove that Hungarian statehood was not solely the achievement of the Magyars. Macurek was the head of the Committee on Hungarian Studies of the Czechoslovak Academy of Sciences, has been very active and a prolific author since the war. Both Macartney and Macurek have successfully demonstrated objectivity. The scholarly well-trained Daniel Rapant has not been able to reach the same level of objectivity due partly to his sensitive subject matters, the history of Magyarization, the Revolution of 1848-1849 and the Slovak-Hungarian historical relations.

It can generally be stated that Hungary's history is rather scantily represented in standard American history books. Of five major textbooks used

60 *Hungary: a Short History*. Edinburgh: University Press, 1962. 262 p.)

61 *Dejiny Madaru a uherského státu* (Prague: Melantrich, 1934. 344 p.)

in courses about Western Civilization at American universities, a 1996 survey has shown that only one mentioned even the name of Hungary's first dynasty, the House of Árpád, to give just one example.

Notable exceptions to this 'rule' are Oscar Halecki's *Borderlands of Western Civilization, a History of East Central Europe* (1952) and Alan Palmer's *The Lands Between, A History of East-Central Europe since the Congress of Vienna* (1970). Palmer was a student and co-worker of Macartney. Both texts give a thorough and balanced description of Hungary's history, well integrated with the histories of the surrounding nations. Alas, both books are out of print.

With the advent of the Internet, the scarcity of English language history books on Hungary have eased. In 1998, there were fifty directly readable and/or downloadable books on various historical and political subjects available on the website: www.net.hu/corvinus/ in Europe and www.hungary.com/corvinus/ in the United States. Other websites contain additional materials. More are being prepared every month.

The Social Sciences

Sociology

The disciplines of both sociology and economics in Central Europe grew primarily out of the historical sciences. Prior to the last quarter of the nineteenth century, social and economic history appeared only within the framework of political history. Not even a separate chapter was devoted to social and economic phenomena. Around the beginning of the 20th century, due to the influence of Hegel, Comte and Marx, historical materialism as well as positivism came to the fore of historical research. It triggered the socioeconomic interpretation of history. Sociologists and economists invented new systems of periodization in history. They analyzed the typical, instead of the individual phenomena in human evolution. This new trend advocated that only one social class be regarded as the real and only history-making factor. This monistic standpoint was in total conflict with earlier views, of, for instance Gergely Berzeviczy (1763-1822).

Berzeviczy, one of the best economists and social philosophers of his age, refuted the monistic stance and expressed high esteem for the functions of the middle class by declaring that: “the *tiers état* is that noteworthy and outstanding class of the society which resides in cities and whose characteristic way of life is urbanism”.[1]

Historical materialism was the driving force of the intellectuals who belonged to two institutions during the first two decades of the twentieth

1 *On economy , 1819.* From Latin manuscript. Jenö Gail, *Berzeviczy Gergely élete és müve,* (Budapest 1902. pp. 41-42); and István Dékány , *“Gazdaság- és társadalomtörténet",* in Bálint Hóman, ed. , *A magyar történetirás új útjai* . (Budapest, 1931. p. 224) .

century: the Galilei Circle, representing a rather small percentage of leftist Budapest University students and professors and the *Twentieth Century* (Huszadik Század), the official journal of the Sociological Society. This, under the editorship of Oszkár Jászi, coordinated the activities of many radical thinkers of the Habsburg Monarchy. Representing this latter group, Ervin Szabó (1877-1918) analyzed Hungary's revolution of 1848-1849 from a point of view of Marxist sociology[2].

Péter Ágoston (1874-1925) also belonged to the leadership of the *Twentieth Century*. He emphasized the role of economic factors in describing and evaluating the functions that the owners of large landed estates fulfilled in the nation's past [3].

The best known Hungarian sociologist up to now has been Karl (Károly) Mannheim (1893-1947). Mannheim who spent his youth in Hungary and experienced the revolution and counter-revolution in his native land, before he went to Germany in 1919. In 1933 fled Germany and spent the remainder of his career in Great Britain, teaching sociology at the London School of Economics. He devoted his entire career to the development of a sociology of knowledge, which branch of science has since been associated with his name. In Karl Mannheim's interpretation, knowledge is a social product and is related to the social status of the individual. In spite of Mannheim's and others efforts, the sociology of knowledge has remained an unsolved issue of epistemology. As an architect of the sociology of knowledge, he reluctantly conceded that objective knowledge of reality was impossible[4].

2 *Társadalmi és pártharcok a 48-49. nagy forradalomban* (Vienna, 1921).

3 *A magyar világi nagybirtok története* . Budapest, 1913

4 For details see his *Wissenssoziologie; Auswahl aus dem Werk (*Berlin, 1964. 750 p.) .

Oscar Jászi (1875-1957, Oberlin, Ohio) studied, besides Budapest University, in France and in England. The nationality question and its federalist solution were central issues in his lifework. In 1918 he was a minister in the blundering post-war government of Mihály Károlyi. After the proclamation of the Hungarian Soviet Republic in March, 1919, Jászi first emigrated to Vienna then to the United States. In 1925 he was appointed professor of sociology at Oberlin College, Ohio, where he earned wide recognition. Oscar Jászi published two main works in the United States[5]. He is remembered as a venomous opponent of Hungary's inter-war government.

During the period between the wars, István Dékány (1886-1965) was a prominent figure in promoting social philosophy which he taught at the Budapest University up to 1946. Dékány also exercised wide influence on sociological research as the secretary general of the Hungarian Philosophical Society and as president of the Hungarian Sociological Association. Using an eclectic approach, István Dékány developed his own system of sociology based on the categories of social philosophy. His treatise prepared for delivery at the 14th (Bucharest, 1939) International Congress of Sociology dealt with the problem of social groups[6]. He published a multitude of monographs on interpsychical cognition, social philosophy and a high-level, really scholarly introduction to social sciences[7], as well as a well-organized dictionary of sociology.

In post-1945 Hungary, Sándor Szalai (b. 1912) has ranked high among Marxist sociologists. Szalai's research has dealt chiefly with method-

5 *The Dissolution of the Habsburg Monarchy* (Chicago, 1929); *Against the tyrant; the tradition and theory of tyrannicide* (with John Donald Lewis as joint author. Glencoe, IL, 1957).

6 *Communautés et organisations; essai sur la classification des groupements sociaux,* Paris: Domat-Montchrestien, 1940. 96 p.

7 *A mai társadalom. Bevezetés a társadalomtudományokba.* (2nd ed., Budapest)

ological topics and social implications of socialist industrialization. Author of several monographs in these fields, Szalai in later years has held an important position in the International Sociological Association and in the United Nations Institute for Training and Research (UNITAR).

Between the two world wars, the movement of the folk's writers (népi irók mozgalma)—especially the works of Géza Féja, Ferenc Erdei and Imre Kovács—culminated in a very specific form of Populism. Its sociological by-product proved to be a characteristic, never-before-used interdisciplinary approach, through which the writers were able to make a highly effective description of the socioeconomic, political and cultural phenomena of individual places and regions.

Economics

Gergely Berzeviczy (1763-1822), mentioned in the previous section, began his economic research under the influence of the founder of modern economics, Adam Smith (1723-1790). In his first significant work Berzeviczy advocated the principle of free foreign trade and disapproved of any form of Viennese mercantilism. At the beginning of the nineteenth century he frequently exchanged letters with leading German scholars and in 1802 was elected member of the Göttingen Academy. In order to expand foreign trade towards Northern Europe Berzeviczy traveled to Warsaw and Danzig to study this problem on the scene. As a result of his study trip Berzeviczy wrote a treatise[8] which was submitted to the Congress of Vienna. As early as 1808 Berzeviczy wrote a well-documented study[9] in which, far ahead of his time, Berzeviczy discussed intercontinental foreign trade relations. In his *De conditione rusticorum in Hungaria*

8 *Die Erweiterung des nordischen Handels.* Vienna, 1814

9 *Ansichten des asiatisch-europaischen Welthandels.* Pest, 1808

(1809) Berzeviczy condemned the system of serfdom and argued for economic liberalism. His purely theoretical work *Oeconomia Publico Politica* was written in 1818 and remained in manuscript form until 1902, when Jenö Gaál published it in Hungarian translation.

Economists and historians of later decades looked back upon Gergely Berzeviczy as a model for progressive social and economic philosophers. Consequently, it was not surprising that Károly Tagányi (see page 142) and Ignác Acsády (see page 141), who as early as 1893 issued the Hungarian Review for Economic History (*Magyar Gazdaságtörténelmi Szemle*), should be the first in Europe to realize such an enterprise.

Gyula Kautz (1829, Györ-1909, Budapest), professor at the University of Budapest, played a leading role in the field of economics, even outside of the Habsburg Monarchy. Kautz' chief theoretical and historical work on national economy[10] hastened his brilliant career which culminated in his appointment as governor-general of the Austro-Hungarian Bank from 1892 to 1900. There is a consensus among economic historians that Gyula Kautz' literary activity was superior to that of his contemporaries.

István Varga (1897-1962) was in close harmony with the traditions of the country's economic thought. Having gained experience in the Central Statistical Office and in a financial institution from 1927 to 1949, István Varga was the head of the Hungarian Institute for Economic Research (Magyar Gazdaságkutató Intézet) where he trained an elite cadre of economists. His publications appeared in several languages. With Mátyás Matolcsy (1905-1953) he published *The national income of Hungary, 1924/25-1936-37* (London: P.S. King & Son, 1938). His book on profit is a standard work[11].

10 *Theorie und Geschichte der Nationalökonomie*, 2 vols., Vienna, 1858-1860)

Theo (Tivadar) Surányi-Unger (b. 1898) was known in Eastern and Western circles alike. His seminars at the University of Szeged trained outstanding economists. After World War II, he taught economics ,and conducted research at several U.S. and West German universities. A very prolific author, Surányi-Unger, in addition to his native Hungarian, wrote a number of monographs in German and English—to single out two, his book on price regulation and on the history of economic philosophy[12]. Through his numerous English language publications Surányi-Unger undoubtedly acquired world fame as an authority on economic policy, comparative economics, as well as economic philosophy[13].

Mathematician John von Neumann (see page 201) made his great contribution to economic theory by publishing hi "Theory of Games and Economic Behavior" with Oscar Morgenstein in 1944.

Hungarian economists contributed to the maintenance of Communism until its well deserved demise. Béla Csikós-Nagy (b. 1915) graduated from Szeged University and was a member for years of Surányi-Unger's seminars. After World War II, Csikós-Nagy specialized in socialist economy while during the war years he had occupied himself with elucidating Hungary's economic role in the German lebensraum. Csikós-Nagy was considered the greatest authority on price regulation in the socialist bloc of countries. Later he has been the chairman of Hungary's National Board of Materials and Prices.

11 *Der Unternehmungsgewinn; ein Beitrag zur Theorie der Vermögensverteilung* (Berlin: Duncker & Humblot, 1957).

12 *Nationale und internationale Preisspolitik*. Jena, 1938; *Geschichte der Wirtschaftsphilosophie* , Berlin, 1931.

13 *Private Enterprise and Governmental Planning; an Interpretation (*1st ed., New York: McGraw-Hill, 1952. 628 p.) and *Economic Philosophy of the Twentieth Century (*DeKalb, IL; Northern Illinois University Press, 1972. 357 p. Translation of *Wirtschafts-philosophie des 20. Jahrhunderts).*

Jenö (Evgenii) Varga (1879, Nagytétény—1964, Moscow) was a leading Soviet economist who published 75 books, brochures and about 500 scientific papers, overwhelmingly in Russian. Between 1927 and 1947 Varga was the director of the Moscow-based Institute of World Economy and World Politics.

For many years József Bognár (b. 1917) was deeply engaged theoretically as well as practically in economic assistance planning especially for the new states of Africa.

Imre Lakatos (1922-1974) graduated in 1948 in Debrecen in mathematics, physics and philosophy. In 1949 he was sent to further studies in Moscow having been a good Communist. After returning to Hungary, he worked in the Ministry of Education, until charged with "revisionism" and put in prison between 1950 and 1953. In 1956 he emigrated to England and obtained a doctorate at the London School of Economics. From 1969 he was professor at London University, from 1971 he taught at Boston University. He is well known for his theories on the methodology of scientific research.

Otto E. Thur (b 1928, Dárda, Hungary) was professor of economics at the University of Montreal and a member of the Economic Council of Canada. He has published many articles in Belgian, German, Italian, as well as Canadian professional journals.

Aranka E. Kovács, professor of the University of Windsor, Canada, was a leading authority on labor problems. Among many other awards, she has been granted the Canada Council Award and has contributed articles, reports and book reviews to major professional journals in the field.

Nicholas Louis Deák (1905, Transylvania - 1985 New York) was an internationally renowned retail currency-exchange dealer, a partner of the Wall Street firm Deak-Pereira. He also dealt in precious metals. During World War II he returned to Hungary and participated in the anti-Nazi resistance.

George Soros (b. 1930, Budapest) left Hungary after the second world war, went to London, and obtained a B.S. degree at the London School of Economics. After immigrating to the United States in 1960 he worked at various Wall Street firms. In 1973 he established the Soros Fund and became a multi-billioner with his wise investment strategies. In the early 1990's, whenever turbulence struck the world market financial dealers asked three questions: Would currency values change? What will happen to interest rates? What is George Soros doing?

Soros uses his amassed wealth for charitable purposes through the Soros Foundations and the Open Society Institute (1993) supporting academic research, foreign travel for academicians and students in Eastern Europe and elsewhere and many humanitarian causes. He has founded and maintains the highly selective graduate program of the Central European University based in Budapest. Soros received honorary degrees from the New School of Social Research, Yale and Oxford universities.

János (John C.) Harsányi (b. 1920) shared the 1994 Nobel Prize in economics together with John Nash and Reinhard Selten "for their pioneering analysis of equilibria in the theory of non-cooperative games". Harsányi showed how social games can be analyzed even when in possession of faulty information. He thus laid the groundwork for a fast developing research sector, the economics of information, taking note of strategic situations where individual participants are unaware of each other's intentions.

László Birinyi (b. 1944, Karcag) was raised in Austria as a son of Hungarian war refugees, who eventually settled in the United States in 1957. He graduated with a degree in history from the University of North Carolina and a masters degree of Business Administration from New York University. His first position on Wall Street was in the computer department of Loeb Rhodes. Birinyi soon went into trading, and was hired by the major trading firm Salomon Brothers in 1976. There he established himself as a leading quantitative market analyst, plumbing the stock market's inner working using sophisticated computer programs, analyzing every trade among the thousands of stocks. By determining the flows of money into and out of stocks, he gained a stellar record in selecting stocks for investment. In 1989 he resigned his directorship at Salomon, and formed his own firm, Birinyi Associates. In addition to financial management of private capital, Birinyi writes a monthly column for *Forbes* magazine. He is also a regular on Louis Rukeyser's popular *Wall Street Week* television program. As one of the ten panelists of the program he was number one stock picker for the past seven years. The average annual return of his selected stocks between 1992 and 1997 was a stunning 45.5 %. Birinyi is a respected source of financial advice for tens of thousands of Americans.

Anthropology and Ethnology

Sándor Solymossy (1864-1945) was for years professor of ethnology at Szeged University between the wars and achieved substantial results in collecting and interpreting folks tales and ancient beliefs.

István Györffy (1884-1939) did valuable spadework in ethnography, especially in the study of peasant settlements and traditional farming methods.

Lajos Bartucz, professor of the University of Budapest, exerted great influence on the inter-war anthropological research in Hungary and neighboring countries. His investigations into the anthropometry of ninth century and pre-Conquest Magyars were considered substantial. He discussed, in a very objective manner, the highly explosive questions of race research and cautiously refuted the then so popular Nazi race myth[14]. At the First Congress of Finno-Ugrists, held in Budapest in 1960 Bartucz delivered a paper[15], which described anthropological ties between the Magyars and other members of Finno-Ugrians.

Gyula Ortutay (b. 1910) was the student of Sándor Solymossy at Szeged University in the first half of the thirties. From his university years Ortutay has been especially prolific author. Scores of his works have been translated into foreign languages. His more important publications include, up to 1963, eleven volumes, mostly folk tales classified by region[16]. He was concerned primarily with universal and comparative folklore and folk ballad and folk tale research. In recognition of his scholarly activities, Gyula Ortutay was elected member of the Finnish Academy of Sciences, the Sicilian Academy of Sciences, the presidium of the International Union of Anthropological and Ethnological Sciences, and the presidium of the International Society for Ethnology and Folklore.

Zsigmond Bátky (1874-1939) dealt with objective Hungarian ethnography, while Béla Gunda (b. 1910) conducted ethnological research on various ethnic entities of the Danube Valley.

Sándor Bálint (b. 1904, Szeged) graduated from University of Szeged, where he lectured on the ethnography of the people of the Great Hungarian Plain, from 1934 up to his retirement. Bálint was an internationally well-known scholar of the religious life and customs of the peoples living in the Middle Danube Valley. He wrote several books on these subjects[17].

János Nemeskéri was one of the most talented anthropologists recently. He has conducted research on modern topics as well[18]. Nemeskéri, with György Acsády as joint author, wrote a comparative study entitled *His-*

14 "Adatok a honfoglaló magyarok anthropológiájához" *(Archaeológiai Értesitö,* 1931); *Fajkérdés, fajkutatás* (Race question, race research. Budapest, 1941. 322 p.)

15 *"Die Finnisch-Ugrischen Beziehungen der ungarischen Anthropologie"*

16 *Kis magyar néprajz (*Short Hungarian Ethnography. 3d rev and enl. ed., Budapest, 1958, for a German ed. see *Kleine ungarische Volkskunde*. Weimar: Bohlau, 1963. 229 p.), *Hungarian folk tales (*Selected and with an introduction and annotations by the editor, Gyula Ortutay) *and Uj magyar népköltési gyüjtemény* (New anthology of folk poetry. Budapest: Akadémiai Kiadó, 1953-).

17 *A szegedi tanyák népe* (1936), *A parasztélet rendje* (1943), *A szegedi népélet szakrális gyökerei* (1943), *A magyar népballada (*1947), *Szegedi szótár* (2 vols., Budapest: Akadémiai Kiadó, 1957).

tory of human life span and mortality (Budapest: Akadémiai Kiadó, 1970. 346 p.).

Pál Lipták (b. 1914) has been a co-worker of János Nemeskéri for decades. Having published a great many papers in Hungarian, as well as Slavic and numerous Western languages, Lipták prepared an exemplary handbook on physical anthropology, human evolution and prehistoric man[19].

Linguistics

Hungarian linguists were creatively present at the dawn of modern linguistics. As early as around the turn of the eighteenth and nineteenth centuries, three Hungarian linguists advocated comparative as well as historical methods in the analysis of linguistic phenomena.

János Sajnovics (1735-1785) while in Lapland on an astronomical expedition collected linguistic data and by using comparative methods he firmly demonstrated the relationship between the Hungarian and Finno-Ugrian languages in his pioneering *Demonstratio Idioma Hungaroram et Lapponum idem esse* (1770). (See also on page 307.)

Sámuel Gyarmathi (1751-1830), in his *Affinitas* (1799) helped lay down the foundations of Finno-Ugrian comparative linguistics by proving the relationship between the Hungarian and Finno-Ugrian tongues.

18 *Demographic and physical-developmental study of those who applied for admission to universities, higher schools in 1966 (*Budapest, Central Statistical Office Demographic Research Institute, 1970)

19 *Embertan és származástan* (Budapest: Tankönyvkiadó, 1969. 283 p.)

Miklós Révai (1750-1807) created and applied a new branch of linguistics, that is, historical philology, in his Latin-language *Elaboratior Grammatica Hungarica* (1806).

Antal Reguly (1819-1858) studied the relationship between the Hungarian and Finno-Ugrian languages more methodologically. Jointly sponsored by the Hungarian Academy of Sciences and the Russian Academy of St. Petersburg, Reguly toured Lapland, the Ural region and Siberia studying the way of life and languages of the Finno-Ugrian peoples.

Pál Hunfalvy (1810-1891) and the German-born József Budenz who from 1858 on made his home in Budapest, initiated a new stage in the Finno-Ugrian comparative linguistics. Since then it has remained the official line of the country's linguistic research, though there have always been efforts to stress Turkish linguistic affinity (by Armin Vámbéry, Gyula Németh, et al.).

Among the linguists of international fame, Gábor Szarvas (1832-1895) and Zsigmond Simonyi (1850-1919) are worthy of note for they published—among many other items—a model historical dictionary of the Hungarian language[20]. Gábor Szarvas began dialectological research in Hungary.

József Szinnyei (1830-1913), an outstanding follower of the Finno-Ugrian school, published a still indispensable multi-volume encyclopedia of Hungarian authors[21].

Oszkár Asbóth (1852-1920) attended Budapest, Leipzig, Berlin and Göttingen Universities. In 1882 and 1889 Asbóth did research work in Russia then was appointed professor of Slavic philology at the University

20 *Magyar nyelvtörténeti szótár*

21 *Magyar írók élete és müvei*. Budapest, 1890-1914

of Budapest, in which capacity he served between 1882 and 1919. Oszkár Asbóth helped introduce Slavic studies into Greater Hungary. He was the first linguist who conducted methodologically well-prepared investigations into the Slavic loan words of the Hungarian language. Asbóth's treatises appeared in the Hungarian and German languages in Hungary and elsewhere. One of his major works[22] had been published in Leipzig when he was 23 years old. Asbóth systematically exchanged letters with Russian and Ukrainian linguists. Their valuable correspondence is preserved in the St. Petersburg Archives of the Academy of Sciences of Russia, the manuscript divisions of the Moscow Museum of History and at the Lenin Library.[23]

Zoltán Gombocz (1877-1935) founded the internationally highly esteemed Budapest school of linguistics. He compiled, with the aid of János Melich (1872-1964), a noted Slavicist, the etymological dictionary of the Hungarian language[24]. For this latter achievement Gombocz and Melich were awarded the Grand Prize of the Hungarian Academy of Sciences in 1921. His methodologically exemplary investigations included many domains of linguistics: general linguistics, Finno-Ugrian and Altaic philology, Hungarian phonetics and phonology, etc. Gombocz published quite a number of monographs[25].

22 *Die Umwandlung der Themen im Lateinischen*

23 For details see *"Asbóth Oszkár orosz nyelvü útinaplója"* in János Váradi-Sternberg's *Utak, találkozások, emberek: Irások az orosz-magyar és ukrán-magyar kapcsolatokról*. (Uzhgorod: Kárpáti Könyvkiadó, 1974. pp. 258-266).

24 *Magyar etymológiai szótár*

25 *Zur ungarischen Phonetik* (with E.A. Mayer, 1909); *Die bulgarisch -türkischen Lehnwörter in der ungarischen Sprache.*

Dezsö Pais (b. 1886) conducted widely recognized research into many fields of linguistics—general as well as comparative, phonology and lexicology, to mention a few. Similarly, Géza Bárczi (b. 1894) also embraced many topics of linguistic research. Miklós Zsirai (1892-1955) in Finno-Ugrian philology and István Kniezsa (1898-1965) as a researcher of the etymology of medieval place-names, history of orthography and Slavic philology likewise distinguished themselves.

John Lotz (1913, Milwaukee-1973, Washington) was a second-generation scholar who completed his education in Hungary, at the Lutheran Gimnázium of Bonyhád (1931) and at Budapest University (1937). For years John Lotz was professor of linguistics at Columbia University, New York and the director of the Center for Applied Linguistics, Washington, D.C.. Lotz was instrumental in initiating several important linguistic projects in the United States and Hungary, among them The Hungarian-English Contrastive Linguistics Project. He contributed to several scholarly journals and collective works in the United States and Europe.

Under the guidance of Géza Bárczi, a group of unusually well-trained linguists produced a six-volume linguistic atlas of Hungarian dialects[26] which is an absolutely unique enterprise. They masterfully applied modern methodology and introduced an entirely new phase, unknown to this day in the making of linguistic atlases. This new phase means that the linguists introduced the "on-the-spot" control of data. This innovation was never before used as a work phase in the history of linguistic atlases.[27]

26 *A magyar nyelvjárások atlasza* (Budapest: Akadémiai Kiadó. In the 1970's)

27 For details see *A Magyar nyelvjárások atlaszának elméleti-módszertani kérdései*. Edited by László Deme and Samu Imre. (Budapest: Akadémiai Kiadó, 1975. 345 p.).

Oriental Studies

Sándor Körösi Csoma (1784, Körös, Transylvania—1842, Darjeeling, India) received a British scholarship when he was fifteen years old to study Oriental languages at Göttingen University. In order to find the ancient home of the Hungarians, Körösi Csoma traveled to Asia. He did not succeed in this romantic endeavor but, instead, under the influence of W. Moorcroft, an English traveler, he immersed himself in Tibetan studies and as a result prepared and published the first grammar of the Tibetan language[28], along with the first English-Tibetan dictionary[29]. Both works are regarded as milestones in Oriental linguistics. In 1837, Sándor Körösi Csoma was appointed librarian of the Asiatic Society in Calcutta. In Calcutta he compiled glossaries for sixteen European and Oriental languages. The Asiatic Society erected a monument above his tomb in Darjeeling. Körösi Csoma's papers were collected and issued by Tivadar Duka[30]. As the founder of Tibetan philology, Körösi Csoma opened up new vistas for Oriental studies.

Ármin (Arminius) Vámbéry (1832-1913) distinguished himself as a traveler in the Middle East and Central Asia and as an authority on those regions. To immerse himself in native culture, he often traveled in disguise as a whirling dervis. His reputation was especially outstanding in contemporary Great Britain and Russia. Vámbéry's *History of Bokhara* appeared in several languages including Russian and in English[31]. His Tartar dictionary[32] proved to be so useful that it was republished in 1972. Vámbéry's views of the Eastern question (Central Asia) were in the focus of debates in England in the last decades of the nineteenth century,

28 *A Grammar of the Tibetan language in English.* Calcutta, 1834

29 *Essay towards a Dictionary Tibetan and English*. Calcutta, 1834

30 *Körösi Csoma Sándor dolgozatai* (Budapest, 1885)

31 London: H. S. King, 1873, which was reprinted by Arno Press, New York, 1973

particularly his relevant monographs, *Central Asia and the Anglo-Russian frontier question*; a series of political papers (London, 1874. VIII, 385 p.) and *The coming struggle for India, being an account of the encroachments of Russia and Central Asia and the difficulties sure to arise therefrom to England* (London, 1885. VIII, 214 p.). His other books include: *Arminius Vámbéry: His Life and Adventures Written by Himself,* New York: Cassel, 1885; *Travels in central Asia, from Teheran Across the Turkoman Desert to Khiva, Bokhara and Samarcand performed in the year 1863,* New York: Harper Brothers, 1865; *Uigurische Sprachmonumente und das Kudatku Bilik*[33], *Hungary in Ancient, Mediaeval and Modern Times,* London: Unwin, 1887; *The Voyages and Adventures of Ferdinand Mendez Pinto, the Portugese,* London: Unwin, 1897; *The Story of My Struggles, The memoirs of Arminius Vámbéry,* London: Unwin, 1905.

Ignác Goldziher (1850, Székesfehérvár—l921, Budapest) received his education in Budapest, Berlin, Leiden and Leipzig where he obtained his doctorate. From 1873 to 1874 Goldziher was on a study trip to Syria, Palestine and Egypt. Between 1894 and 1921 he taught at the Budapest University and was recognized as one of the greatest scholars of Semitic philology. In 1889 at the Stockholm International Congress of Orientalists he was awarded the Gold Medal for his scholarly achievements and was elected member of the Berlin, St. Petersburg, Göttingen, Amsterdam and Copenhagen academies. Most of his treatises were published in his lifetime not only in Hungarian but in German, French, English, Russian, Swedish, Serbian as well as Arabic languages. According to Russian orientalist M. A. Batunskii, Ignác Goldziher positively influenced the development of czarist Russian and Soviet Oriental studies and this is why Goldziher was reelected in 1922 to the Soviet Academy of Sciences.[34] Goldziher was the first scholar who employed modern, critical methods

32 *Etymologisches Wörterbuch der turko-tatarischen Sprachen* (Leipzig: F. A. Brockhaus, 1878)

33 Uigur text with German translation., Osnabrück: Biblio Verlag, 1985

in the historiography of Islamic civilization. Several of his works have recently been republished[35].

Gyula Germánus (b. 1884) studied history, Latin, Oriental languages, Arabic and Turkish literatures at Budapest, Istanbul, Vienna and Leipzig universities. In 1907 he worked in the Library of the British Museum. Germánus acquired international fame as an authority on the cultural history of Islamic peoples and on Arabic literature. He made numerous trips to the Middle East and published extensively—chiefly in English—on his topics. Interestingly, most of his writings have been published abroad by foreign publishers: for example, *Lecture on Turkish Popular Literature* (Lahore, 1931); *The role of Turks in Islam* (Hyderabad, 1933-1934); *The Awakening of Turkish Literature* (2 vols., Hyderabad, 1933); *Sulle orme di Moometto* (Milano, 1938); *Mahmoud Teymour and Modern Arab Literature* (London, 1950); *Sources of the Arab Nights* (London, 1951); *Unknown Masterpieces of Arab Literature* (Hyderabad, 1952); *Arab Geographers* (London, 1964); *Trends of Contemporary Arab Literature* (London, 1957-1958); *The Berber-Arab Literature of Morocco* (Hyderabad, 1964); *Ibn Khaldum, the Philosopher* (Lahore, 1967); *Arab Poets and Critics* (Delhi, 1967); *New Arab Novelists* (Lahore, 1969). Evidently, Germánus was instrumental in informing the English-speaking world about Islamic civilization, his focus being the history of Arabic literature.

Ervin Baktay (1890-1963) concentrated his scholarly activities on the problems of Indic religions, philosophy, art, as well as social life and customs. In 1928 Baktay successfully located the most important places of Sándor Körösi Csoma's journey, which Baktay summarized in his

34 *M. A. Batunskii, K voprosv a znachenii nauchnogo nasledija I. Goldziera* . (Izvestiia Akademii Nauk Uzbekskoi SSR, 1960. pp. 50-58.).

35 *See his Études islamologiques; traduction analytique par G. H. Bousquet* (Leiden: E. J. Brill, 1962. 133 p., reprinted from Arabica, t. 7-9), his *Gesammelte Schriften* (edited by Joseph de Somogyi. Hildesheim: G. Olnis, 1969-1973).

monograph[36]. In 1956 and 1957 at the invitation of the government of India, Ervin Baktay again made a study tour of India. Baktay's books include treatises on Rabindranath Tagore (1922); a two-volume set about India(1931); *Kashmir* (1934); and an art history of India (1958) which in 1963 was translated into German[37].

Lajos Ligeti (b. 1902) studied at Budapest University, the Sorbonne and the Collège de France. Between 1928 and 1931 Ligeti made a study trip to Mongolia[38]. During the years 1933 to 1935 Ligeti lectured at the l'Ecole des Langues Orientales, Paris. In 1936 and 1937 Ligeti conducted research work in Afghanistan. He was a member of the Mongolian Academy of Sciences and several other learned societies, including the Leipzig and the French academies. For years he has been the editor of *Acta Orientalia*, a journal issued by the Hungarian Academy of Sciences.

Lajos Ligeti has contributed to many areas of Oriental studies but primarily dealt with the languages of Central Asia and Altaic philology. He has written quite a number of books[39] and scholarly articles for domestic and foreign journals[40]. Lajos Ligeti was regarded as one of the greatest experts in his fields.

36 *Körösi Csoma Sándor* (Budapest, 1962).

37 *Die Kunst Indiens.* 494 p., illus., col. plates.

38 *Rapport préliminaire d'un voyage d'exploration fait en Mongolie chinoise, 1928-1931*. Leipzig, 1933.

39 *Az ismeretlen Belsö Ázsia* (The unknown Central Asia. Budapest, 1940) was translated also into Turkish *(Bilinmiyen Ic-Asya* . Istanbul, 1946. 261 p.) . Ligeti's *Catalogue du Kanjur mongol imprimé (Budapest. Bibliotheca orientalis Hungarica, 3)* was continued by *Biambyn Rinchen's Catalogue du Tanjur Mongol imprimé* (New Delhi, International Academy of Indian Culture, 1964-)

40 *Histoire secrète des Mongols* (Text in Mongolian. Budapest, 1971. *Monumenta linguae Mongolicae collecta, I)* and *Mongolian studies* (Amsterdam: Grüner, 1970. 590 p.),; *Studia turcica* (Articles in English, French, German, Russian and Turkish. Budapest, 1971. P.498. *Bibliotheca Orientalis Hungarica*, 17).

Philosophy

The flourishing Renaissance culture, which culminated in the court of King Matthias I (1458 -1490), came to a sudden end as a consequence of the Battle of Mohács in 1526. The trend of humanism, which had up to that point of time provided some unity to knowledge fell apart in the subsequent movements of the Reformation and the Counter-Reformation. In 1635, one year before the founding of Harvard University, Cardinal Peter Pázmány (1570-1637), a leading figure of Hungary's Counter-Reformation, founded the Nagyszombat University: the hotbed of scholastic philosophy. A follower of Aristoteles, Péter Pázmány investigated the nature of universals and categories in his *Dialectica* and wrote several other philosophical treatises.

János Apáczai Csere (1625-1659) was the first Hungarian to receive a doctor's degree from a Dutch (Hardwijk) university. He published the first Hungarian-language philosophy book[41], expressing a universal-pansophic philosophy. His book on logic was issued in Transylvania[42].

István Márton (1760-1831), an early follower of Immanuel Kant (1724-1804), expounded his master's thoughts in his *Systema Philosophiae Criticae* (1820).

In the nineteenth century, Hegel, Comte and Neo-Scholasticism provided stimulus to the activities of Hungary's philosophers, simultaneosly the idea of creating a national philosophical system appeared on the scene. It is, therefore, quite understandable that already between 1835 and 1845 a three-volume set of prize-winning philosophical works were

41 *Magyar Encyclopaedia* (Utrecht, 1653-1655)

42 *Magyar Logikátska* (Fejérvár, 1654)

prepared in Hungarian[43]. These essays which were awarded prizes in competitions sponsored by the Hungarian Academy of Sciences, were concerned with the historical development and contemporary status of philosophy, including psychology and educational theory in Hungary and elsewhere. Subsequent to such preparatory efforts, individual philosophers of European fame a short while later began their many-sided activities.

Károly Bohm (1846-1911) studied at Pozsony, Göttingen as a disciple of H. Lotze and H. Ritter and in 1896 was appointed professor of philosophy at Kolozsvár University. In 1881 he founded the *Magyar Philosophiai Szemle* (Hungarian Philosophical Review) to which Bohm contributed several essays. He was the first Hungarian philosopher who developed an independent system of philosophy and into it he incorporated some elements of the philosophies of Kant and Comte. Bohm contributed studies to philosophical anthropology[44], to axiology[45], to logic and to experimental psychology, as well as to the theory of knowledge. He founded a flourishing school of philosophy among whose followers were Béla Tankó and György Bartók.

The greatest Hungarian philosopher, Ákos Pauler (1876-1933), was born into an intellectual environment. His father was well-known historian, Gyula Pauler. Ákos Pauler's first published work appeared in 1893 in a scholarly journal, *Bölcseleti Folyóirat* (Philosophical Journal). In this article the high-school student Pauler argued in defense of metaphysics. Years later, influenced by Imre Pauer, his philosophy professor, Ákos Pauler for years became a defender of positivism. Having obtained his doctorate (1898), Pauler continued his studies at Leipzig and at the Sorbonne. Af-

43 *Philosophiai pályamunkák.* Pest: Eggenberger, 1835-1845.

44 *Az ember és világa.* 3 vols., Budapest-Kolozsvár, 1883-1906

45 *Az értékelmélet feladata és alapproblémái*. Budapest, 1900

terwards Pauler rejected positivism and remained a lifelong adherent of objective idealism. Pauler continued research work in several domains of philosophy. In the order of the chronology of his monographic publications Pauler: elucidated the concept and the tasks of the philosophy of nature[46]; he discussed the psychological foundations of epistemology[47]; determined the problem of the concrete in modern philosophy[48]; dealt with the relativity of cognition and of concept-forming in mathematics[49]; analyzed the sources, subjects and limits of knowledge[50]; and clarified in a supremely logical way the notion of epistemological categories[51]. His philosophical introduction has always been regarded as an innovative act for its unique division of philosophy and because important philosophical issues were put into historical perspective by Pauler[52]. In Pauler's opinion, logic is the most significant part of philosophical studies. His relevant monograph is indeed a standard work in the literature of pure logic[53].

Pauler succeeded in clarifying many theretofore obscure topics. He threw new light on the Aristotelian interpretation of Plato's theory of

46 *A természetfilozófia fogalmáról és feladatairól*. Budapest, 1898

47 *Az ismeretelmélet lélektani alapjairól*. Budapest, 1898

48 *A magánvaló problémája az ujabb filozófiában.* Budapest, 1901

49 *Az ismerés viszonylagossága és a matematikai fogalomalkotás.* Budapest, 1902

50 *Ismeretelméleti tanulmányok.* Budapest, 1903

51 *Ismeretelméleti kategóriák.* Budapest, 1904

52 *Bevezetés a filozófiába*. Budapest, 1920. 1st ed., *Grundlagen der Philosophie.* Berlin-Leipzig: W. de Gruyter & Co., 1925

53 *Logika*. Budapest. 1925, in German: *Logik. Versuch einer Theorie der Wahrheit*. Berlin-Leipzig: W. de Gruyter & Co., 1929.

ideas. Besides the fact that Pauler succeeded in elaborating a quite independent system of philosophy, he greatly contributed to several spheres of philosophical thinking. As a highly esteemed logician, the advocate of pure logic, Pauler added his “reductive method” to the classical forms of inference, that is, to induction and deduction. He significantly enriched the field of logical principles by adding to them his own *principium classificationis,* according to which everything is classifiable at least in the category of unclassifiable. Pauler’s metaphysics relies on the so-called substances which are the centers of self-activity. All substances strive toward the principle of self-liberation, that is, toward the Absolute. The ontological basis of substances is their striving toward the Absolute. This reasoning gives a uniform metaphysical background to Pauler’s world-view. The majority of philosophers in twentieth century Hungary and the Middle Danube area have looked upon Ákos Pauler as a great authority of philosophy in general and of logic and epistemology in particular. His system has attracted many a thinker, among them József Somogyi (1898-1947) and Béla Brandenstein. Recently Pauler has been acknowledged more and more outside his native land and his name has been entered in internationally well-known professional encyclopedias, while more and more references have been made to his scholarly activities in monographic literature.

Between the wars the official trend of Neo-Scholasticism flourished. Antal Schütz (1880-1953), József Trikál (1873-1950) and to a certain extent József Somogyi, can be listed as its main representatives. Gyula Kornis (1885-1958) excelled in the service of supplying a political philosophy for the conservative regime.

Endre Ivánka (b. 1902) was professor of philosophy at Vienna University and published several standard books and articles on ancient Greek philosophy and the Byzantine civilization[54].

54 Plato Christianus; *Ubernahme und Umgestaltung des Platonismus durch die Väter.* Emsiedeln: Johannes Verlag, 1965. 495 p.).

Béla Brandenstein, like his master, Ákos Pauler, extended his investigations almost to the entire domain of philosophy. Born in Budapest in 1901, he graduated from the local university and obtained doctorate in philosophy in 1923. Between 1928 and 1945, Brandenstein taught philosophy at the University of Budapest and was the president of the Hungarian Philosophical Society. After World War II he was appointed professor of philosophy at Saarbrücken University, Germany where he taught until his retirement. Prior to 1945, Brandenstein wrote several monographs[55], including and a monumental volume on *Nietzsche* (Budapest, 1942. 503 p.) as well as numerous essays in *Budapesti Szemle* . However, his main contributions to philosophy appeared in the post-1945 years. His lifework was summarized in the six-volume work[56]. In this grand synthesis Brandenstein examines the all-important problems of ontology, logic, philosophy of mathematics, metaphysics, theory of science, epistemology, aesthetics, ethics, and many borderline problems of philosophy. In the last decades Brandenstein has published well over a dozen books, all in German. In his last monograph, Brandenstein returned to two of his favorite topics: logic and ontology[57]. A notably logical thinker, Béla Brandenstein has shown to be an independent philosopher with a strong leaning toward the traditional.

Primarily since the conclusion of World War II, many a Hungarian philosopher has left his native land and worked abroad, chiefly in Western countries. Imre Lakatos (1922-1974) acquired world fame as an authority on the philosophy, methodology and history of science. His works appeared in Western languages[58].

55 *Bölcseleti alapvetés* (Philosophical foundations. Budapest, 1935. 546 p.)

56 *Grundlegung der Philosophie* (Foundations of philosophy. Munich, 1965-1970)

57 (*Logik und Ontologie* . Heidelberg: Winter, 1976. 120 p.)

Ervin László's career is one of the most interesting ones. Born in Budapest (1932), he was first known as an accomplished pianist. László received U.S. citizenship at age 21. Interestingly, in 1962 he worked as a scientific collaborator at the Institute of East-European Studies at the University of Fribourg. László's field of specialization is of an interdisciplinary nature. His studies are concerned with systems theory and philosophy. He prepared widely known treatises[59] on the system view of the world; the natural-philosophy of the new developments in the sciences[60]. Ervin László edited an important collective work, containing the lectures delivered at the first Systems Philosophy Symposium, arranged by the State University of New York in 1973[61].

Ludwig von Bertalanffy (1901-1972) was Austrian-born and was educated at the University of Innsbruck and the University of Vienna. A renowned expert on theoretical biology, was also deeply engaged in general systems theory[62].

Arthur Koestler (1905, Budapest) is perhaps the best known Hungarian philosopher. First he was known as a novelist, journalist and political scientist, but then in the late fifties Koestler turned to philosophy and has become one of the most celebrated philosophers of the Western world.

58 *Historia de la ciencia* . . . Madrid, 1974*; Proofs and refutations* , 1976*; Problems in the Philosophy of Science* (papers delivered at the International Colloquium in the Philosophy of Science, Bedford College, 1965. Edited by Imre Lakatos)

59 *System, structure and experience; toward a scientific theory of mind* (New York: Gordon and Breach, 1969. 112 p.)

60 New York: G. Braziller, 1972. 131 p. , *A strategy for the future; the systems approach to world order* (New York: G. Braziller, 1974. 238 p.)

61 *The world system; models, norms, applications* . New York: G. Braziller, 1973. 215 p.

62 *"Introduction: the origins of general systems theory in the work of von Bertalanffy,"* in *The relevance of general systems theory: papers presented to Ludwig von Bertalanffy on his seventieth birthday* *(*Edited by Ervin László. New York: G. Braziller, 1972. VIII, 213 p.)

Koestler has philosophically analyzed such subjects as art, science and society. His investigations in the field of philosophical anthropology startled the world by his unconventional approach as is demonstrated in *The Sleepwalkers* (1959) in which he scrutinized man's changing role in the universe, while in *The Ghost in the Machine* (1968) Koestler convincingly argued against the mechanistic interpretation of man's nature.

Philosopher Elie Wiesel (b. 1928) was the recipient of the 1986 Nobel Prize for Peace "because he was one of the leading intellectual figures in an age when the world was inflicted by violence, oppression and racism". In 1989 a book was published in Tel Aviv on persons regarded as contributing the most to their culture in Hungary and Israel alike. The front page includes a picture of Elie Wiesel, who contributed a foreword to the edition in Hungarian.

Psychology and Psychiatry

With the defeat in the War of Independence of 1848-1849, Hungary completely lost its constitutional institutions and its cultural elite suffered in every respect. A weighty percentage of the intelligentsia was imprisoned, executed or left the country. During this Era of Habsburg Absolutism (1849-1867) systematic cultural movements completely died out. It was the Austro-Hungarian Compromise (Ausgleich) of 1867 that rung down the curtain on this period of stagnation and ushered in a cultural revival never before seen in the country. Hungary once again resumed active participation in Europe's intellectual efforts.

The school system was modernized at all levels in order to create quality education based upon the pillars of educational and child psychology. This new, psychology-grounded school system produced several generations of cultural elite up to the end of World War II. Scientists, scholars and artists who were educated in these new schools promoted mankind's civilization in the various fields of arts and sciences.

Studies in psychology were promoted by the establishment of special education schools. The first such school, the Institute for the Deaf, was founded at Vác in 1802 by a local lawyer András Cházar. The establishment of the internationally recognized Training College for Teachers of Handicapped Children, (Budapest, 1922) gave impetus to the development of several branches of experimental psychology.

László Nagy (1857-1931), more than any one else, helped develop a new method applied in child study and educational psychology. In 1881 Nagy began teaching at Budapest Teachers Training Institute, where in 1909 he founded the first laboratory for educational psychology. In 1916 he commenced lecturing in experimental psychology at Apponyi College (Budapest) where professors of the country's teachers training institutes were educated. As early as 1903 László Nagy was instrumental in founding the Society for Child Study (Gyermektanulmányi Társaság) , later organizing and heading the psychological laboratory of the Pedagogic Seminary of the City of Budapest. That same year he also founded a periodical entitled *A gyermek* (The child), which, for decades remained a distinguished forum for psychologists and educators engaged in child study. In addition László Nagy was at the vanguard in the founding of the Budapest-based Museum of Child Study (*Gyermektanulmányi Múzeum*). He was among the first theorists to stress as a basic principle of education, that the child should be the center of education: that the whole teaching process—curriculum and methods of instruction—should be adjusted to the nature and requirements of children. He was also among the first of the reform thinkers who methodically discussed the significance of children's drawings in education. László Nagy's then innovative didactic was built upon direct observation, practical exercises as well as on systematic studies of school children's activities. With his pedagogic views László Nagy was well ahead of contemporary educational theorists. He worked out the psychology of the range of children's interests[63], which guided teachers all over Hungary.

Károly Schaffer (1864-1939), neurologist and psychiatrist, completed his medical studies in Budapest and from 1901 up to his retirement was professor of neurology and psychiatry there. He conducted research in the morphology of nerve cells, the morphological bases of hereditary nervous and mental disorders and hypnotism, to mention but a few of the scientific fields within his interest for which he received international recognition. Károly Schaffer's published several important textbooks[64].

Pál Ranschburg (1870-1945), a noted psychiatrist, neurologist and psychologist, graduated from Budapest University and established the first psychophysical laboratory as early as 1890. In 1928 he founded the Hungarian Psychological Society. Ranschburg devised and applied several new measuring methods and devices for investigating intellectual functions. His research on association and memory is still held important. Pál Ranschburg dealt extensively with children's intelligence and the psychology of reading and writing. Besides his several Hungarian-language monographs he wrote a still very useful German-language book on the psychology of reading and writing and related cognitive development[65].

Sándor Ferenczi (1873-1933), one of the giants of psychoanalysis, at the outset of his career was profoundly engaged in organizational activities. In fact, it was partly attributable to Sándor Ferenczi's initiative that prior to World War I psychoanalysts from many European countries convened for yearly meetings. In 1909, at a meeting in Nuremberg, Ferenczi

63 *A gyermek érdeklödésének lélektana* ; psychology of the child's couriosity, Budapest, 1908

64 *Über das morphologische Wesen und die Histopathologie der hereditär- systematischen Nervenkrankheiten* (Berlin, 1926) , *Az elmebetegségek és kapcsolatos idegbetegségek kórtana* (Pathology of mental diseases and their related nervous disorders. Budapest, 1927) , *Anatomische Wesenbestimmung der hereditär-organischen Nerven-Geistes-krankheiten* (With Dezsö Miskolczy. Szeged, 1936) , *Histopathologie des Neurons* (Budapest-Leipzig, 1938) .

65 *Die Lese- und Schreibstörungen des Kindesalters; ihre Psychologie, Physiologie, Pathologie, heilpedagogische und medizinische Therapie* . Halle a. S., 1928. 314 p.

made the motion to organize the International Psycho-Analytical Association. In 1918 he was elected to its presidency. In 1913 Ferenczi and three colleagues formed the Hungarian Psycho-Analytical Society. He remained its permanent president for the rest of his days. During an eight month visit to the United States beginning in 1926, Sándor Ferenczi gave a series of lectures at the invitation of the New School of Social Research in New York City.

Ferenczi was a devoted co-worker of Sigmund Freud. He wrote a number of papers on his theories of personality, personality disorders and a wide range of psychoanalytical topics. The last of the therapeutic theories he formulated can be summarized in one sentence: "The indispensable healing power in the therapeutic gift is love."[66]

Many of the books and voluminous papers by Sándor Ferenczi are now available in English translation. These include *Sex in Psychoanalysis* (New York: R. Brunner, 1950), *First contributions to psycho-analysis* (London: Hogarth Press, 1952), *Further contributions to the theory and technique of Psycho-analysis* (London, 1926, 1950, 1951; New York, 1952, 1953). His complete works have been issued in French under the title *Oeuvres complètes* (Paris: Payot, 1968-).

Lipót Szondi was born in Hungary in 1893 and graduated in 1919 from Budapest University. Following his graduation he served until 1926 as assistant in experimental psychology under professor Pál Ranschburg at the Institute of Psychology of the Budapest University. Before World War II Szondi headed the Institute of Physiology and Pathological Psychology at the Training College for Teachers of Handicapped Children (Gyógypedagógiai Tanárképzö Föiskola, Budapest). It was during the years 1927 to 1941 that Szondi developed a new branch of science, the so-called schicksal (fate, destiny) psychology. He worked out a system of

66 De Forest, Izette, *The leaven of love; a development of the psychoanalitic theory and technique of Sándor Ferenczi*. (Hamden, Conn., 1965. p. 6.).

depth psychological analysis that has been designated as schicksal analysis. He has developed the Szondi Test method for psychiatric and neurologic testing. Topics covered by him include mental deficiency[67] and anthropometric norms[68]. Szondi wrote numerous books on his field[69]. On leaving Hungary he first lived in Switzerland, then in the USA and finally resettled in Switzerland.

Dezsö Miskolczy (b. 1894) was a close collaborator of Károly Schaffer. He graduated from the Faculty of Medicine of the Budapest University. During 1924 and 1925 Miskolczy continued his research work at the Cajal Institute in Madrid. He taught at the universities of Szeged (1930-1940), Kolozsvár (1940-1945), Marosvásárhely(1945-1964) and from 1964 up to his retirement at the Budapest University of Medicine. Miskolczy published several books and about 100 papers on the structure of the cerebellum, schizophrenia and relevant topics. He was elected member of the Hungarian Academy of Sciences, the Leopoldina, the Romanian Academy of Sciences and several other international societies. His highly esteemed monograph on the overlapping questions of internal medicine and neurology was translated into German[70].

Géza Révész (1878-1955) achieved renown for his studies in acoustic sensation. He was for years head of the Amsterdam Psychological Insti-

67 *A fogyatékos értelem*. Budapest, 1925; *Constitutioanalysis és értelmi fogyatékosság*. Budapest, 1931

68 *Magyar antropometriai normák.* Budapest, 1929

69 *Experimental diagnostics of drives.* New York: Grune & Stratton, 1952. Translation of *Experimentelle Triebdiagnostik; tiefenpsychologische Diagnostik im Dienste der Psychopathologische, Kriminal- und Berufpsychologie, Charakterologie und Paedagogik*. 2 vols., Bern, 1947; *The Szondi-test; in diagnosis, prognosis and treatment*. Philadelphia: Lippincott, 1959. 309 p.

70 *A bel- és ideggyógyászat határterületi kérdései ; (Grenzgebiete der inneren Medizine und Neurologie in Klinik und Praxis* (Frankfurt am M.: J. A. Barth, 1972. 224 p. *)*.

tute and editor of a well-known monographic series there under the title *Psychologische bibliotheek*. Its first volume was written by him. In this widely acclaimed book Géza Révész discussed the role of psychology in scientific research ad introduced some reformative ideas to improve the university training of psychologists. His book on the psychology of genius also met with great success[71].

During the inter-war years, László Benedek (1887-1945) was one of the best known psychiatrists and neurologists in Hungary. Professor of psychiatry and neurology at Debrecen and later at Budapest University, he was highly esteemed for his publications on hydrophobia[72], paralysis[73], and on his own individual method for cranial percussion[74]. His book on insulin shock was discussed at several international meetings.

In the sphere of pediatrics Pál Gegesi-Kiss (b. 1900) followed the best traditions as represented decades ago by János Bókay (1858-1937) and Pál Heim (1875-1929), both pioneering pediatricians. In recent years Gegesi-Kiss shifted his concentration to psychological topics and together with Lajos Bartha (b. 1927) developed completely new methods in experimental psychology. Gegesi-Kiss' monumental work on childhood disorders of personality appeared in German as well[75].

Thomas Stephen Szász (b. 1920, Budapest) has challenged many traditional notions which has triggered a chain of repercussions and reassessments in the field of law as well in psychiatry. He received his M.D. from the University of Cincinnati in 1944 and has been teaching psychiatry at

71 *Creatieve begaafdheid*. Den Haag: Servire, 1946. 138 p.

72 *Über die Entstehung der Negrischen Körperchen.* Berlin, 1921

73 *Der heutige Standder Behandlung der progressiven Paralyse*. Berlin, 1926

74 *Über die Schildelperkussion.* Berlin, 1932

75 *Persönlichkeits-Störungen im Kindesalter* (Budapest: Akadémiai Kiadó, 1969. 597 p.).

the State University of New York at Syracuse since 1956. In his opinion mental illness is only a “myth”. Szász is founder and board chairman of the American Association for the Abolition of Involuntary Mental Hospitalization. His writings include *The Myth of Mental Illness* (1961), *Psychiatric Justice* (1965), *Ideology and Insanity* (1970). His books are included in the curricula of countless institutions of higher education all over the world.

Dennis Szabó (b. 1929, Budapest) has for years been on the staff of the University of Montreal and was the director of its International Center of Comparative Criminology. He was an internationally acknowledged authority on criminal psychology and criminal justice. One of his best known monographs is *Criminologie* (Montreal, 1965. 565 p.).

Another Hungarian pioneer of psychoanalysis was Franz Alexander, who practiced at Los Angeles’ Mount Sinai Hospital in the 1950’s.

Musicology

During the first decades of the nineteenth century, litterateurs already recognized that their art could be rejuvenated by means of folk literature. János Erdélyi (1814-1868) collected folk songs and legends[76], the preponderance of his work being so folk literature oriented that it included not more than twelve folk melodies. Although years later István Bartalus (1821-1899) in his seven-volume folk song collection (1873-1896) included music scores, it did not arouse much interest in genuine folk melodies. The real breakthrough came in 1895 when Béla Vikár (1859-1945) using Edison’s phonograph recorded folk songs for the very first time. Vikár’s collection of folk music material was acclaimed by international representatives of the profession at the Paris

76 *Népdalok és mondák.* 3 vols., 1846-1848

World Exhibition in 1900. It is interesting to note that Béla Bartók himself later transcribed Vikár's phonographic material.

Béla Bartók and Zoltán Kodály found it vital to develop a precise, scientific methodology for collecting folk songs. Kodály began a tour for the purpose of collecting folk songs in 1905, placing emphasis on genuine folk melodies. Zoltán Kodály's doctoral dissertation on the strophic structure in the Hungarian folk song which appeared in 1906 was a decisive step in the right direction. That same year he and Bartók started their life long collaboration in ethnomusicology which revolutionized not only Hungarian music but the entire field of the music of the Western world. They proved in a series of treatises that the pentatonic (five-tone) scale is the ancient, genuine foundation of Hungarian folk music. The pentatonic scale has since become the wellspring for many Hungarian composers who were to follow the traditions of Bartók and Kodály. Their collaborative efforts formed the keystone for the research of the many composers and musicologists who have subsequently devoted their research to ethnomusicology.

Béla Bartók laid the foundations for comparative ethnomusicology in his *"Our folk music and the folk music of neighboring peoples; with 127 melodies"*, Budapest, 1934[77]. In *Our Folk Music* Bartók comparatively examines genuine folk songs of the Middle Danube Valley nations, while determining their ethnic origins and the relative degree and extent of mutual influences. This invaluable contribution to comparative ethnomusicology and folklore has been translated into German and Russian[78].

A multivolume set entitled *A magyar népzene tára* (Thesaurus of Hungarian folk music. Budapest: Akadémiai Kiadó, 1951- illus.) has been pub-

77 *Népzenénk és a szomszéd népek népzenéje ; 127 dallammal*, Budapest, 1934

78 *Die Volksmusik der Magyaren und der benachbarten Völker* (Berlin: Walter de Gruyter, 1935), *Narodnaia muzyka Vengrii i sodernikh narodov* (Moscow: Muzika, 1966)

lished under the names of Béla Bartók and Zoltán Kodály. The volumes published thus far appear to be the best compiled folk music collections ever: *I. Gyermekjátékok* (Children's games, 934 p.); *II. Jeles napok* (Special days, 1245 p.); *III A/B .Lakodalom* (Weddings, 1089, 704 p.); *IV. Párositók* (Pairing songs, 905 p.); *V. Siratók* (Laments, 1139 p.). Future volumes will not be restricted to but a single genre of song. This enterprise is regarded as one of methodological excellence replete with appropriate ethnomusicological interpretations.

There were at least forty to fifty learned ethnomusicologists working in Hungary. Among them are László Lajtha (1892-1963) who focused on Bartók's works on musical folklore and forms of folk music András Szöllösy who examined ancient Hungarian folk music and comparative musical folklore.

Bence Szabolcsi (b. 1899) occupied himself with comparative studies of the peoples who evolved and used the five-tone scale, as opposed to those who did not. He also studied Hungarian and universal histories of music.

Dénes Bartha (b. 1908) has published extensively on such topics as the eighteenth-century folk songs, Johann Sebastian Bach and universal music history, both instrumental and vocal. [79]

The following two works on the history of Hungarian music merit special mention: *"Chronicle of Hungarian music; a thousand years of our musical culture in documents"*[80], edited by Dezsö Legány and *"A history of Hungarian music"*[81] by István Szelényi (b. 1904).

79 For a more complete survey see Jaap Kunst, *Ethnomusicology: A study of its nature, its problems, methods and representative personalities to which is added a bibliography* . (TheHague: Martinus Nijhoff, 1974.) .

80 *A magyar zene krónikája; zenei müvelödésünk ezer éve dokumentumokban;* Budapest: Zenemükiadó, 1962. 535 p.)

The most recently published is "Hungarian folk-ballads and Europe" by Lajos Vargyas[82], is also a high-level comparative treatment of the subject.

Hungarian musicologists have also written monumental works of excellence in fields related to ethnomusicology. In closing this chapter let us mention a few of them: *Studia Musicologica* (1961- Budapest, biannual); *Magyar Zene* (Hungarian Music, 1960- Budapest, bimonthly); *Magyar Zenetudomány* (Hungarian musicology, 1953- Budapest, annual) and Monumenta Hungariae musica (1963- Budapest), a well-edited monographic series.

81 *A magyar zene története* . Budapest: Zenemükiadó, 1959. 2 vols.

82 *A magyar népballada és Európa*, Budapest: Zenemükiadó, 1976. 2 vols.

Mathematical and Natural Sciences

Mathematics

In mathematics, physics and several branches of the natural sciences, Hungarians displayed remarkable creative genius. Since the closing years of the fifteenth century they have assumed an active role in Europe's intellectual life. Georgius (György) of Hungary published his *Arithmetica* in the Netherlands in Latin, as early as 1499. This is regarded as one of the very first books ever written on the subject. But the Turkish occupation of a century and a half hindered any further progress.

Following the country's liberation from the Turkish occupation, György Maróthi (1715-1744), a Debrecen school master, wrote a model Hungarian mathematical textbook (*Arithmetica*, 1743). For many decades this has served as a guide for teachers and beginning students of mathematics.

Research by Hungarians in mathematics and analytic geometry started with the Bolyais. Farkas Bolyai (1775-1856), the father, studied in Göttingen where he forged a lifelong friendship with Karl Friedrich Gauss (1777-1855), the greatest mathematician of all time. Having finished his studies, Farkas Bolyai returned to Marosvásárhely (now Tirgu Mures, Romania) and by frequent correspondence with Gauss they continued their fruitful cooperation. Farkas Bolyai was the first to recognize the significance of axiomatic methods in his Latin-language *Tentamen* (1832/33) and made several strikingly new, innovative statements on integral calculus, as well as the theory of sets. He tried unsuccessfully to prove Euclid's parallel postulate (that is, that parallel lines meet at infinity).

János Bolyai (1802-1860) educated by his father, Farkas Bolyai and trained in the spirit of Karl Gauss, wrote his *Absolute Science of Space* (*Appendix scientiam spatii absolute veram exhibens*) in Latin, as an *Appendix* to the first volume of his father's *Tentamen*. János Bolyai succeeded in proving that both his father and Karl Gauss attempted in vain: showing that Euclid's parallel postulate was not necessary and that a whole system of geometry could be based on the pseudo sphere of Beltrami. János Bolyai had already proven the 5th Euclidean postulate (the axiom of parallelism) around 1820—much earlier than the Russian Nikolai Ivanovich Lobachevskii (1793-1856) did in 1829. Bolyai referred to this discovery in a letter addressed to his father, Farkas Bolyai, on November the 3rd, 1823 exulting that ". . .I have created a new world from nothingness. . ." Bolyai's revolutionary paper on absolute geometry opened new horizons in physics and even in philosophy. His discovery refuted the Kantian concept of "a priori space." Thus János Bolyai, with the Russian Nikolai Ivanovich Lobachevskii, was the founder of non-Euclidean geometry.

He is also known for his contribution to group theory. However, his work should also be viewed as an important step towards understanding the connection between gravity and the structure of space-time (general relativity). The epoch-making significance of Bolyai's discovery was recognized only years later when mathematical thought had adequately advanced and various schools had come into existence.

In Hungary the last quarter of the nineteenth century meant the breakthrough in mathematical thinking. After the decades-long standstill following the work of the Bolyais, two brilliant schools of mathematics were founded. One school of mathematicians grouped around the professors of the Technical University of Budapest. Here, Jenö Hunyadi (1838-1889), a pioneer of linear algebra, accomplished great results in the theory of conic sections which earned him an international reputation. Gyula König (1849-1913) also recognized internationally for his proofs of some basic theses of the theory of sets.

At the University of Kolozsvár, which later, in 1920, as a consequence of historic Hungary's breakup, was transferred to Szeged, Gyula Farkas

(1847-1930) excelled chiefly in mechanics and his investigations into linear disparity expanded the horizons of mathematical thought.

During the first years of the twentieth century, many young mathematicians appeared on the scene as the products of the then already famous Hungarian mathematical schools. Lipót Fejér and Frigyes Riesz should be the first of these to be mentioned, all the more because both of them created by means of a long line of gifted disciples a school of mathematics.

Lipót Fejér (1880-1959) is considered one of the country's foremost mathematicians. He spent the 1899-1900 academic year in Berlin and there, under the influence of H. A. Schwarz, his attention turned to the Fourier's series. He published his first treatise of major importance in 1900 entitled *Sur les fonctions bornées et integrables* (Paris). Many of his studies were published in German. Fejér laid the foundations for the modern theory of trigonometric series, thereby giving impetus to research in analysis. He taught mathematics first at Kolozsvár then at Budapest University. For his international renown Fejér was elected member of the division of mathematics and physics of the Göttingen Scientific Society, the Bavarian and Polish academies of sciences and the Calcutta Mathematical Society, to mention a few. Lipót Fejér was one of four of the most outstanding European scientists invited to the Chicago World Exhibition in 1933.

Frigyes Riesz (1880-1956) finished his university studies at Budapest, Zurich and Göttingen. Professor of mathematics at the University of Kolozsvár (later Szeged) from 1911 to 1945 and then at Budapest University until his death, Riesz had a great part in making Szeged one of the world centers of mathematical research. Together with Alfred Haár (1885-1933) he began in 1922 the periodical *Acta Scientiarum Mathematicarum* in which many famous papers were published. Frigyes Riesz most known achievement was the so-called Riesz-Fischer theorem in the domain of the theory of real functions. His role is widely acknowledged in the development of abstract spaces, Riesz is also well known as one of the founders of functional analysis, a branch of modern mathematics. His monograph *Les systèmes d'équations linéaires à une inflnité d'inconnues* (Paris, 1913) is considered a turning point in the field of functional analysis. His work co-authored by Béla Szökefalvi-Nagy (*Leçons d'analyse fonctionelle...*) was a worldwide bestseller and was translated into several languages.

Pál Dienes (1882, Tokaj - 1852, Turnbridge) obtained his degree in education at the Budapest University of Sciences in 1904. During his college years he spent a year at the Sorbonne in Paris. In 1909 he returned to defend his dissertation and received the "Docteur de la Sorbonne" degree. In 1917 he researched the theory of complex variables at the Budapest University of Sciences. In 1919 he was involved in the Communist revolution at the university and found it prudent to leave the country afterwards. He obtained a teaching position in 1921 at the University of Aberystwyth, Wales, then, in 1923 at Swansea. In 1931 his book on Taylor series was published in Oxford. Its second edition was published in New York in 1957, over 500 pages. His research interest was in differential geometry and infinite matrices. He was also a fine poet. After his retirement Fortune Press published his poems under the title *The Maiden and the Unicorn*, which was described as an artistic expression of his views on mathematics, philosophy and music. His new mathematical ideas were published in 47 papers.

József Kürschák (1864-1933) as a pupil of Gyula König, started his research and was associated with the Technical University of Budapest from 1891. Kürschák's research fields included investigations into determinants, matrices and the theory of numbers which brought him worldwide recognition. He took part in preparing mathematical curricula for the school reforms transpiring at the turn of the century.

One of the greatest mathematicians of our time, John von Neumann (1903, Budapest - 1957, Washington) attended the famous Lutheran High School at Budapest. After graduation he studied chemistry at the famous Eidgenössische Technische Hochschule in Zürich and took his degree in 1926. Von Neumann obtained his Ph.D. in mathematics in Budapest in

1927. After studying in Göttingen, Berlin and Hamburg he went to Princeton University in 1931 as a lecturer. In a short time he was promoted to be professor of mathematical physics. In 1933 he joined the newly founded Institute for Advanced Studies, Princeton, NJ, as research professor of mathematics. He remained a member of the Institute until his death. In 1945 von Neumann was appointed director of the Electronic Computer Project, Institute for Advanced Studies, which under his guidance developed several major electronic computers. He was the original developer of the binary code, the basic element of modern computer operations. After a while, his attention turned to quantum mechanics. His monograph, *Mathematical Foundations of Quantum Mechanics* (1932) has remained the standard treatise on the subject. Von Neumann's interest extended to several questions of applied mathematics. He was one of the founders of the theory of games, a momentous accomplishment. His application of the theory of games to economics is likewise of great significance. Its results were published in cooperation with economist Oskar Morgenstern under the title *Theory of Games and Economic Behavior* (1944). Von Neumann's research work decisively influenced the progress in the theory of computers and automata. During World War II von Neumann took part in the development of the atomic bomb. Because of his achievements, he became a member of the U.S. Atomic Energy Commission.

Károly Jordán (1871-1959) did pioneering work in the fields of mathematical statistics and the calculus of probabilities[1].

Between the world wars and afterwards, many noted mathematicians emigrated to Great Britain and to the United States. Among them, Pál Dienes (1882-1952) went to England and became professor at Birkbeck College. His monograph *The Taylor Series; An Introduction to the Theory of*

1 *Statistique mathematique* . Paris, 1927.

Functions of a Complex Variable (New York, 1957) is still widely used and appreciated.

Tibor Radó (1895-1965) started the Technical University of Budapest in 1913, but the war interrupted his studies. Later, he completed his mathematics education at the University of Szeged in 1921. There he taught mathematics until 1928, when he received a Rockefeller Foundation scholarship to study in Munich. In 1929 - 30 he taught at Harvard, then settled at Ohio State University until his retirement in 1948. His main interest was in conformal transformations and in Riemann surfaces. His major accomplishments included the determination of topologic bases on mathematical analysis, contributions to the subharmonic functions, an the mathematics of automatons.

Kornél Lánczos (1893-1974) graduated from the Budapest University of Science with a degree in Physics and worked at the physics department of the Technical University of Budapest afterwards. After receiving his doctorate in 1921, he went to Frankfurt and then on to Berlin. There he met Albert Einstein with whom he built up a close working relationship. They became a life long friends. In 1930 Lánczos moved to the United States and became a professor at Purdue University, one of America's best engineering schools, in Lafayette, IN. In the 1950's he returned to Europe to work at the Dublin Institute of Advanced Studies for the rest of his life. His scientific work first concentrated on the general theory of relativity. He advanced the unified field theory, combining gravitational and electric fields. His other scientific interest was in quantum mechanics, approaching the problems of eigenvalues from the concept of integral equations. He made many contributions in developing simplified approximative mathematical techniques, that later became very useful when adapted to algorithms for electronic computers. He wrote almost a hundred scientific papers, and several books.

Francis N. Nagy was known for his research and inventions on solid-state micro/nanoautomation technology. His pioneering development of the first British switching-mode, electrically driven antistatic ro-bot in the United Kingdom. He was a founding member of the first Information Technology Centre in the UK.

John G. Kemény (1926, Budapest-1994), at the age of 13 was recognized to be a genius. He was brought to the United States in 1939. When 17 years old, he was called up as a soldier and assigned to be a mathematician on the Manhattan Project. After the war he became the assistant of Albert Einstein. He has developed the BASIC computer code (with Tom Kurtz) from which earned him the name: “Father of Microcomputing”. Kemény was active in several fields of mathematical research, namely in mathematical analysis, business mathematics and in investigations into Markov processes. Later he became the president of Dartmouth College. (Kemény’s brother-in-law was writer George Mikes, humorist author of *How to be an Alien* and other bestsellers.)

Pál Erdös (1913-1997) completed his studies in Budapest and from 1934 has lived in Great Britain and the United States. His main fields of interest included the theory of numbers along with the calculus of probabilities, etc. His international distinction is based on more than a thousand of his scientific publications.

Pál Turán (1910-1976), was professor of mathematics at the University of Budapest, who was especially versed in the theory of numbers and mathematical analysis and probabilistic number theory. In 1938 he introduced the sum-power method, an entirely new method of analysis[2] which has been translated into English and Chinese.

Following a line of great tradition, many a Hungarian mathematician has extended the work of Frigyes Riesz. Foremost among them was his one-time closest associate, Béla Szökefalvi-Nagy (b. 1913). Szökefalvi-Nagy was trained by his father, Gyula, (1887-1953) also a noted

2 *Eine neue Methode in der Analysis und deren Anwendungen,* 1953

mathematician and by Frigyes Riesz—with whom he collaborated for many years. His first standard work appeared in Berlin in 1942 under the title *Spektraldarstellung linearer Transformationen des Hilbertschen Raumes*. He has been professor of mathematical analysis at Szeged University from 1948. During 1964 he was guest professor at Columbia University, New York City and in 1970 at Indiana University. He was a leading world authority on functional and mathematical analysis. Several of his treatises have been published in English, German, French, Russian and Chinese. Szökefalvi-Nagy received an honorary doctorate from the Dresden University of Technical Sciences and from Finland's Turku University and was elected (foreign) member of the Academy of Sciences of the Soviet Union.

Algebra has played a prominent role in contemporary research. Alfred Rényi (1921-1970) and László Rédei (1900-1980) and their associates have achieved international fame in this discipline. Rényi, with his co-workers, has applied, with great success, the calculus of probabilities and the methods of mathematical statistics to many practical problems. Rédei's main fields of investigation embraced many algebraic and geometrical problems, most importantly the theory of numbers. His major work (*Algebra*, 1954) was published in English as well as German. Internationally valued work in geometry has been done by a great many other specialists, among them György Hajós (1912-1972), Ottó Varga (1909-1969), László Fejes Tóth (b. 1915) and Pál Szász (1901-1978). They followed the best traditions of Hungarian science as once represented by Béla Kerékjártó (1898-1946) who produced lasting results in the theory of topological groups and in projective geometry. László Fejes Tóth was guest professor at Freiburg (1960-1961) and at the University of Wisconsin (1963-1964).

Rózsa Péter (1905-1972) in Budapest has distinguished herself as a researcher in the foundations of mathematics and has carried on noteworthy investigations into recursive functions. Her *Rekursive Funktionen* (1951, 1957) has been translated into English (*Recursive Functions*. 3d rev. ed., 1967), Russian and Chinese. From 1937 Ms. Péter has been on the editorial boards of *The Journal of Symbolic Logic* (Princeton) and since 1955 of the *Zeitschrift für mathematische Logik und Grundlagen der Mathematik* (issued in East Germany at the time). Her *Játék a végtelennel: matematika ktvüzállóknak (Playing with infinity...*) New York: Simon & Schuster, 1961, 1962) has reached 20 editions in 10 languages.

László Kalmár (1905-1976) dealt chiefly with mathematical logic, cybernetics and topics of applied mathematics. He has published several papers at home and abroad.

György Pólya (1887, Budapest - 1985, Palo Alto) obtained his doctorate in mathematics in Budapest, then continued his studies at Göttingen, Paris and Königsberg. In 1914 as an associate and in 1928 as professor, he joined the teaching staff of the Eidgenössische Technische Hochschule in Zürich. From 1940 Pólya lived in the United States and taught first at Brown, then at Stanford universities. He produced significant results in the theory of real and complex functions, calculus of probabilities and the methodology of mathematical problem-solving. His collection of mathematical problems[3] (co-authored by Gábor Szegö) is considered an indispensable textbook. His book *How to Solve it?* (1945) was translated into sixteen languages. He has written over 250 scientific publications. His *Collected Works* were published in four volumes (1974-1984).

Gábor Szegö (1895, Kunhegyes - 1985 Palo Alto) studied at Budapest and Vienna universities, then taught at Berlin and Königsberg. From 1934 Szegö lived in the United States was on the faculty of Washington University in Saint Louis and, from 1938, at Stanford. He pursued studies in the fields of mathematical analysis, orthogonal polynomials and Toeplitz matrices. In 1965 Szegö became an honorary member of the Hungarian Academy of Sciences.

3 *Aufgaben und Lehrsätze aus der Analysis* (2 v., 1925, 1959)

Alfred Haar (1885 Budapest-1933 Szeged) introduced in 1932 a measure on groups, now called the Haar measure, used by von Neumann and others.

It is impossible for lack of space to survey *in toto,* however superficially, the activities of those Hungarian mathematicians who have greatly contributed to their science. Noted mathematics professors of Hungarian descent can be found all over the world and especially in the United States.

Hungary's high-school students have won international mathematical contests every single year as individuals, as well as in teams. This fact explains the past and present achievements of Hungarian mathematicians and augurs well for the future of Hungarian science.

Physics

Edited by Szabolcs Marka

From the earliest times, Hungarians expressed interest in physics. Izsák Czabán (Zabanius) the first known advocate of atomic theory in his *Existentia atomorum* (1667). János Pósaházi (d. 1686), one of the masters of the famous Sárospatak College—where Johann Amos Comenius, the world famous Czech educator taught between the years of 1650 and 1654—compiled an early bestseller of his age on physics in 1667 entitled *Philosophia naturalis*. Pósaházi, who had studied at Utrecht and Franeker, through this book helped educate future generations of scientists in his native land and elsewhere in Europe.

Somewhat later, in 1678, Márton Szilágyi Tönkö, from Debrecen, authored the first monograph on Cartesian physics in Hungary.

Gradually, Debrecen became an important cultural center of the nation. One of the century's foremost physicists András Ségner (1704, Pozsony-1777, Halle) began his higher educational studies at the Debrecen College in 1724. A year later, he enrolled in the Medical Faculty at Jena, studying medicine and physics simultaneously. In 1730 he obtained his medical diploma and immediately began his medical practice in Pozsony. The following year Ségner began practicing medicine at Debrecen, as the city physician. Afterwards, between 1733 and 1755, Ségner worked as professor of physics, mathematics and chemistry at Göttingen University and then taught physics, mathematics and astronomy at Halle, Germany.

Ségner achieved noteworthy results in fluid mechanics as well as in the mechanics of solids. Among his multi-faceted endeavors, the domain of hydraulics is registered in the history of science as the most important. András Ségner was the first scientist who introduced the concept of surface tension of liquids. He invented the so-called Ségner wheel, the ancestor of reaction-turbines. This he first described in 1740 in his Göttingen treatise under the title *Programma quo theoriam machinae cuiusdam hydraulicae praemittit*. Leonard Euler's epochal equations, the theoretical foundations of fluid motion, were proven by Ségner's experimental results on turbines.

Ségner also excelled as a mathematician by producing, among other things, the first proof of Descartes' theory. In return for his theoretically as well as practically important inventions, Ségner was elected member of the Royal Society in 1739, the Berlin Academy in 1747, the Göttingen Royal Scientific Society in 1751 and the St. Petersburg Academy in 1754. Karl Keller, a Ségner biographer[4] and many leading historians of technology regarded Ségner as the father of the turbine.

Elek Horányi (1736, Buda - 1809, Pest) joined the Piarist Order in 1752. He studied philosophy in Pest and from 1756 studied natural sciences in

4 Karl Keller: "Johannes Andreas Segner" in *Beitrag zur Geschichte der Technik und Industrie*, 1913, p. 54-72

Rome. He continued his education in Switzerland, Holland and England. After he completed his educational tour, he taught at various Piarist schools in Hungary. In his three volume book entitled *A Memoria Hungarorum* published in Vienna he described the life accomplishments of 1155 Hungarian scientists. His work resulted in invitations to several scientific societies of Europe. In 1778 he obtained his doctor of philosophy degree. In addition to his work in the history of science, his publications on electricity are noted, in which he expounded Benjamin Franklin's work. In his *A selecta universae Philosophiae capita* ((Tyrnaviae, 1768), he proclaims the superiority of experimental physics over philosophical foundations.

Mathematician-astronomer Miksa Hell (1720-1792) was the son of Mátyás Cornelius Hell, chief mathematician of the Selmec mines. Having graduated from Vienna University's Faculty of Philosophy, he taught at Löcse (now Levoca, Slovakia), Zsolna (now Zilina, Slovakia) and Kolozsvár (now Cluj, Romania). He helped establish and modernize observatories at the University of Nagyszombat (now Trnava, Slovakia), in Kolozsvár, Eger (Hungary) and Vienna where he was appointed director of the observatory. Miksa Hell was regarded a great authority by European astronomers for his mathematically well-based observations which are partly described in his astronomy yearbook *Ephemerides astronomicae ad anni ... ad meridianum Vindobonense*, published between 1757 and 1793. His many-sided interests (astronomy, mathematics, geography, history, etc.) are reflected in the prolificness of his publications. Miksa Hell and János Sajnovics (1733-1785) were the first to compute correctly the distance between the Sun and the Earth based on their observation of the planet Venus moving in front of the Sun.

Miklós Konkoly-Thege (1842-1916) although a versatile scientist, was above all an astronomer. In 1871 he built his own Ógyalla (now Stará Dala, Slovakia) meteorological and geomagnetic observatory which was recognized throughout the world. Among his several inventions are the Konkoly-Thege diagrams which are still used today. A. Kopff, former president of the Astronomische Gesellschaft, in 1942 acknowledged the uniqueness of Konkoly-Thege's accomplishments when he stated that...

"Konkoly-Thege was the first to conduct astrophysical investigations and is now considered the founder of this young discipline."

Jenö Gothard (1857-1909) under the influence of Konkoly-Thege became an astronomer and constructed his private observatory at his estate in Hereny, near the city of Szombathely[5]. Gothard was one of the fathers of astrophysics. He designed and constructed a number of photographic and spectroscopic instruments and furthered the growth of amateur photography. According to J. M. Eder: "a Hungarian amateur (Jenö Gothard) has fought for and established the right of photography in the domain of astronomy."

Ányos Jedlik (1800, Szimö - 1895, Györ) a Benedictine monk, was a genius in experimental physics. Between 1840 and 1878 Jedlik taught physics at Budapest University of Sciences. At the beginning of his scientific career he dealt with chemistry, electrochemistry and electricity. Later, in addition, Jedlik engaged in optical experiments. During the years 1827-1828, he conducted experiments that resulted in the invention of the first electro-motor. This electro-motor worked on the basis of electromagnetic effect. With this invention, Ányos Jedlik became the first physicist-technologist who as early as 1827 transformed electrical energy into motion. Jedlik made several improvements on his electro-motor to demonstrate that it is suitable for powering vehicles. In 1855, he designed a model for an electric motorcoach. In 1850 Jedlik developed the first unipolar machine. In connection with relevant experiments he discovered—six years earlier than either Werner Siemens and Charles Wheatstone did—the principle of the dynamo and constructed the first model of his dynamo-electric motor. His unipolar machine seems to be of utmost importance because J. Noegerrath invented his unipolar generator for practical use a full half century later in 1905.

5 *"A herenyi astrophysikai observatorium leirása és az abban tett megfigyelések 1881-ben"* in A Magyar Tudományos Akadémia Értesitöje , no. 3, 1882, p. 1-35

Ányos Jedlik's third significant invention was the construction of his "electrostatic machine", a high-capacity electric condenser. For this invention, on recommendation by Werner Siemens himself, the "Medal for Progress" was awarded to Jedlik at the 1873 Vienna World Exhibition. This equipment was an early form of impulse-generators, that are now applied in nuclear engineering research.

His experiments on light interference conducted in the 1860's were also regarded as pioneering research.

Out of his fifty-three years as physics teacher Jedlik spent 38 years at the university level. During his educational career he wrote the first Hungarian physics textbook in 1850. With his successor, Loránd Eötvös, he educated the subsequent generations of the country's physicists.

Loránd Eötvös (1848-1919) university studies, including his doctoral degree, were completed at the University of Heidelberg under such professors as Kirchoff, Bunsen and Helmholtz. Very soon he became the greatest Hungarian scientist of theoretical and experimental physics. Eötvös did much in Europe's professional circles to have the priority of Jedlik's inventions acknowledged. In 1872 Eötvös was appointed to the chair of theoretical physics at Budapest University. From 1870 on, for about two decades Eötvös examined capillary phenomena and worked out an entirely new method for measuring surface tension, the widely used Eötvös' reflection method. Through theoretical reasoning, Eötvös recognized the correlation between surface tension, and molecular weights of liquids measured at different temperatures. In doing so he discovered the so-called Eötvös Law (1866). The Eötvös Law was declared by Albert Einstein to be one of the pillars of his theory of relativity. For many years Eötvös studied the problem of gravity and designed the world-renowned Eötvös Torsion Balance (Pendulum) which measured the minute changes of gravity and determined the distribution of masses in the earth's crust. The Eötvös Torsion Balance is still used all over the world for gravity measurements and for geophysical explorations. His ingenious method of measurements won him the prestigious Göttingen

Benecke Prize. His method was subsequently improved upon by his disciples, and the American Dicke.

Eötvös finally extended his research into the field of electromagnetism and designed appropriate instruments for this purpose. He also called geophysicists attention to the presence of the Coriolis force. With this, he gave new proof of the earth's rotation. Eötvös' contribution to science has always been highly valued by the international community. In remembrance of the eightieth anniversary of the first measurements by the Eötvös Torsion Balance (1891) the Hungarian Academy of Sciences sent commemorative photographs and literature to the world's leading geophysicists of the day. Sigmund Hammer's letter of thanks is typical and reflects fully the deep appreciation of Eötvös' work existing even in our decade. Sigmund Hammer, professor of geology-geophysics at the University of Wisconsin, said in his letter addressed to professor György Barta of Hungary: "I deeply appreciate your thoughtfulness and kind generosity in sending me photographs and literature celebrating the 80th anniversary of the beginning of active field operations by the Eötvös Torsion Balance. I will prize these very highly for the rest of my life. The World owes a great debt to your illustrious countryman. As a small return for your great kindness to me, I am enclosing a reproduction of the Torsion Balance map which led to the first oil field discovery by geophysicists in the western hemisphere. I have distributed this little map to hundreds of my students and co-workers in geology and geophysics. It was traced from Dr. Barton's paper 'The Eötvös Torsion Balance Method of Mapping Geologic Structure', *Technical Publication No. 50, American Institute of Mining and Metallurgical Engineers*, 1930."[6]. The use of the Eötvös Torsion Balance has been a landmark in geological research and prospecting and was instrumental in the discovery of oil fields in Texas, Venezuela, the Zala oil fields in Hungary and elsewhere.

6 *Magyar Tudomány*, June 1972, p. 395-396

Radó Kövesligethy (1862-1934), himself a world famous seismologist, was the assistant of Eötvös between the years of 1883 and 1893. His monographs on mathematical and astronomical geography (1899) and on the universe (1906), as well as his Latin-language *Seismonomia* (Modena, 1906), are still highly valued and his findings discussed at today's international symposia.

Since Eötvös' work, his countrymen's studies in gravitation, geomagnetism and seismology have been notable. Among them the achievements of László Egyed (b. 1914), who headed the Budapest University's Institute of Geophysics, deserve special mention. He has contributed much, in the spirit of Eötvös, to the science of geophysics. The international community of geophysicists has focused growing attention on Egyed's investigations into the inner layers of the earth. In connection with the latter, László Egyed developed an entirely new theory relating to the expansion of the earth's inner structure. His main works on geophysics (1956) and earthquakes (1966) have been translated into several foreign languages.

Sándor Mikola (1871-1945) came from a poor peasant family of Slovenian background. He received his diploma from The Budapest University of Science in 1898 and became a teacher of physics at the Lutheran Highschool ('Fasori Gimnázium') in Budapest between 1897 and 1935. From 1928 he was the principal of the school. His students included such giants of the scientific world as John von Neumann, Eugene Wigner. Both of them remembered him and his mathematics teacher colleague László Rácz, with gratitude and appreciation. His well equipped laboratory allowed him to produce high quality scientific results. He wrote published several books on the teaching of physics. His influence on scientific education in Hungary was considerable.

István Rybár (1886-1971) obtained his teaching diploma in physics and mathematics at the University of Sciences in Pest. By 1908 he was already assisting Loránd Eötvös and later he became his principal associate. From 1915 he was a university lecturer. In his scientific work his attention leaned towards questions in spectrum analysis and the reflexion of light.

Later, he concentrated on the improvement and development of the torsion balance. In 1930 he spent several months at the University of Houston. After returning to Hungary, he became a member of the Loránd Eötvös Institute of Geophysics. From 1931 he was a member of the Hungarian Academy of Sciences. His type E-54 improved torsion balance won the grand prize at the Brussels World Fair in 1958.

Károly Novobátzky (1884-1967) worked out a uniform space theory and the electrodynamics of insulating materials. Novobátzky founded a new school of theoretical physics.

From the end of World War II, research has focused on experimental physics for the simple reason that scientific tasks in Communist Hungary were made to support national economic plans. Research in physics was under the supervision of the Hungarian Academy of Sciences at its Central Institute for Physical Research (KFKI), as opposed to being concentrated at university institutes. Since the mid-thirties experimental physicists have undergone part of their training at the well-equipped laboratories of the United Incandescent Lamp and Electric Factory (Egyesült Izzólámpa és Villamossági Rt., Budapest) After the 1970's, as the paranoid Communist oppression eased up, young researchers had increasing opportunities to travel and receive training at foreign institutes.

The task of describing principal achievements in contemporary physics is a time- and space-consuming enterprise. Therefore, we will restrict our discussion to internationally renowned physicists.

Fülöp Lénárd (1862-1947) received his Nobel Prize in Physics (1905) for his contribution of the physics of cathode rays (electron beams). He discovered the photoelectric effect and his accurate observations related to it played a key role pointing towards quantum theory. He conducted extensive research on the physics of phosphorescence and luminescence. His invention of the so-called 'Lénárd window' made possible to conduct experiments with electron beams and to study fluorescence outside of cathode ray tubes. He also invented the photoelectric cell, which is the basic constituent of most electron tubes.

Pál Selényi (1884-1954) invented the electrographic process which is the conceptual basis of the Xerox copying machines.

From 1933 Michael (Mihály) Polányi (1891-1976) has taught at Oxford. His manifold areas of expertise embrace physicochemistry, sociology and philosophy which is a very rare phenomenon in our age of specialization. Polányi's investigations into the structure of metals and the adsorption of gases are significant. Interestingly, since about 1945 Polányi's interest has been devoted to the problems of epistemology and the philosophy of science. In his later years, his research, lecturing and publishing in these fields have earned him a worldwide reputation.

Egon Orowan (1902-1989) was born and raised in Budapest. He started his college education in Vienna and completed it in Berlin. Upon returning to Hungary in 1933, he wrote an article in the *Zeitschrift für Physik* on his research on the plasticity and crystal dislocation of metals. This paper represents the beginning of modern physics of metals. He spent four years during research at the Incandescent Light and Electric factory, after which he moved to Cambridge to work at the Cavendish Laboratory. In 1950, he accepted an invitation to MIT's Department of Mechanical Engineering. He realized that the faults in crystal structures and plasticity concepts apply to rocks as well as to metals and turned his attention to geophysical research. The fact that his early theoretical assumptions were correct was proven by electron microscopy twenty years after he published them. He has written a great number of scientific articles. His accomplishments were recognized by being elected member to the Royal Society as well as to the National Academy of Sciences.

Lajos Jánossy (1912-1978) worked abroad as a physicist—from 1934 to 1950 in Berlin, London and Manchester and between 1947 and 1950 as the head of the School of Cosmic Physics at the Dublin Institute for Advanced Studies. He developed the mathematical apparatus of the theory of cosmic radiation. Jánossy's monographs on cosmic radiation, theory of relativity, quantum theory and the problem of the application of the calculus of probabilities in physics were published worldwide. He also did valuable research work in nuclear physics together with Dezsö Kiss, Lénárd Pál and Ervin Fenyves (b. 1924).

Pál Gombás (1909-1971), a condensed matter physicist, developed the statistical model of atoms.

Ágoston Budó (1914-1969) and István Kovács (b. 1913) excelled in the study of the structure of molecular spectra and aroused the interest of scientists outside Hungary in their work.

Sándor Szalay, Sr. (1909-1987) was the father of nuclear physics in Hungary. He discovered the enrichment mechanism of uranium in nature which lead to the discovery of several uranium deposits worldwide. He found one of the richest uranium deposits of the region of the Mecsek mountains in Hungary. He founded the Institute of Nuclear Research of the Hungarian Academy of Sciences. In 1955 Szalay and Gyula Csikai discovered neutrinos on their cloud chamber photograph, showing the nucleus abruptly changing direction as it emits a neutrino.

György Marx (b. 1927) dealt highly successfully with the physics of elementary particles, worked out the theory of neutrino emission of the Earth and Sun. Marx and his student, Sándor Szalay Jr. proposed to explain the distribution of the clusters of galaxies by the gravitational accumulation of massive neutrinos in the Early Universe. The research for this Dark Matter is still in the focus of astronomical interest.

Sándor Szalay Jr. was awarded Hungary's Széchenyi Prize in 1991 for his discovery of the large scale (400 million light years) distribution pattern of galaxies.

Between the world wars and afterwards many well-trained physicists left the country and found excellent opportunities abroad, especially in the United States, to continue their already well-known physical research work.

Three Hungarian-born physicists, Edward Teller (b. 1908), Leo Szilárd and Eugene P. Wigner worked closely with Enrico Fermi. The four of them persuaded Albert Einstein to write his historic letter in 1939 to President F. D. Roosevelt that lead to the start of the U.S. atomic-bomb project (The Manhattan Project). These Hungarian physicists received the highest honors that science and the United States can bestow and they rank among the architects of the atomic age.

Teller, the "father of the hydrogen bomb"—an nickname he loathes—studied at Budapest and in Göttingen, from the leading atomic physicists of the world. With the rise of Hitler he first moved to Denmark, then to Britain and in 1935 he emigrated to America. By 1941 he was part of the research group of Enrico Fermi that produced the first nuclear chain reaction. In 1958 Teller was appointed director of the new federal weapons laboratory at Livermore, California. He was also professor of physics at the University of California at Berkeley. In 1962 the U.S. Atomic Energy Commission conferred the Enrico Fermi Award on Edward Teller. He was instrumental in the development of submarine-launched rockets and the conceptual design of America's missile defense system, Star Wars. His scientific work was substantial in America's winning of the Cold War and the subsequent demise of the Soviet Union.

Leo Szilárd (1898-1964) from the beginning of the twenties has been associated with the Institute of Theoretical Physics at the University of Berlin. He became a physicist under the influence of Einstein and Planck. With Einstein, in 1929, he jointly patented a refrigerator with no rotating parts. In the year of the Nazi takeover in 1933, Szilárd left Berlin and after a brief stay in Vienna, went to London. In England one of Rutherford's lectures aroused his interest in atomic energy. In 1937 he joined the staff of Columbia University in New York. Between 1942 and 1945 he conducted research in nuclear physics at the University of Chicago. He helped Enrico Fermi's team design the first nuclear reactor which commenced operation at the University of Chicago on December 2, 1942.

After the first use of the atomic bomb, Szilárd became so disillusioned that he advocated the peaceful use of atomic energy and international control of nuclear weapons. As a consequence, he received the Atoms for Peace Award in 1959.

Eugene (Jenö) Wigner (1902-1995), like John von Neumann, attended the Lutheran High School in Budapest. He started his career as a chemical engineer, but very soon his interest turned to theoretical physics, which he taught at the Berlin Technical Institute, then at Princeton University and afterwards at the University of Wisconsin. In 1936 he evolved the theory of neutron absorption which was utilized in constructing nuclear reactors. After this he worked out his law of parity conservation. In the years of World War II, Wigner was in charge of the group concerned with the theory of chain reaction and the basic design for the plutonium-producing reactors at Hanford, Washington. For some years he taught theoretical physics at Princeton University after the war, then he was appointed a member of the General Advisory Committee to the U.S. Atomic Energy Commission. In 1963 Wigner won the Nobel Prize for Physics for his extraordinary contributions to nuclear physics including his formulation of the law of conservation of parity. Eugene Wigner has published extensively on theoretical and nuclear physics and was the author of *Dispersion Relations and their Connection with Casualty,—Group Theory and Symmetries and Reflections: Scientific Essays.* He wrote over 200 papers on physics.

Maria Telkes (1900, Budapest-1995) has long been acknowledged as a pioneering authority in the use of solar energy. Telkes has been associated with several prestigious U.S. research organizations. Photovoltaics, solar cooking, heating, distillation and thermoelectricity were some of her areas of interest.

Joseph Lindmayer, formerly with the Hungarian Academy of Sciences, has also conducted research in solar energy utilization. In his other field of interest he published the *Fundamentals of semiconductor devices* (Princeton, NJ: Van Nostrand, 1965. 486 p.). One-time department head of semiconductor physics of the Sprague Electric Company Research Center in North Adams, MA, Lindmayer was branch manager of the Communication Satellite Corporation's Comsat Laboratories in Bethesda, MD.

Zoltán Bay (1900-1992) graduated (Ph.D., 1926) from the Budapest University of Sciences[7]. From 1926 to 1930 he conducted research in the Physikalisch-Technische Reichsanstalt and in the Physikalisch-chemisches Institut of the University of Berlin. His experiments culminated in the first spectroscopic proof that active nitrogen gas contains free nitrogen atoms. In 1930 he obtained the chair of Theoretical Physics at the University of Szeged (Hungary). In 1936 he was invited to head the Research Laboratory of the United Incandescent Lamps and Electric Co. (Tungsram) in Budapest. Among several patents he developed the pioneer patent for electro-luminescence in 1939. During World War II Bay was ordered by the Hungarian government to work on radar. Completely isolated from foreign literature, he developed the Hungarian military radar. After the war he built equipment to detect radar echoes from the moon. Even though his work was hindered by the devastations of the war, it led to success in early 1946, simultaneously with the independent similar work by the U.S. Army Signal Corps (led by J. H. De Witt). These two experiments are now considered to be the starting accomplishments of radar astronomy. However, the Hungarian experiment, by introduction of the principle of repetition and long time integration, went one step further in the direction of later development. All modern radar astronomy systems take advantage of integration, first demonstrated in Bay's design.

While chief of the Tungsram Laboratory, Bay also headed the Institute of Atomic Physics established in 1938 at the Technical University of Budapest. In his research there, Bay introduced for the first time the princi-

7 This biographical sketch contains excerpts from *Fifty Years in the Laboratory; A Survey of the Research Activities of Physicist, Zoltán Bay*, by Francis S. Wagner.

ple of secondary electron multiplication in atomic counting. With this, he increased the speed of counting by three orders of magnitude. The new concept served as the basis for all subsequent high speed counting, e.g. for scintillation counters and photomultipliers. By applying the new counters Bay worked out the first nanosecond coincidence circuits in 1943.

In 1948, just before the Communist take over, Bay left Hungary for the United States. He continued his fast coincidence work at George Washington University. By introduction of the principle of the differential coincidence circuit, he could reduce the resolving time to a small fraction of a nanosecond, surpassing in that respect all other contemporary coincidence circuits. The application of his circuitry and that of his coincidence theory led to important results in the measurements of very short time intervals.

In 1955 Bay joined the National Bureau of Standards. There he first conducted research into ionization by high energy particles in matter. By developing new techniques he improved the accuracy of the measurements of important constants and helped to clarify the theory of the ionization process.

After the advent of lasers, around 1960, Bay's interest turned towards a new possibility of measuring the speed of light. In the course of his investigations, he concluded that his new experimental design permitted the measurement of optical frequencies—a first in experimental physics. This opened the way to the first practical realization of a new measurement system, in which the units of time and length are connected through the speed of light. His experimental proof, that the universal system of measuring time and length based on the speed of light was, in fact, valid, represented a breakthrough in measurement science. On his 90'th birthday, Bay received the order of the Hungarian Republic adorned with rubies.

Miklós Kürty (b. 1908) was a pioneer of low temperature physics. He achieved very low temperatures (well below 1 K) via magnetic cooling. He received the Fritz London Award for reaching microkelvin temperatures. During World War II he has worked on the British atomic bomb project to develop an isotope separation method by means of gaseous diffusion.

Károly Simonyi's (b. 1916) important contributions to science covers electron, nuclear and accelerator physics, microwave and radar technology. Simonyi was a collaborator of Zoltán Bay's radar echo experiment. He is also the author of an outstanding book: *The Cultural History of Physics* which was translated into several languages. His son Charles Simonyi had been one of the founders of the Palo Alto research laboratory of Xerox Corporation. Currently, he is a chief software architect of Microsoft Corporation, directing the development of the Excel and Word programs.

Pál Greguss (b. 1921, Budapest) graduated at the University of Szeged with a degree in physics and chemistry in 1944 and received his doctorate there in 1951. He taught biophysics at the University of Budapest and then joined the Central Physics Research Institute of the Hungarian Academy of Sciences between 1949 and 1951. Between 1956 and 1976 he headed the Ultrasonic Research Laboratory of the Railway Scientific Research Laboratory. In 1966 and 67 he was invited as a research scientist to the University of Durgapur, India, then became research professor of ophthalmology at the Applied Biophysics Institute at the New York Medical College from 1969 to 1973. Greguss served as professor at the Institute of Physics at the Technical University of Darmstadt between 1973 and 1977. In 1976 he was appointed as head at the newly created Applied Biophysics Institute at the Technical University of Budapest, where he served until 1990. In 1989 he received a Certificate of Recognition from NASA for inventing the PAL optics, a 360 degree lens, which is used as the optical part of the PALAD instrument for precise location determination in space. This instrument became part of NASA's Deep Space research program. Pál Greguss is the author of over 330 scientific publications, owner of over twenty international patents. He is a scientific consultant of research organizations such as NASA, “Frédéric Joliot-Curie” National Research Institute in France and the Department of Manufacturing of the Technical University of Budapest.

Imre Izsák (1929, Zalaegerszeg - 1965 Paris) after tumultuous years at the end of the second world war, including a stint as prisoner of war, he completed his studies at the University of Budapest in 1951. His first position was at the Astronomical Observatory of the Academy of Sciences, then he became an instructor at the University of Szeged. After the 1956 Revolution he escaped from Hungary and went first to Locarno, then to the United States. From 1958 he worked at the University of Cincinnati and in 1959 he joined the Smithsonian Institution’s Astrophysical Laboratory in Cambridge, MA. By the following year, he became director of NASA’s Department of Celestial Mechanics. He had many publications. His work actually proving that the equator of the Earth is not circular and its surface is wavy (geoid undulation) is one of the most remarkable. One of the Moon’s craters was named after him, so was one of the asteroids.

Chemistry

Up to the middle of the nineteenth century, progress was very slow in chemistry. One of the reasons being that the country’s industrial development did not show any encouraging signs. It is by no means surprising that under these circumstances chemistry could not be regarded as an independent branch of science but was associated with medicine. The first Hungarian book on chemistry was written by a physician, Ferenc Nyulas (1758-1808). His book dealt with the chemical analysis of medicinal waters of Transylvania[8]. Nyulas thus adopted and popularized the trend of chemical analysis. In addition, Ferenc Nyulas was one of the

8 *Az erdélyországi orvosi vizeknek bontásáról*. Kolozsvár, 1800

discoverers of manganese and described it long before Klaproth, to whom this work is generally credited. In spite of Nyulas' work, chemistry remained a neglected branch of scientific activities for decades afterwards. Only a few individuals like János Irinyi (1819-1895) devoted some research to it. Irinyi conducted experiments which led to the invention and improvement of phosphorous matches.

Real progress came only in the second half of the nineteenth century and was ushered in by Móric Preysz (1829, Sopron - 1877, Budapest) who studied at Pest and in Vienna. Preysz demonstrated as early as 1861 that the post-fermentation of the Tokaji wine (popularized in the United States under the name "Tokay") can be prevented if it is heated in a closed vessel at temperature of 70-80 C°, which is then kept air tight. He demonstrated this method of preventing post-fermentation in Tokaji wine at the 1862 general meeting of the winemaking society of the Hegyalja region (Hegyaljai Bormivelö Egyesület), thus preceding by years Louis Pasteur (1822-1895), who presented his process of pasteurization only in 1865. The scientific world could not take cognizance of Móric Preysz process because his relevant articles appeared only in Hungarian periodicals[9].

Systematic and organized research in chemistry began with Károly Than (1834, Óbecse - 1908, Budapest). At age fifteen, he joined the Hungarian army during the 184849 revolution. After the war he worked as a pharmacist's assistant while completing high school. In 1853 he received a scholarship to the University of Vienna. Obtaining his doctorate in chemistry in 1858, he then spent a year in Heidelberg as Bunsen's disciple, after which his attention turned to physical chemistry and gasometry. From 1860 Than taught chemistry at Pest University and in 1872 he established the First Institute of Chemistry at Pest University,

9 *"Vélemény és inditvány a borok megtörésének elhárítására nézve,"* Gazdasági Lapok, 1859; *"Néhány szó azon módokról, melyek a bor romlásának meggátolására szolgálnak,"* Gazdasági Lapok, 1862*; "A tokaji bor utóerjedésének meggátlásáról,"* Termtud. Közl., 1865

which in a while rose to European fame. Károly Than was instrumental in founding the *Hungarian Periodical for Chemistry* in which outstanding and innovative articles have been published ever since. He was the first to discover carbonoxysulphide in the gases of the Harkány medicinal waters and later derived it experimentally. His methods for gas analysis were precise and his methods for volumetric analysis (mol) were internationally acclaimed and accepted. Furthermore, His definition of chemical affinity was adopted verbatim as a model. As the founder of up-to-date higher education in chemistry in the country, Than established a school which trained the next generation of chemists. His main works include treatises on the unity of the volumetry of molecular weights [10]; rudiments of qualitative chemical analysis[11].

In the second half of the nineteenth century the country's industrialization process—though being in an embryonic phase—brought about progress in several branches of the applied sciences, among them the field of chemical technology. Vince Wartha (1844-1914), a Bunsen disciple, and from 1867 on professor of chemical technology at Technical University of Budapest, kept abreast of Western scientific advances. He specialized in the application of theoretical results in, for instance, wine chemistry, city water supply, ceramic manufacture, to mention a few. Vince Wartha pioneered in the analysis of eosin, and devised a very good method for manufacturing eosin-glazed pottery. Vilmos Zsolnay (1828-1900) introduced Wartha's process in his porcelain and faience factory at Pécs in 1867 and started decorating earthenware with eosin glaze. As a result, the Zsolnay products became world famous within a very short period of time.

Vince Wartha published many books and articles in his native Hungarian and German in Hungary and elsewhere. His first monograph ap-

10 *A molekulasúlyok térfogatának egységéröl*. Budapest, 1888

11 *A qualitativ chemiai analysis elemei*. Budapest, 1895

peared as early as 1867 in Zurich[12], which was translated into French in 1877.

The most talented member of Károly Than's school was Lajos Winkler (1863-1939) whose doctoral dissertation discussed the determination of oxygen dissolved in water[13]. The method, described in his dissertation, is known as "Winkler's iodometric determination" and has become a classic in chemical analysis. Lajos Winkler acquired world fame by many of his accomplishments: interception of ammonia in tartaric acid solution, laying down new foundations for weight analysis, determination of the "Winkler's correlation" between the stability and inner friction of gases, etc. Owing to Winkler's determination of iodide and bromide, the analytics of halogens has since been considered in a world context to be a distinctively Hungarian branch of science. Winkler's process for iodine and bromine determination is even now widely applied. Several leading Hungarian chemists of the twentieth century were trained by Winkler. He published over 200 articles in foreign and Hungarian periodicals. His handbook dealing with chemical laboratory investigations was internationally acknowledged[14].

Elemér Schulek (1893-1964) was Lajos Winkler's assistant from 1918. In 1926 as a Rockefeller fellow Schulek made a study tour of the United States and some European countries to investigate their pharmaceutical industries. Appointed the head of the Chemistry Division of the National Institute of Health in Budapest in 1927 and in 1944 professor of inorganic and analytical chemistry at Budapest University, Elemér Schulek achieved meritorious results in the chemistry and application of halogen cyanides and interhalogens. His use of his own methods to research the

12 *Die qualitative Analyse mit Anwendung der Bunsenschen Flammenreaktionen.*

13 *A vizben feloldott oxigén meghatározása*, 1888

14 *Untersuchungsverfahren für das chemische Laboratorium*, Stuttgart, 1936

systems of hydrogen peroxide and sulphuric acid is also noteworthy. Schulek, according to his critics, created solid foundations for the up-to-date analysis of drugs. His publications appeared in English, German and Hungarian. One of his major works was published under the title "Theoretical foundations and methods of general quantitative analyticalchemistry"[15].

Colloid chemistry has been for decades in the focus of Hungarian scientists, a case in point being Richard Zsigmondy (1865-1929) who as early as 1925 received a Nobel Prize for chemistry for the elucidation of the heterogeneous nature of colloidal solutions. Zsigmondy was born and educated in Austria and Germany, but her parents were Hungarian and he spoke Hungarian as well.

Jenö Ernst (1895-1981) started his studies in medicine in 1913. Interrupted by the war and five years of prisoner of war camp in Russia he finally graduated at the University of Pécs in 1923. His research interest was in the field of physical processes in human biology. His studies on muscular mechanics brought him international recognition. In 1939 he worked with Albert Szent-Györgyi initiating research on the biochemistry of muscles. After 1945 he was appointed to a professorial position at the University of Pécs, directing his Institute of Biophysics until his retirement in 1971. He was one of the initiators of the International Biophysical Union. His scientific work was published in 200 papers and three monographs[16]. He received many awards for his work.

Aladár Buzágh (1895-1962) obtained his degree in chemical engineering at the Technical University of Budapest and was employed at the De-

15 *Az általános kvantitativ analitikai kémia elvi alapjai és módszerei*. (Co-author: Zoltán László Szabó. Budapest, 1966 -)

16 *Die Muskeltätigkeit* (Budapest, 1958), *Biophysics of the Striated Muscle* (Budapest, 1963), *Biology without Mysticism* (Budapest, 1976).

part ment of Chem is try at the Uni ver sity of Sci ence. In 1925 he was in vited by Wolfgang Ostwald, one of the leading figures of colloid chemistry, to the University of Leipzig. Together they developed the "Ostwald - Buzágh set tling the ory" and the con cept of colloid-stability named con ti nu ity the ory. From 1928 Buzágh worked in Berlin and five years later re turned to Hun gary. His work on ad sorp tion and his re search on bentonite were his most important contributions. Hungary's bent onite de pos its were com mer cially sig nif i cant as they are es sen tial in oil drilling. In 1939 he went to the United States for a lec ture tour. In 1943 the Bu da pest Uni ver sity of Sci ence set up an in de pend ent re search in sti tute for colloid re search, which he headed un til his death.

Most in dus tri ally de vel oped coun tries of the world granted pat ents for József Varga's (1891-1956) inventions in mineral oil industry. Interestingly, József Varga participated in Hungary's public life between 1939 and 1943 in his ca pac ity as min is ter of in dus try, later as min is ter of com merce and trans por ta tion and fi nally as a mem ber of par lia ment. At the beginning of his career, Varga occupied himself with the utilization of bauxite in the man u fac ture of ce ment. He ob tained his most sig nif i cant re sults in the prep a ra tion of syn thetic gas o line and pro pel lants. He is es pe cially re mem bered in pro fes sional cir cles for the high-pressure hy dro ge na tion of coal and min eral oil. In this field his in ter na tion ally val ued discovery was the so-called "Varga-Effect" (hydrogen sulphide effect). Af ter the con clu sion of World War II Varga in vented the hydro-cracking process named after him for the hydrogenation of min eral oils and tars con tain ing much as phalt un der me dium pres sure. For the fur ther de vel opment of his hydro-cracking process the Hungarian—East German Varga Research Society was formed. Varga published many articles in Hun gary and abroad deal ing with the re sults of his in ves ti ga tions. His two-volume set "*Chem i cal tech nol ogy*" de serves spe cial men tion[17].

17 *Kémiai technológia* prepared with Károly Polinszky. Budapest, 1953-1961

Géza Zemplén (1883-1956) received his doctorate from the Budapest University in 1904. Afterwards he joined the research staff of Emil Abderhalden (1877-1950) in Berlin and studied the chemistry of enzymes. Later, also in Berlin, Zemplén became a close associate of Emil Fischer (1852-1919) and with Fischer engaged in the synthesis of amino acids. Géza Zemplén founded the first school of organic chemistry in Hungary. He performed internationally acknowledged research in the fields of carbohydrates and glycosides. He invented the Zemplén saponification method and a new technique for sugar decomposition bearing his name. His extensive treatise of carbohydrates[18] ranks among his most important publications.

Aladár Schuller (1886-1960) studied chemical engineering in Budapest and completed his doctorate in Berlin. In 1924 he was invited to work with L. Gevaert in his factory at Antwerp. He spent decades working on the development of film acetate. Based on his patents, Gevaert introduced the first inflammable film in 1937. He received the first class industrial medal of Belgium and was awarded the Knight Cross of the Belgian Order of the Crown.

Best known in biochemistry, Albert Szent-Györgyi (1893, Budapest-1986, Woods Hole, MA) studied at the Budapest and Cambridge universities. Working at Cambridge University (1927, 1929) and in 1928 at the Mayo Foundation, Rochester, MN, he isolated hexuronic acid (now called ascorbic acid or Vitamin C) from plant juice and adrenal gland extracts. Between 1931 and 1945 he taught medical chemistry at the University of Szeged. Szent-Györgyi was awarded the 1937 Nobel Prize in physiology and medicine for his discoveries in connection with the biological combustion processes, with special reference to vitamin C and the catalysts of fumaric acid. He was the first to isolate vitamin C from paprika. Szent-Györgyi discovered a protein in muscle that he named

18 *Kohlenhydrate* . Berlin, Wien, 1922. XXIV, 1101 p.

"actin." In 1945 he was appointed professor of biochemistry at Budapest University. Emigrating to the U.S. in 1947, he became director of the Institute of Muscle Research at the Marine Biological Laboratory at Woods Hole, MA. At the Institute he conducted investigations into the biochemistry of muscular action and into the causes of cell division, obtaining highly important results in the fields of cell respiration, the theory of cell oxidation, etc. He published many books and articles on biochemistry in English, German and Hungarian. Among his most essential works are *On Oxidation, Fermentation, Vitamins, Health and Disease* (1940), *Chemical Physiology of Contractions in Body and Heart Muscle* (1953) and *Introduction to a Submolecular Biology* (1960).

From the mid-thirties Szent-Györgyi has exerted great influence upon his disciples in Hungary and elsewhere. Several of his closest research associates have produced internationally recognized studies: Bruno F. Straub (b. 1914), for one, ranks high among Szent-Györgyi's former assistants. A great number of biochemists—including the late Imre Szörényi (1901-1959) and particularly Bruno Straub— have engaged in protein research. As a Rockefeller fellow, Straub worked at Cambridge University from 1937 to 1939. After the war he taught biochemistry at Szeged (1945-1949) then medical chemistry at the Budapest University of Medical Sciences. In 1971 he was appointed Director General of the newly organized the Szeged Biological Research Center of the Hungarian Academy of Sciences (Szegedi Biológiai Kutató Központ). Bruno Straub and his associates have significantly enriched our knowledge with their internationally valued investigations into the structure of enzymes, muscular action, cell respiration and protein synthesis. His book on biochemistry[19] has been translated into a multitude of foreign languages, including German and Russian.

19 *Biokémia* (Budapest: Medicina, 1958. 600 p.)

Biochemist Mihály Gerendás (1908-1976) graduated from Szeged University where he worked under the guidance of Albert Szent-Györgyi. In the meantime in 1938 Gerendás was an associate of professor Wartburg in Berlin. He was appointed to teach biochemistry at Budapest University in 1942. Gerendás conducted investigations into the physiology of blood clotting and prepared bleeding reducing agents. Gerendás' therapy-oriented research produced several useful remedies and his literary activities served the same purpose[20].

George Charles Hevesy (b. 1885, Budapest—1966) developed isotopes as tracers in chemical research which earned him the 1943 Nobel Prize for Chemistry. Hevesy also discovered a new element: hafnium, a member of the zirconium ores. He studied and did research work in Berlin, at the University of Freiburg and in 1911 Hevesy started working in Manchester under the direction of Ernest Rutherford (1871-1937), the famed British physicist, during which time Hevesy was encouraged to explore the application of radioactive isotopes as tracers. In 1912 he joined Friedrich Paneth's staff in Vienna, where he greatly improved his isotopic tracer technique. The results of his lifework are summarized in several publications[21]. In recognition for his unique accomplishments in radioactivity research György Hevesy was awarded in addition to the Nobel Prize, the Faraday, Copley and Bohr Medals, the Enrico Fermi Prize and the Atoms for Peace Award.

Physical chemist Géza Schay (b. 1900) and his collaborators have produced excellent results in catalysis, reaction kinetics, gas chromatography and various aspects of nuclear chemistry and in the rubber industry.

20 *Thrombin-Fibrin- produkte und ihre Anwendung* (Budapest, 1963)

21 *Das Element Hafnium* (Berlin, 1927) *; Artificial activity of hafnium and some other elements* (Copenhagen, 1938) *; Radioactive indicators; their application in biochemistry, animal physiology and pathology* (New York, 1948) *; Adventures in radioactive research;* the collected papers of G. H. (New York, 1962)

They succeeded, among other things, in establishing correlations between the structure and reactivity of unsaturated conjugated and aromatic compounds. Schay's publications included several major works[22].

Imre Valkó (1902-1975) graduated with a degree in chemistry at the University of Vienna in 1926. He worked as a researcher for the Hungarian Rubber factory, then went to work for I. G. Farben in Germany between 1929-39. In 1939 he went to Canada, then to the United States, where he ended up with a professorial appointment at MIT. His name became world famous when, in 1932, along with H. .K. Meyer and G. von Susich demonstrated the macromolecular thermodynamic behavior of rubber. He also done research on artificial fibers, textile dying and colloid chemistry.

László Erdey (1910-1970) received his Ph.D. in electrochemistry at the Budapest University in 1938 and in 1949 became professor of chemistry at the Technical University of Budapest. His research and publishing activities embraced the most important aspects of analytical chemistry. He invented several new research methods such as ascorbinometry and the application of luminescent indicators. With the assistance of his co-workers Ferenc and Jenö Paulik, Erdey invented the derivatograph, a device which is used the world over for simultaneously measuring the weight and thermal effects of the same single specimen. Erdey published several books and many articles in various languages. His multivolume set[23] is regarded as a standard work in gravimetric analysis. Its English edition, *Gravimetric analysis*, appeared first in New York in 1963 as volume 7 of the International Series of Monographs on Analytical Chemistry and

22 *Hochverdünnte Flammen* (Berlin, 1930); *Theoretische Grundlagen der Gaschromatographie* (Berlin, 1960), which was published also in Russian and Hungarian and *Fizikai kémia* (Budapest, 1945, 1970; with Gyula Gróh and Tibor Erdey-Gruz)

23 *A kemiai analizis súlyszerinti módszerei*. Budapest, 1960. 3 vol's.

in 1965 in Oxford under the same title as a 3-volume edition. 1973 saw the publication of his book, *Ascorbinometric titrations.*

Győző Bruckner (1900-1980) studied at the Technical University of Budapest and at the University of Szeged. In 1930 Bruckner received a state grant to work in F. Pregl's Institute of Micro Analysis in Graz, Austria. He taught at Szeged until 1949, then at Budapest University. Bruckner and his associates helped elucidate the chemical structure of peptides and proteins. His main work is "Organic chemistry"[24].

Zoltán Földi (b.1895), László Varga (b. 1903) and their colleagues excelled in the synthesis of substances used in the pharmaceutical and canning industries.

In pharmacology Béla Issekutz (b. 1886) and Miklós Jancsó (1903-1966) scored outstanding successes. Issekutz' investigations into the physiology of the thyroid gland and the action mechanism of insulin are especially well known. He discovered many important medicines, among them the widely used diuretic Novurite. Issekutz authored a standard work on the history of pharmacology[25].

Miklós Jancsó's studies on the reticulo-endothelial system are significant contributions[26]. In addition, the activities of Jancsó, like that of Issekutz, are of significance because both focused their research work on the production of entirely new natural and synthetic drugs and revealed the relationship between their chemical constitution and effect.

24 *Szerves kémia,* 1952, 1955, 1964.

25 *Die Geschichte der Arzneimittelforschung* (1971).

26 *Speicherung, Stoffanreicherung in Retikuloendothel und in der Niere* . 1955

László Zechmeister (1889-1972), an internationally famed expert in organic chemistry, also studied in Zürich. In the years 1920 and 1921 he conducted industrial chemical research in Hungary and from 1921 to 1923 in Copenhagen. From 1923 to 1940 Zechmeister held a professorship in chemistry at the Medical Faculty of the University of Pécs, Hungary, after which he emigrated to the United States, where he was professor of chemistry at the California Institute of Technology in Pasadena from 1940 to 1959. Most of Zechmeister's experiments were conducted in the following laboratories: Chemical Laboratory of the Technical Institute of Zurich; Kaiser-Wilhelm Institute for Chemistry, Berlin-Dahlem; Royal Veterinary and Agricultural Academy, Copenhagen; Chemical Institute of the Medical Faculty, The University of Pécs, Hungary; Gates and Crellin Laboratories of Chemistry, California Institute of Technology, Pasadena. The major fields of investigation in which he became internationally famous include carotenoids, carbohydrates, vitamins, organic compounds, plant physiology and chemical genetics, chromatographic methods and reduction methods. The *Bibliography of papers published by L. Zechmeister and co-authors in the fields of chemistry and biochemistry, 1913-1958* (Wien: Springer, 1958. 22 p.) lists 257 published items (books and periodical articles) [27].

Koloman (Kálmán) Laki (1909, Szolnok-1983, Bethesda) received his Ph.D. in organic chemistry and biochemistry from the University of Szeged in 1936. He belonged to the inner circle of the study group headed by Albert Szent-Györgyi. Before coming to the United States Laki was professor of the Faculty of Medicine of the Budapest University. For years he has been the chief of the Laboratory of Biophysical Chemistry, the National Institutes of Health, Bethesda, Maryland. He is the author of well

27 To list a few of them: *Carotinoide; ein biochemischer Bericht über pflanzliche und tierische Polyenfarbstoffe* (Berlin, *1934); Cis-trans isomeric carotenoids, vitamins A and arylpolyenes* (New York, 1962) *; Principles and practice of chromatography* (New York, 1943, first published in German) *; Progress in chromatography , 1938-1947 (* London, 1950) . Many of his works between 1923 and 1940 were published in his native Hungarian.

over 100 scientific papers. His monographic publications include *Fibrinogen* (New York: M. Dekker, 1968. 398 p.); *Contractile proteins and muscle* (New York: M. Dekker, 1971. 606 p.) and *The biological role of the clot-stabilizing enzymes: transglutaminase and factor XIII* (Editor: K. Laki. New York: New York Academy of Sciences, 1972. 348 p.). This collective volume contains papers presented at a conference sponsored by the New York Academy of Sciences and held on November 18-19, 1971. Later, Laki received an honorary doctor's degree from the Lajos Kossuth University of Debrecen.

Gábor Fodor (b. 1915, Budapest) graduated from the Technische Hochschule in Graz, Austria in 1934 and obtained his Ph.D. in chemistry from the University of Szeged in 1937. For years he was associated with the University of Szeged as professor of chemistry and headed the research laboratory of stereochemistry of the Hungarian Academy of Sciences in Budapest. Fodor was awarded Hungary's prestigious Kossuth Prize twice (1950, 1954) for chemistry. In 1961 he was an Overseas Fellow of the Churchill College, Cambridge, Great Britain. He has participated in many international conferences in Europe and North America. He published three books and more than 200 scientific papers in stereochemistry and organic compounds in which fields Gábor Fodor was regarded one of the world's leading authorities. He wrote a multi-volume monograph on organic chemistry[28]. From 1967 he has taught and conducted research as a professor of West Virginia University.

George A. Oláh (b. 1927, Budapest) graduated from the Technical University of Budapest in 1949 where he held assistant and associate professorship between 1949 and 1956. In the meantime George Oláh was the Associate Director of the Chemical Research Institute of the Hungarian Academy of Sciences, 1954-1956. From 1965 Oláh has been associated

28 *Szerves kémia*, was translated into German entitled *Organische Chemie* (Berlin: Deutscher Verlag der Wissenschaften, 1965-)

with the Case Western Reserve University in Cleveland, Ohio and later joined UCLA as professor of chemistry. He published more than 450 scientific papers and has 85 patents issued in his name. Oláh's contributions to chemistry cover a wide field of electrophilic organic reactions, particularly carbonium ions, Friedel-Crafts chemistry, aliphatic and aromatic substitutions and hydrocarbon chemistry. George Oláh has demonstrated unusual breadth and originality as evidenced by his major research accomplishments including the pioneering of new techniques and solvent systems (of the superacid type) which allow the study of reactive intermediates, particularly carbonations, as long-lived stable species in solutions; the application of physical methods such as nuclear magnetic resonance and Raman spectroscopy to the study of these systems and extensive structural and mechanistic studies involving a large variety of organic systems and many other topics. He received the Nobel Prize for Chemistry in 1994.

Camille Sándorfy (b. 1920, Budapest) of the University of Montreal and a member of the Royal Society of Canada has acquired international recognition for his research in quantum chemistry and molecular spectroscopy. His major contributions include *Electronic spectra and quantum chemistry* (Englewood Cliffs, NJ: Prentice Hall, 1964, 385 p. Translated from the French original).

John C. Polányi (b. 1929) is the son of the physicist Michael Polányi. He has been working at the University of Toronto, Canada. Winner of numerous Canadian and international awards in chemical research, he is a member of the Royal Society of Canada. He published many items in his field. *The Chemical kinetics* (London-Baltimore, MD, 1972. 322 p.) appeared under his editorship. For his work on chemical reaction dynamics Polányi received a Nobel Prize in 1986.

Botany

Edited by István Isépy

Sixteenth-century Hungary relapsed into its pre-Renaissance stagnation and only isolated forces of cultural and scientific advancement were at work during the Ottoman occupation. Cultural activities, if any, were concentrated on the timely issues of the Reformation and Counter-Reformation. But some of the clergymen, historians and physicians—all of these being polymaths to an extent, diverted some of their energies to biological sciences. Thus did Péter Melius Juhász (1536-1572). He studied at Wittenberg in 1556 and from 1561 up to his death, was the bishop of the Reformed Church in Debrecen. Besides his official activities, Melius Juhász found time to author the first Hungarian-language book on botany and medicine. His book carried the then popular title *Herbárium* (Kolozsvár, 1578) in which two hundred and fifty plants of Debrecen and its vicinity are described using Hungarian terminology, with attention to their medicinal values.

József Benkö (1740-1814), another minister of the Reformed Church, was active as historian and botanist. He organized a botanical garden and compiled his *Flora Transilvanica*.

János Földi (1755-1801) embraced a variety of subjects in his short career. He was known as physician, naturalist, linguist and poet. Földi prepared an early criticism of Hungarian botany[29]. He planned to prepare a comprehensive work on natural history but was able to finish only the first part of his animal taxonomy[30] following the system of Carolus Linnaeus[31].

29 *Rövid kritika és rajzolat a magyar füvésztudományról*. Vienna, 1793.

30 *Állatok országa*, 1801

Pál Kitaibel (1757-1817) was the country's first natural scientist in a modern sense, engaging in botany, ecology, plant geography, balneology and mineralogy. Kitaibel described 275 plant species with illustrations in his main work[32]. More than fifty plants bear his name. Kitaibel identified about half the plant species characteristic of the Hungarian flora.

János Xántus (1825-1894) was one of several thousand to set foot in America after the crushing of the Hungarian Revolution of 1848-1849. During his stay in America from 1851 to 1864, Xántus rose from obscurity to international fame as a pioneer in the natural history of the United States. He collected and classified 390 zoological and botanical species—mainly vertebrates—entirely new to science. His collections were deposited for the most part in the Smithsonian Institution, but a generous portion was housed in the Hungarian National Museum in Budapest.

János Xántus made a significant contribution to geography as well. He also dealt extensively with some topics of ethnography, including the life and customs of the American Indians. Having returned to his native Hungary, Xántus organized the renowned Budapest Zoological and Botanical Garden and was named its first director.

Vince Borbás (1844-1905) studied natural history and languages at the University of Pest. Following this, he worked in Berlin under the founder of botanical taxonomy, Alexander Braun, then at Innsbruck, under Anton Kerner who was a leading expert of botanical geography. In Kerner's main work, *Pflanzenleben der Donauländer* (1863) a detailed description of Hungary's plant cover is included. Kerner describes Hungary's lowlands as a treeless, grass covered prairie. In the next fifty years Borbás opposed Kerner's assumptions. He argued that last natural state is the for-

31 *Természeti história a Linné systémája szerint*. Pozsony, 1801.

32 *Descriptiones et icones plantarum rariorum Hungariae* (Vienna, vols. 1-3, 1799-1812)

est-steppe. The *puszta*'s veg e ta tion has more in com mon with the Hun-garian central mountains (Mátra, etc.) than with any of the South Rus sian steppes. Borbás' stud ies of the re-forestation of the windblown sandy deserts, the ac cre tion of wa ter bod ies are con sid ered to be ma jor con tri bu tions to the plant suc ces sion the o ries, even though the in ter na-tional scien tific com mu nity con sid ers Clemets: *Plant Succession* (1912) to be the seminal work in this field. In the taxonomic area he professes modern evolutionary concepts. He defines some two thousand new taxons of the flora of Hun gary and the Bal kans, most of which are still con sid ered valid.

The ma jor works of Borbás in clude a mono graph on the wild roses of Hun gary (1880) books on the flora that of the Bu da pest re gion (1886), on the flora of the sand deserts of Hun gary and their sta bi li za tion and of the flora of Balaton re gion (1900). His ag gres sive, un com pro mis ing na ture brought about a num ber of en e mies and as a re sult, his pro fes so rial ap-pointment at the University of Kolozsvár was delayed until the end of his life, in 1902. How ever, he was the spir i tual fore run ner and founder of the 20^{th} cen tury's ad vances in geo-botanics and floristics.

Árpád Pál (1889-1943) com pleted his stud ies in Bu da pest and in 1929 was al ready a full pro fes sor of bot any at Bu da pest Uni ver sity. A pi o neer of plant phys i ol ogy and one of the first spe cial ists in plant hor mone re-search, his most im por tant works ap peared in Hun gar ian and Ger man.

Sándor Jávorka (1883-1961) also a grad u ate of the Bu da pest Uni ver sity, had great in flu ence on the bot a nists deal ing with Cen tral Eu rope. For a while Jávorka worked in the University's Botanical Garden then for many years in the Bo tan i cal Di vi sion of the Hun gar ian Na tional Mu-seum. He made sev eral study trips to the Carpathian Ba sin and the Bal-kan Pen in sula which helped him elu ci date many fun da men tal ques tions of floristics and phyt ogeography. Hav ing dis cov ered more than one hun-dred plants of which about forty bear his name, his plant identification hand books are still widely used by sci en tists in ter ested in the plant life of the Dan ube Val ley and the Bal kan Pen in sula[33].

István Györffy (1880-1959), professor of botany at Kolozsvár and Szeged universities, was known as one of the world's outstanding bryologists. He issued and edited several important publications such as the *Bryophyta regni Hungariae* and the *Folia Cryptogamica*. At the chairs of botany in both universities Györffy organized highly professional research groups dealing with cryptograms. He studied chiefly the anatomy, composition and identification of mosses. István Györffy was especially versed in the bryology of the High Tatra Mountains and that of Transylvania. One of his monographs was published about the flora of the High Tatra Mountains[34].

Pál Greguss (b. 1889) studied biology in Budapest and Prague, specializing in plant taxonomy, genetics and xylotomy. He took part in many international conferences in Europe and Canada. Greguss published extensively in English, German, as well as Russian. As a xylotomist he achieved a world reputation through his publications and lectures delivered at international symposia. His well-known publications include the *Identification of living gymnosperms on the basis of xylotomy* (Budapest, 1955. 263 p.) ; . Greguss research in paleobotany[35] met with the approbation of the professional community.

33 *A magyar Flóra (Flora Hungarica* . 3 vols., Budapest: Studium, 1925) *;A magyar flóra képekben (Iconographica florae hungaricae* . . . Budapest, 1929-1934, abstracts of preface in English, German, French, Italian, Czech, Romanian and Croatian) *; Kerti virágaink; középeurópai disznövények szines atlasza (Colored atlas of Central Europe's ornamental plants* . Budapest: Mezögazdasági Kiadó, 1962. 154 p., 116 col. plates) *; Erdö-mezö virágai; a magyar flóra szines kis atlasza . Függelékben: az Északi Kárpátok virágai (Colored atlas of the Hungarian flora and the flowers of the Northern Carpathian Mountains* . Budapest: Mezögazdasági Kiadó, 1958. 208 p., 120 plates, map. This was translated into Slovak under the title Kvety lesov a lúk (Bratislava, 1966. 256 p.).

34 *Die Pflanzenwelt der Hohen Tatra* (Késmárk—Budapest: Verlag *"Turistik und Alpinismus,"* 1922. 79 p., with illus.).

35 *Tertiary angiosperm woods in Hungary*. Budapest, 1969. 151 p., illus., maps, 93 plates

Several of Györffy's and Greguss' disciples rose to international fame in hydrobiology—for example Tibor Hortobágyi, professor of botany at the Gödöllö University of Agricultural Sciences, Gábor Uherkovich, researchassociate of the Hungarian Academy of Sciences in Pécs and István Kiss, professor of biology at Szeged Pedagogic College. Hortobágyi studied the phytoplankton of India's Yamuna River[36] and the microvegetation of Lake Balaton. Gabor Uherkovich researched the freshwater microbiology of the Tisza River[37] and Finland's flora in a multivolume set [38]. Both Hortobágyi and Uherkovich command a place among Europe's leading algologists. They have delivered lectures at international symposia and seminars in most European countries.

Ludwig von Bertalanffy (1901-1972, Edmonton) was born in Austria of Hungarian parentage. He studied in Vienna and in Innsbruck and received his doctorate in 1926. He taught biology at the University of Vienna. His interest turned to the broad systems theory of living organisms. In 1949 he immigrated to Canada and accepted a teaching position at the University of Ottawa. From 1961 until 1968 he was at the University of Edmonton, researching biology, citochemistry and cancer. He has shown increasing interest in philosophical studies. He called attention to the increasing robotization of modern man and the need for humanizing science to counteract it.

Educated at Budapest and Berlin universities in biology and chemistry, Rezsö Soó (1903-1980) furthered his studies at Tihany Biological Institute (1927-1929) before being appointed professor of botany at

36 *Phytoplankton organisms from three reservoirs on the Jamuna River, India* . Budapest: Akadémiai Kiadó, 1969. 80 p., illus., 30 plates.

37 *A Tisza lebegö paránynövényei; a Tisza fitoszesztonja* . Szolnok: Damjanich János Muzeum, 1971, 282 p., 143 tables

38 *Zur Chlorococcalen-Flora Finnlands* (Helsinki: Societas pro fauna et flora Fennica, 1968-1973. Summaries also in English)

Debrecen, then at Kolozsvár and Budapest universities. Soó's research and literary activities have focused on phytogeography, plant taxonomy and phytogenesis. Soó was the first scientist in Hungary to engage in phytosociological research. He devised an entirely new system of phytotaxonomy. In 1947 Soó began publication of a multivolume set on the plant communities of the Carpathian Basin[39]. His six-volume standard work[40], (Systematic and plant geographic handbook of the Hungarian flora and vegetation) is based on his two-volume *A magyar növényvilág kézikönyve* (Handbook of the Hungarian flora) which was prepared on the grounds of Sándor Jávorka's works. Soó's works are considered the best handbooks ever written on Central Europe's flora and vegetation. He published about 500 items in addition to his reports on his many study trips throughout Europe, Morocco, Egypt, Turkey, Gruzia and Armenia.

Bálint Zólyomi's (1908-1997) professional career has been connected chiefly with the Museum of Natural Sciences (Természettudományi Múzeum, Budapest). From 1967 he was a member of the leadership of the International Union of Biological Sciences. Zólyomi has been engaged in phytosociological, ecological, forest typological and pollen analytical studies. Soó, Zólyomi and Imre Máthé (b. 1911) have solved significant problems of systematics and have achieved a high degree of success in cross-breeding.

Bálint Zólyomi was the primary contributor to the 1967 publication of Hungary's potential vegetation map based on vegetation history, climate, soil and vegetation-cover relationships. Using pollen-analytical studies first time in Hungary, his research clarified the formation of Hungary's vegetation after the last Ice Age[41].

39 *Conspectus des groupements végétaux dans les bassins carpathiques* (Institut botanique de l'Université à Debrecen.

40 *Synopsis systematico-geobotanica florae vegetationisque Hungariae. (A magyar flóra és vegetáció rendszertani—növényföldrajzi kézikönyve)*, Budapest: Akadémiai Kiadó, 1964-1973.

Leslie Oláh (b. 1904 in Kassa—now Kosice, Slovakia) has had a long and distinguished career. In his native land he was the head of the Institute of Plant Genetics in Budapest (1938-1945) and professor of botany at the Faculty of Economics of the Technical University of Budapest (1942-1945). Simultaneously, Oláh was the director of the University's Institute of Agrobotany. After leaving Hungary, he occupied leading positions in his field at La Plata University (Argentina, 1948-1953). From 1954 to 1957 he was head of the Treub Laboratory and professor at the University of Indonesia (Buitenzorg-Bogor, Java), then professor at Duquesne University at Pittsburgh, Pennsylvania, 1958-1959 and finally at Southern Illinois University, Carbondale, Illinois from 1959 to 1972.

Oláh's scientific interests embraced cytology, genetics, cytogenetics and electron microscopy. His research topics include cytological and cytogenetical research in plants (Solanum, Triticum, Digitalis, Corypha, Rafflesia and Dodecatheon genera), investigations into the behavior of digitonin-treated cells in tissue cultures, cytotaxonomical research in the Dodecatheon genus, ultrastructural studies on the effect of digitonin on microtubules in plant cells, to mention just a few. Leslie Oláh was the first scientist ever to conduct research on several rare endemic plants. For this purpose he led field expeditions to several regions of the world (Sumatra, 1954; Java and Celebes, 1956; Lesser Sunda Island, 1957; India, etc.). He delivered papers at numerous international conferences in Europe, the Americas and Asia. Since 1930 Oláh has published several books and hundreds of periodical articles in Hungarian, English, German and Spanish.

Pál Juhász-Nagy (1935-1993), ecologist, biologist, was professor of Loránd Eötvös University and member of the Hungarian Academy of

41 Ten thousand years' history in flower pollens (in Hungarian) *Természettudományi Közlemények* 68, 1936.

Sciences specialized in theoretical biology, bio-mathematics and historical biology. His major contributions included the development of the universal conceptual system of ecology and the development of the structural models of plant associations. Among his many publications, *The Disappearing Diversity: The Central Question of Biosphere Research* (Az eltünö sokféleség: a bioszféra kutatás egy központi kérdése) Budapest: Scientia Kiadó, 1993, was published posthumously after twenty years of rejections and lack of understanding. His valuable work is continued by his students.

Pál Jakucs (b. 1928) biologist, ecologist, is professor of the University of Debrecen, founder of Hungary's first Department of Ecology, is a member of the Hungarian Academy of Sciences. His central research interest is the xeroterm oak forests of the Carpathians and the Balkans, studying the dynamics of the boundaries forest-steppe plant associations. His books, published in German, are well known[42]. Since 1972 he conducts studies as part of the international "Man and Biosphere" program, on the ecology of the oak forests in Hungary, on their destruction, effects of acid rain and related subjects.

Tamás Pócs (b. 1933) is a professor of botany and biology at the School of Education of Eger. He is a member of the Hungarian and Norwegian Academies of Science. He has spent ten years in Tanzania as a professor of agricultural engineering. His research results on the ecology of tropical mosses and forests were internationally noted.

Tibor Simon (b. 1933) is the head of the Plant Taxonomy and Ecology Department at the Loránd Eötvös University in Budapest. He has published widely on the vegetation in the Carpathian Basin. He organized

42 *Die pythozönologischen Verhältnisse der Flaumeichen Buschwälder Südosteuropas* (Budapest: Adadémiai Kiadó, 1961), *Dynamische Verbindung der Wälder und Rasen* (Budapest: Akadémiai Kiadó, 1972)

and directs a complex research program dealing with the Hungarian flora and the practical ecological interpretation of plant associations.

Attila Borhidi (b. 1932) is professor of botany at the University of Pécs and director of the Ecological and Botanical Research Institute of the Hungarian Academy of Sciences. As a result of his six years work in Cuba, he wrote a highly comprehensive geobotanical monograph: *Phytogeography and Vegetation Ecology of Cuba* (Budapest: Akadémiai Kiadó, 1991.) He has several text books on the taxonomy of the vegetation of Hungary.

Gábor Fekete (b. 1930) is the head of the Department of Ecology of the Hungarian Academy of Sciences' Botanical and Ecological Research Institute. His research is concentrated on ecophysiological research, cönological succession and vegetation dynamics. He was the chief organizer of the World Conference of the International Association of Vegetation Science in Hungary.

Zoology

As mentioned in the section on biology, the first Hungarian-language animal taxonomy was published in 1801 by János Földi's (1755-1801) under the title: *Állatok országa* (Animal world).

János Salamon Petényi (1799-1855) was instrumental in founding scientific ornithology.

Imre Frivaldszky (1799, Bacskó-1870, Jobbágyi) accompanied biologist Pál Kitaibel on his study trips. Though Frivaldszky graduated in medicine from Pest University in 1823, his interest was in botany and zoology, especially the latter's branch of entomology. Frivaldszky organized several scientific expeditions to the Balkan Peninsula and Turkey to study their fauna. He also merits attention for discovering Haberlea, a new genus. In one of his more important early works he discussed the characteristics of the fauna of the Middle Danube Valley[43].

János Frivaldszky (1822, Rajec - 1895, Budapest), himself a noted entomologist, took part in the expeditions of his uncle, Imre. Several insects were discovered by him and are named after him. János Frivaldszky was the first speleologist in greater Hungary and he was the first Hungarian to devise a system of ornithology. Frivaldszky published many items in Hungary and abroad. His *Aves Hungariae* (Budapest, 1891) remains a standard work.

Géza Entz, Sr. (1842, Mezökomárom -1919), professor of zoology at Kolozsvár and Budapest universities, conducted decades-long research on Protozoa. He acquired international fame for his discovery of symbiosis between unicellular animals (Protozoa) and plans (Algae). Many of his works appeared in foreign journals[44].

His namesake, another Géza Entz (1875, Kolozsvár—1943, Budapest), also a noted zoologist and university professor like his namesake, taught in Hungary and Utrecht. In 1929 he was appointed director of the Tihany Biological Institute. With his associates, he started the hydrobiological investigation of Lake Balaton. His two-volume *Beiträge zur Kenntniss der Peridineen* (1926-1927), as well as his studies in hydrobiology, are deemed very useful to this day.

István Apáthy (1861-1922) a preeminent zoologist of his age, graduated from Budapest University where from 1885 to 1886 he taught at the Department of Zoology. Between 1886 and 1889 he conducted research in Italy at the Naples Zoological Station. In 1890 Apáthy became professor

43 *Jellemzö adatok Magyarország faunájához* . Pest, 1870.

44 *"Über Infusorien des Golfes zu Neapel"* (Mitteilungen aus der zoologische Station zu Neapel, Leipzig, 1884.)

of zoology at Kolozsvár and later at Szeged. He fathered the theory of neurofibrillary continuity, which influences even our present-day knowledge of histology. He also made significant contributions to microtomy. In addition to his scientific work Apáthy engaged in belles-lettres, sociology and was known as a publicist. Many of his more important works were published in German, which was then the language of science[45].

One of the last polymaths, Ottó Herman (1835-1914), studied at Miskolc and at the Vienna Polytechnikum. While working under the guidance of another great natural scientist, Sámuel Brassai (1800-1897), he organized a famous zoological collection. Ottó Herman's three-volume work on the spider fauna of Hungary[46] and his works in ethnography, linguistics, archaeology (especially his studies of prehistoric man) and ornithology, earned him global repute. The 2nd International Ornithological Congress held in 1891 in Budapest, shifted Herman's interest to ornithology. He was a very active member of that international congress and was inspired to organize the Hungarian Ornithological Center (Magyar Ornitológiai Központ) in 1893. His book on birds[47] is remarkable.

Entomologist and ethnographer Lajos Biró (1856-1931) made several study trips—first to New Guinea in 1895, where he spent seven years, then to Greece (1906) and Bulgaria (1928). The collections of his one-man expedition to New Guinea are especially highly valued.[48]

45 *Die Mikrotechnik der thierischen Morphologie* (2 vols., Braunschweig-Leipzig, 1896-1901), *"Das leitende Element des Nervensystems und seine topographischen Berichtungen zu den Zellen"* (Mitteilungen aus der Zoologischen Station zu Neapel, Leipzig, 1888).

46 *Magyarország pókfaunája*. Budapest, 1876-1879.

47 *A madarak hasznáról és káráról*, 1901.

József Gelei (1885-1952) was one of Apáthy's disciples at Kolozsvár University. From 1924 on he was professor of zoology and comparative anatomy at Szeged. Gelei was regarded an international authority on the studies of protozoa, cytology and the microtomy of vertebrates. Several of his works were published abroad[49].

Szilárd Donhoffer (b. 1902) and Kálmán Lissák (b. 1908) have done extensive research work in animal physiology. Donhoffer's successful research into the nervous and hormonal control of energy and Lissák's work on a variety of questions including hormone metabolism are well-known.

Zoltán Kaszab (b. 1915) graduated from the Budapest University and from 1937 has worked chiefly as scientist and later head of the Department of Zoology of the Museum of Natural Sciences in Budapest. From 1963 Kaszab has been general editor of a monumental monographic series issued by the Hungarian Academy of Sciences dealing with Hungary's animal world (*Magyarország állatvilága*). Between 1963 and 1968 Kaszab led six zoological expeditions to Mongolia and discovered a staggering number—some 2,500—of animal species. He published over 250 items in Hungary and abroad.

Great traditions in experimental biological research exist in Hungary. In line with those traditions, the Hungarian Academy of Sciences on April 2, 1971 opened its Szeged Biological Center (MTA Szegedi Biológiai Központja). This institute, with its ultra-modern research facilities, holds its own among the world's top institutions. The Szeged Biological Center's research is conducted on an interdisciplinary basis with chemists,

48 Sándor Asztalos: *Biró Lajos, a nagy magyar utazó* (Budapest, 1953 and T. Bodrogi and L. Boglár edited *Opuscula ethnologica memoriae Ludovici Biró sacra* (Budapest, 1959)

49 *Das erregungsleitende System der Ciliaten* (Lisbon, 1935) , *Feinstrukturen einzelliger Organismen* (Jena, 1943) .

physicists, mathematicians and scientists representing several other branches of science. The Szeged Biological Center consists of four institutes: biophysics, biochemistry, genetics and phytophysiology. Its first director was Brunó F. Straub, a world authority on biological sciences. The Center has been cooperating with the leading biological research institutions of other countries[50].

Studying the overlapping scientific areas between geology and zoology, Géza Gyula Fejérváry (1894-1932) published his first article on zoology at the age of 16. First he worked at the zoological department of the Hungarian National Museum, later he became an instructor of geo-botany at the University of Pécs in 1924. His specialties were zoological geography and paleobotany. In 1930 he was appointed to the chair of Zoology at the same institution. His research on the isolated ecology of the island of Malta received international notice.

Béla Hankó (1886-1959) graduated at the Budapest University of Sciences where he has shown considerable interest in the ecology of birds. Later, from 1910, he turned his scientific attention to the regenerative capabilities of invertebrates. He conducted research at the zoological institutes of Helgoland (1911) and Naples (1912/14). After serving in the army during the first world war, he turned his attention to ichthyology, publishing several books on fish pond management. When the Tihany Biological Research Institute was created, he became its first director. After being appointed as a professor at the University of Debrecen in 1929, he published widely on Hungary's ancient domesticated animals.

50 For further details see Gábor Farkas' article "Megnyilt az MTA Szegedi Biológiai Központja" *(Magyar Tudomány*, July-August, 1971, pp. 423-429). Note that this was originally written in 1977.

Engineering

The Early Years

Technical innovations of the past were discovered by inquisitive minds usually without any formal scientific training. In Hungary the first such specialist of consequence was Faustus Verancsics (1551?-1617), bishop of Csanád. His uncle, Antal Verancsics, was archbishop of Esztergom. In 1609, Faustus Verancsics resigned his bishopric to devote full time to scientific studies. He concentrated primarily on architecture and technology. His illustrated book entitled *Machinae Novae Fausti Verantii* (Venice, 1616) described contemporary machines, including his own invention, a water turbine, parachute and other technical innovations.

Technical sciences in the early years were not distinguished from the science of physics. Many scientists mentioned earlier could have just as well listed in this chapter. For instance, the two giants of Hungary's early engineering András Ségner (see page 207), the inventor of the water turbine and Ányos Jedlik (see page 210), inventor of the dynamo, were discussed in detail in the chapter on physics.

Sámuel Mikoviny (1700-1750) was the head of the mining officer training school at Selmecbánya. This school was the forerunner of the famous College of Mining and Forestry, established in 1763. Mikoviny was an early pioneer of mining mechanization. His water management inventions included a changeover paddle wheel used in pumping.

József Károly Hell (1713-1789) studied under Sámuel Mikoviny. He was the first to construct a compressed air-operated mining machine (*machina hydraulica pneumatica*, 1753). In 1749 he invented a water column pumping machine. In 1756 he put into operation a mine ventilator he designed. All these were of a revolutionary nature at that time in mining machinery. The Hell-invented "water column" machine was a predecessor of our modern mining machines. Hell's main work appeared in Vienna in 1711, under the title: *Berechnung der Luftmaschine* .

Farkas (Wolfgang) Kempelen (1734, Pozsony,- 1804, Vienna) pursued studies mainly in philosophy and jurisprudence in Györ and Vienna. The Royal Castle of Buda was constructed under his supervision. From 1786 to 1798 Kempelen worked as a councillor at the Royal Hungarian Chancery. He was multi-faceted genius: he improved the steam engine, designed a prototype of the steam turbine. As early as 1778, he designed a typewriter for the blind. Kempelen's most famous invention was the so-called automaton chess player. It was described in detail in *Leipziger Magazin für Naturkunde, Mathematik und Oekonomie* (1784). Its structure is not completely known. The machine was destroyed by fire in 1854 during the Philadelphia Exhibition. Edgar Allan Poe based one of his novels on Kempelen's invention of the chess playing machine.

Kempelen also invented the world's first talking machine, which uttered a few sentences in 1790. By this, he could be considered the founder of experimental phonetics and physiological acoustics. In 1791 he published his main work in Vienna which was recently reprinted under the same title[1].

Ignác Born (1742, Nagyszeben, Transylvania - 1791, Vienna) was a Jesuit for a while, then quit and studied law in Prague. During an extended trip though Western Europe he studied mining and smelting. From 1770 he served as a government employee in the bureau of mining and studied the conditions of Hungary's mining and smelting industry. He published his findings in a German language book, containing 23 on his reports, which was soon translated into French, English and Italian. He became internationally known for introducing a new way of smelting,

1 *Mechanismus der menschlichen Sprache nebst Beschreibung einer sprechenden Maschine* (Stuttgart-Bad Cannstatt: F. Frommann, 1970. XIV, 456 p., illus.)

amalgamation. Twenty-seven experts from eight nations came to visit his experimental smelting plant at Szkleno, in Northern Hungary That was the world's first scientific congress on mining and smelting. He reported his results in a highly successful book published in 1786. He was awarded memberships at the Royal Society and the academies of science of Göttingen, Toulouse, Stockholm, Upsala, Padua, Sienna and St. Petersburg.

József Kiss (1748-1813) graduated at the Gumpelsdorf (Vienna) Academy for Military Engineers about 1768. After completing his military service he worked as a civilian engineer on the Pozsony - Komárom section of the Danube. Several of his valuable maps and river control plans are extant. His work on draining the swamps in the Bácska (Vojvodina) region was rewarded with an appointment to engineering director in Zombor. Recognizing the considerable elevation difference between the Danube and the Tisza rivers, he proposed a navigational and drainage channel between the two rivers. This became a reality, under the name of Ferenc Canal, that was completed by 1802. The economic value of this navigational was considerable, as it has shortened the transport line between the Bánság—Temesvár region—and the markets on the Northwest.

Sámuel Gyarmathy (1751-1830) received a medical degree in Vienna in 1782. He had a deep interest in the natural sciences. In 1784, a scant half a year after the successful balloon experiment of the French Montgolfier brothers, he repeated the Montgolfiers' experiment in Pozsony. Later he repeated it again. It is not known how Gyarmathy learned about the French event. Later in his life he worked as a country doctor, then taught at the Calvinist college at Zilah.

István Vedres (1765-1830) was one of the first graduates of the *Institutum Geometrico et Hydrotechnicum*, the Institute of Surveying and Hydraulic Engineering of Pest University. This school, was founded in 1782 was Europe's first university level engineering school. From 1786 he was Szeged's city engineer until his retirement in 1821. During his tenure, the construction of every new house in the city of Szeged required his written approval. This was an early form of planning control. He fought against the baroque style and supported classicism in architecture.

Vedres' major technical accomplishments included the design of the first permanent bridge over the Tisza river, Szeged's new city hall (since replaced)—including Hungary's first permanent, heated, brick theater—hospital, schools and other major structures. He is recognized as Hungary's first city planner. As a fervent reformer, he won the admiration of István Széchenyi. He was also a prolific writer. In his books Vedres propagated the universal teaching and use of the Hungarian language, as a fundamental step toward social and economic progress (1790), recommended the construction of a canal between the Danube and Tisza rivers to improve transportation of agricultural products, proposed to convert the old fortress of Szeged into commercial warehouses just like London's harbor district, the Docklands (1805). In other books he recommended a system of awards and state grants to induce and encourage invention and scientific progress (1807), proposed the establishment of a school of forestry, and the systematic reforestation between the Tisza and the Duna rivers to reclaim the dunesand desert, that existed there at the time (1825). He promulgated the draining of swamps and the construction of reservoirs to support irrigation on the Great Plains of Hungary.

On his own land at Vedresháza—a village he founded on land he reclaimed from swamp—he build a four thousand acre agricultural experiment station, planting hemp, tobacco, cotton, and fruit trees. He even tried silkworm breeding. Vedres had a respectable private library and an art collection. He was also a successful playwright. Vedres was a genuine renaissance man.

József Petzval (1807, Szepesbéla - 1891, Vienna) received his engineer's diploma from the Institute of Engineering of Pest University in 1828. Between 1828 and 1835 Petzval was employed as a city engineer of Pest. From 1832 to 1836 he worked as a lecturer, later full professor of mechanics and higher mathematics at Pest University. Afterwards accepted a full professorship at the University of Vienna where he worked until 1877.

Petzval invented and constructed in 1840, the double system of lenses which were employed in the Voigtländer cameras. According to a note found in Petzval's literary legacy, he should be considered the inventor of the modern system of anastigmatic lenses. Interestingly enough, the somewhat altered form of the Petzval objective is still used in most modern movie cameras and slide projectors. Around 1860, using a device he himself constructed, Petzval made reliable photogrammetric measurements. His experiments are summarized in two of his books[2].

Ottó Petzval (1809-1883), József's older brother, likewise an engineer-mathematician and graduate of Pest University, taught higher mathematics there between 1858 and 1883. In addition to mathematics, Ottó Petzval was also versed in hydraulicengineering.

Sándor Asbóth (1811, Keszthely - 1868, Buenos Aires) studied mining engineering at Selmecbánya and took his examinations in engineering at the Institute in 1836 in Buda. In the 1848 revolution he served as an engineering officer and went into emigration as Kossuth's military aide. He settled in the United States, worked at a Colorado iron mine and later built a steel company in New York. He was the first to use bitumen asphalt for New York City sidewalks. During the Civil War he served as a general in the Union Army, later he was military commander in Florida and then in Kentucky. He received a serious head wound in the Pea Ridge battle in Arkansas. After the war, in 1866, he was appointed U.S. ambassador to Argentina and Paraguay. Upon his death the Argentinian government declared a national day of mourning.

2 *Bericht über die Ergebnisse einiger dioptrischen Untersuchungen* (Pest, 1843) and *Bericht über optische and dioptrische Untersuchungen* (Sitzungsberichte, Vienna, 1857)

Antal Péch (1822-1895) was Hungary's most gifted mining engineer in the 18th century. Péch's research into the earth's crustal movements proved to be of epochal significance. His valuable papers appeared primarily in *Bányászati és Kohászati Lapok* (Journal of Mining and Metallurgy) which he founded. One of his major publications describes the principles and practical rules of ore dressing[3].

János Mihalik (1818-1892) graduated as a military engineer at Hainburg and received a commission as lieutenant. He soon resigned his commission and joined Széchenyi in his efforts to modernize the country. His foreign travels to Italy and Holland allowed him to import the latest technologies to Hungary. Among others, he has introduced vitrified brick manufacturing in Southern Hungary. He designed the control gate for the Francis Canal on the Danube at Bezdán, which was the first hydraulic structure in Europe made of concrete.

Ernö Hollán (1824 - 1900) studied at the military engineering school in Vienna. He was a liberal-minded nobleman and was a member of Széchenyi's inner circle. Hollán served as an engineering officer in the Hungarian army in 1948-49 and was jailed afterwards. In 1856 he published a plan under the title, "*The System of Hungary's Railways*". In 1861 he became a member of the Hungarian Academy of Sciences. In 1866 Hollán founded the Hungarian Engineers and Architects Society. He used these forums to point out that Vienna's railroad building plans were contrary to Hungarian economic interests. As a member of the Hungarian cabinet between 1867 and 1872, he exerted considerable influence on the development of Hungary's transportation system. His well laid plans were later used in the dismemberment of Hungary after World War I. Circumferential lines, traversing lands populated entirely by ethnic Hungarians, were transferred to successor states for their strategic convenience, with complete disregard of President Wilson's concepts of

3 *Az ércek elökészitésének elvi és gyakorlati szabályai*. Pest, 1869

national self determination. Main arterial rail lines emanating from Budapest had to be reduced to a single track from the original double tracks to hinder Hungary's defense in any potential future conflict with her neighbors.

Lajos Martin (1827-1897) was an engineering student at the start of the 1848 revolution. He joined the artillery of the Hungarian army. After the war he was forced into the Austrian army, where his engineering knowledge was recognized. He was sent to officers' school, became a lieutenant, and was assigned to be an instructor in Krems. Martin developed an interest in rocketry and in his free time applied engineering concepts to their design. He proposed the stabilizing of the rocket's flight by axial rotation. Although the authorities did not accept his recommendations, he was sent to Trieste to assist with the design of ship screws. After resigning his army commission he went into private practice and teaching. In 1872 he was appointed to the chair of mathematics at the new University of Kolozsvár. There he focused his interest on the dynamics of flying, making plans for flying machines and building experimental models. In 1870 he demonstrated his invention, a flapping winged aircraft, that managed to fly to a height of ten feet. On the occasion of his appointment as rector of the university, in his inaugural address he foresaw the future of flight as such: "I want to glance at the influence of the flying machine on the life in future. New life conditions will develop: the transportation will depend less on the railways.... society will insure itself with new international contracts and agreements"[4]

István Schenek (1830-1909) educated as a pharmacist and chemist in Vienna and obtained a teaching certificate and doctorate there. After several teaching positions in Hungary he became chemistry professor at the College of Mining at Selmecbánya. He had opportunity to conduct research and to set up the mechanical laboratory of the school. His primary ac-

4 Nemeskürty István: *A köszivü ember unokái* ,Budapest: Magvetö, 1987. p. 45.

complishment, with the aid of István Farbaky, was the creation of the lead - electrolyte battery. This battery was used for the lighting of all buildings at the College for many years. In 1885 on an international competition for the lighting system of the Vienna Opera House, the Schenek-Farbaky accumulators won. This accomplishment soon brought about the wide ranging application of this device.

Metallurgist Antal Kerpely (1837- 1907) was, for many years a professor at the highly regarded College of Mining Engineering at Selmecbánya. He attained world fame through several patented inventions. As an engineer at Hungary's Ruszkabánya Metallurgical Works, Kerpely obtained a patent for his novel process to free iron from (sulphur, phosphor and copper) contaminations. In 1884 he obtained a patent for his regenerative puddling furnace. His books and articles were avidly pored over by professionals around the world for its new inventions like the air heater and for designs of his iron smelting plants. His periodical *Berichte über die Fortschritte der Eisenhüttentechnik* (Leipzig, 1866-1896) was unique and well-known by iron metallurgists everywhere as was his handbook on iron metallurgy[5].

András Mechwart (1834-1907), a Swiss mechanical engineer, joined the small Budapest workshop of Abraham Ganz in 1859. Together they developed this small workshop into the world famous Ganz Works. Mechwart was one of the developers of the flour rolling mill which was originally invented by the Swiss Helfenberger in 1812. Count István Széchenyi has imported the first such mill to Hungary in 1839. By significant improvements on the technology by Mechwart—namely, he has created the cold cast-iron roller frame, operating with notched steel cylinders—this revolutionary milling technique earned international renown for Hungary's milling industry. The technique was introduced to

5 *A vaskohászat gyakorlati és elméleti kézikönyve*. 2 vols., Selmecbánya, 1873-1874); *Die Anlage und Einrichtung der Eisenhütten* (Leipzig, 1873-1884)

the United States in 1878. Many U.S. patented improvements to roller milling are associated with Hungarian names: Gömöry, Rózsa, Gracza, Szász and Magassy. On a world scale, by 1910 the flour milling capacity concentrated in Budapest was second only to Minneapolis. Having lost most of its grain supply, Hungary's milling industry collapsed after the first World War, when the country was dismantled.

Ede Kühne (1839-1903) completed his studies in Köln. He went to Hungary in 1862 and, with Robert Ludwig, he purchased an agricultural machinery repair workshop. Among other things, he improved the horse-drawn sowing machine. After 1869, when he became the shop's sole proprietor, he achieved significant improvements and developed it into a nationally recognized agricultural machinery factory. In 1874 Kühne's horse-drawn plunger disk seed-drill appeared on the market. It marked the beginning of mechanization of sowing in the Austro-Hungarian Empire. In this sowing machine, the dipping cylinder/disks, driven by the running wheels, provided a reliable and accurate sowing mechanism. With the concurrent huge expansion of arable land in the Great Hungarian Plain owing to flood control measures, Hungary became the bread basket of Europe. Kühne's factory's products received many special medals between 1869 and 1875. At the Paris World Fair in 1878 his sowing machine received a silver medal as a first prize. At the Fair in Vienna in 1890 the ten-thousandth "Hungaria Drill" sowing machine was exhibited.

Sándor Rejtö (1853-1928), while a professor at the Technical University of Budapest, established the University's widely known Material Testing Laboratory. He designed several material testing devices and instruments for his laboratory. He devised a unique microscope, as well as a tensiometer for material testing. Rejtö's theory for the behavior of structural materials produced an international echo. He developed entirely new concepts of material science (internal friction, lasting changes of form). Sándor Rejtö also developed a novel technique for the malleable transformation of metals. His inventions and innovations were introduced in many industrially developed countries. For his successful research work, the 1912 New York Congress of the International Association for Testing Materials elected him its honorary chairman. Rejtö published many scientific papers in the field of mechanical technology in Hungarian as well as in other languages. One of his outstanding books appeared in German[6].

Dávid Gestetner (1854, Csorna - 1939, London) worked in his uncle's butcher shop until he emigrated to the United States at the age of 17. In New York he worked as a street vendor. In 1879 he went to London and in the following year he obtained a patent for his 'cyclostyle pen', which consisted of nothing else but a tiny wheel with sharp sprockets. In 1881 he started working on his next invention, a copying machine. Using a fibrous, Japanese style paper, he cut out shapes with his wheel and using a paint roller he copied the shapes onto another sheet. To make it easier to use, he built a wooden box to hold the paper and a crank to turn the roller. This was his first 'automatic cyclostyle', the first copy machine. Further improvements led to an automatically operated machine manufactured by his company. From these inauspicious beginnings, the company has grown into Gestetner Holdings PLC, a major international firm.

Károly Köszeghi-Mártonyi (1783, Sopron - 1848, Brünn) graduated from the Military Engineering College in Vienna. Afterwards he worked on the construction of the fort of Franzenfest. His interest was directed toward earth pressure analysis, performing large scale model experiments. He clarified the relationships between the magnitude and distribution of earth pressure and the characteristics of the soil, namely the density, the internal friction and the cohesion. He studied the related theoretical concepts also, demonstrating the corresponding Coulomb and Francis theorems. His results were proven correct by modern soil mechanics laboratory analysis. Köszeghi-Mártonyi's greatest contribution was the development of the compressed air breathing apparatus.

6 *Einige Prinzipien der theoretischen Mechanischen Technologie der Metalle* (Berlin, 1927).

Needed for army sappers working in shafts full of explosive gases, the apparatus consisted of a steel container filled with 120 liter of air at 20 bar pressure, equipped with a flexible hose and a mouth piece. This allowed the sappers to enter into gas filled shafts up to 25 to 30 minutes. The concept is still in use in scuba diving, fire fighting and mine rescue. The apparatus was first demonstrated in 1829 and was manufactured by C. E. Kraft for the army as well as for fire departments. The invention of the Austrian army's standard mobile cooking apparatus (goulash cannon, as it was called by the soldiers) was also his accomplishment. Köszeghi-Mártonyi was elected to Hungary's Academy of Sciences in 1848, the year of his death.

János Luppis (1813-1875), a naval officer of the Austro-Hungarian Navy was the inventor of the first modern torpedo. He submitted his idea to the Austrian Ministry of War in 1846, but his proposal did not receive any support. Luppis then joined up with Robert Whitehead, a British designer settled in Fiume and together they began manufacturing the Luppis-Whitehead torpedo. The device was driven by a tank of compressed air at 25 atm. pressure, in which the air was preheated to increase efficiency. This driving mechanism was also a Hungarian invention. It was designed by navy lieutenant János Gesztessy and Lajos Obry chief technician at the Fiume Naval Arsenal. A gyroscope assured that the torpedo stays on course. Large quantities of the Luppis-Whitehead torpedo were sold to England, Germany, Italy, France, Japan and Russia. Its first war time use was on May 29, 1877 in a civil war in Peru. The large scale use started during the Japanese-Russian war of 1904. As an award for his work, János Luppis received nobility from king Francis-Joseph in 1869.

Dávid Schwartz (1850-1895) was a technician, who managed his own lumber company. At the age of forty he developed an interest in the rigid, dirigible airship. He wanted to use metal rather than impregnated cloth. The ministry of war in Vienna rejected his submission. He was invited by the Russian government to St. Petersburg to build his dirigible, but after two years his financial support has ended. From Russia he went to Germany and joined with Karl Berg, owner of an aluminum company. Selling all his holdings, he concentrated building his rigid-structured dirigible from 1895. His design was a 47.5 meter long, 13.5 meter wide cylinder with conic ends. The structure was covered with an 0.2 millimeter thick aluminum sheet. The operator's gondola was attached by aluminum rods, holding a four cylinder 16 HP engine that turned the 2 meter wide propeller. In 1896 his first flying test was unsuccessful on account of the poor quality hydrogen available. At the first successful flight test only his widow appeared. She sold the plans and the rights to Count Ferdinand Zeppelin. As the cliché goes, the rest was history.

Following the American Civil War, but especially in the last quarter of the nineteenth century, the rapid advance of American industry and technology exerted a great impact on men of science everywhere. During this period Benjamin Franklin was gradually replaced in the foreign image by Thomas A. Edison, perhaps the most prolific inventor of the world.

Tivadar Puskás (1844-1893) was educated in Budapest, but completed his engineering degree in Vienna. At age 23 he went to London, then to the United States. He settled in Colorado but in 1876 returned to Hungary. While in America, he became familiar with the telegraph and thought about an idea of connecting several lines into a central exchange. The concept was turned into a patent in Belgium. Puskás returned to the United States and met Alexander Graham Bell[7] and Thomas Edison concerning the idea of telephone exchange. Edison appreciated his knowledge and invited him to his laboratory. They worked together for two years. According to Edison's statement, "Puskás was the first man in the world who raised the idea of telephone exchange." In 1877 Edison sent Puskás to Europe to sell his inventions. In 1878 he demonstrated Edison's phonograph in Paris. Meanwhile he worked on the principle of

7 There is a legend concerning this visit. Allegedly, when Puskás first tried the telephone, he shouted in his native language *"I hear it!"*, or *"hallom"* in Hungarian, giving rise to the word *hallo.*

the telephone exchange. The original form of Puskás' invention was displayed at the Paris Electrical Exhibition in 1881. In 1887 he introduced the multiplex switch boxes, that had an epochal significance in the further development of telephone exchange. In 1878, Puskás constructed the first telephone exchange in Boston. In the following year, he built the first European telephone exchange in Paris. It was a successful business. He sold the rights to all European countries, with the exception of France and Hungary. With the aid of his brother Tivadar, he developed the telephone exchanges in these two countries.

Puskás also invented the "telephonic newspaper"[8]. In 1893 he obtained the Austrian patent right to his invention, the "telephonic newspaper," a system of news distribution to a network of subscribers. This functioned as a wire news system—the precursor of the radio. It commenced operation in Budapest as early as 1893. The historic event was described recently by David L. Woods as follows: "The real pioneering genius who created these concepts of modern radio and television programming was Tivadar Puskás, who established the first operational broadcasting organization in 1893."[9] Puskás described some of his ideas in a German language article[10] in 1893.

At the end of the nineteenth century a significant invention was made in the telecommunication industry. Antal Pollák (1865, Szentes -1943, Budapest) and József Virág (1870, Földvár - 1901, Budapest) obtained a patent for their rapid telegraph apparatus which was able to communicate at the speed of 5,000 signs per minute[11].

8 Called telephonograph, telediffusion, in Hungarian: telefon-hirmondó.

9 David L. Woods, *"Semantics versus the 'First Broadcasting Station,"* J. Broadcasting, vol. 11, 1967, no. 3, pp. 199-207

10 Schroeder: *"Organisation und Einrichtung einer Telephonzeitung"* (Zeitschrift für Elektrotechnik, 1893).

Donát Bánki (1859-1922) completed his studies at the Technical University of Budapest, was assistant professor there from 1879 to 1880 and full professor from 1899 until his death. With the aid of János Csonka (see below) he constructed the world-renowned Bánki - Csonka engine, whose most significant innovation was the first gasoline carburetor, for which they obtained a patent in 1893. A year later, Bánki obtained a patent for the first high-pressure internal combustion engine. His literary endeavors encompassed the theory of gas engine and the basic principles of designing steam and hydraulic engines. One of his chief works on hydraulics and hydraulic engines is still in the form of university lecture notes[12]. His new water turbine[13] captured the interest of technologists even decades after his death.[14]

János Csonka (1852-1939) was born in Szeged. His father, Vince, was a well-respected master machine builder, who spoke fluent Latin and who, with the help of his apprentices and assistants, constructed a wide variety of mechanisms, from windmills and watermills to medical instruments. János Csonka was an autodidact. Unlike his brother who became a chemical engineer, he did not enroll in any university but spent several years traveling and working in Western Europe, particularly in Paris, London, Vienna and Zurich. While an employee of Europe's best-known factories, he studied the technology of machine construction, preparing numerous notes and sketches and perfecting his knowl-

11 For details see Antal Pollák: *40,000 szó óránként* (40,000 words per hour, Budapest, 1934) and József Virág: *Pollák-Virág-féle betüiró gyorstelegráf* (Magyar Mérnök- és Építész Egyl. Közl., 1901).

12 *Gyakorlati Hidraulika és hydrogépek;* jegyzet, vols. 1-2, Budapest, 1901-1902.

13 *Neue Wasserturbine* (Berlin, 1917)

14 The relevant study by Charles Arthur Mockmore and Fred Merryfield entitled *The Banki Water-Turbine* (Corvallis, Engineering Experiment Station, Oregon State System of Higher Education, Oregon State College, 1949. 30 p.

edge of languages. In 1876 he became the head of the training shop at the Technical University of Budapest. The youngest of many applicants for the job, including several engineers with extensive industrial backgrounds, Csonka occupied this position for 48 years. He was instrumental in the education of two generations of Hungarian mechanical engineers. In 1883 he built a new type of gas engine for the training shop. He manufactured each part himself, even the mold for cylinder casting. In contrast to other contemporary gas-engines, Csonka's was already a four-cycle engine, with intake and discharge valves. Subsequently, he built several newer and better versions, some of which could be fueled either by gas or gasoline.

In 1887 János Csonka was joined in his work by Donát Bánki, mentioned above, who later became a distinguished professor at the university. Their collaboration proved to be exceptionally fruitful. One of their inventions was the gas and kerosene hammer (1888), later manufactured by the Berlin Anhaltische Maschinenbau Company. In 1893, as mentioned earlier, they produced the Bánki-Csonka engine. A measure of their progress is the fact, that they patented engines at a time when the original patent of the Otto engine still exerted strong restrictions on engine manufacturers. The most significant feature of the Bánki-Csonka engine was a constant fuel lever atomizer which they constructed in 1891 named "carburetor." It operated by the suction produced by the piston. The first model already had float valve control, a needle valve and a butterfly valve. Their carburetor was patented half a year before Maybach built his first similar device—who is, by some, erroneously considered its inventor. The classic simplicity of this invention—its functioning automatically and with scarcely any moving parts—insured its general acceptance. A century after it was conceived by Csonka, it is still an essential part of many gasoline engines. The Bánki - Csonka engine was simple. In efficiency and operational safety it surpassed the original Otto engine, as well as all contemporary ones. It had a vertical cylinder, an enclosed crank case and the use of valves was far in advance of other designs. The engine employed the asymmetric crankshaft design of Westinghouse steam engines, a concept never before utilized in gasoline engines. Consequently, it was incorporated into combustion engines throughout the world. Another re mark able in no va tion of this en gine was the “au to matic tube ig ni-tion”, which elim i nated the then cus tom ary flame ig ni tion, a pe ren nial fire hazard. As a result, the new and highly combustible fuel—gasoline—could now be safely used. An even more im por tant in no va tion was the rais ing the com pres sion ra tio, which led to lower fuel consumption.

János Csonka ranks among the first to employ aluminum in the con-struc tion of gas o line en gines and to use the high volt age magneto ig ni-tion for gas o line en gines.

In 1896 the col lab o ra tion be tween Bánki and Csonka be came less in ti-mate and in 1898 ceased al to gether. Csonka now con cen trated his at ten-tion on the construction of various vehicles of transportation. The en gine-powered tri cy cles, built by him for the Hun gar ian Postal Man-age ment in 1900 were in use for twenty years.

Csonka built the first Hun gar ian au to mo bile in 1902, a car with two cyl-in ders. He de signed and built the very first four-cylinder au to mo biles in Hun gary in 1904. He built var i ous four-cylinder au to mo biles between 1906 and 1912, that proved their excellent quality in several international automobile races.

At the age of 73, János Csonka re tired from the uni ver sity and opened a work shop for the con struc tion of gas o line en gines. Un der the lead er ship of two of his sons, János and Béla, it grew into a significant industrial plant: the “János Csonka Ma chine Fac tory”. (It was na tion al ized in 1948 and from it developed what was known later as the “Kismotor- és Gépgyár” Small En gine and Ma chine Fac tory). János Csonka con tin ued to work in tensely un til just a few days be fore his death on Oc to ber 27, 1939.

Al though János Csonka never re ceived any for mal train ing as a me chan-i cal en gi neer, he was none the less awarded that ti tle when the Hun gar ian Chamber of Engineers invited him to become a member under the so-called “ge nius clause.” He was the first ever to be so honored.

Electrical Engineering

Károly Zipernowsky (1853-1942) a mechanical engineer and inventor, started his career as a pharmacist. He then enrolled in the Technical University of Budapest from which he graduated in 1878 in electrical engineering. Upon his graduation András Mechwart, managing director of the Ganz factory, hired him to organize the factory's electricity department. As Ganz was the first factory in Hungary engaged in electricity. It thus became Zipernowsky's task to develop the electric power industry in Hungary.

Between 1893 and 1924, Zipernowsky was professor of electrical engineering at the Technical University of Budapest. He preceded his contemporaries in the production and utilization of alternating currents. With the help of Miksa Déri (1854-1938), Zipernowsky constructed a self-induction alternating current generator in 1883.

The monumental significance of this invention is immeasurable. In the 1880's, the world's scientists' attention turned toward the distribution of electric power. While Edison solved the problem of carrying electricity to short distances with direct current, historical credit is due to Zipernowsky and his colleagues for developing the transmission of electricity to long distances, using alternating current.

In 1889, with the scientific collaboration of Miksa Déri, he obtained a patent for a multiphase current distribution system. In his book[15] he described forty of his inventions, among them a single-track electric railway.

15 *Zipernowsky Károly saját és másokkal közös, szabadalmazott találmányai* (His patented inventions. . . Budapest, 1900.

The transformer, Zipernowsky's most significant invention, was jointly produced with Miksa Déri and Ottó Titusz Bláthy in 1885[16]. This made it possible to distribute electric current over long distances.

Ottó Titusz Bláthy (1860-1939) belonged to the giants of electrical engineering. In addition to his help in the development of the world's first transformer, Bláthy also was the first in the world to successfully apply the parallel switch of alternating currents. [17] The first wattmeter of alternating currents (1885) and the first adequate turbine regulator were Bláthy's patents. One of his single-phase engines is housed in the Deutsches Museum in Munich. He wrote about fifty Hungarian and foreign language articles. Both the Vienna and the Budapest technical universities awarded him honorary doctor's degrees in 1917.

Manifesting the advanced state of electric technology in Hungary even before the turn of the century, the first city in Europe equipped with street lighting was Temesvár in 1884 (now Timisoara, Romania) preceding the major metropolises like Paris, Rome, Berlin, Vienna and Budapest. [18] Similarly, the electric subway built in Budapest in 1896 was the first in the world, however, it should be noted that it was equipped by Siemens.

Endre Kolossváry (1858-1938) graduated with a mechanical engineering degree at the Technical University of Budapest. He spent his engineering career at the Hungarian Post Office. From 1919 he was the assistant director of the organization, in charge of the telephone and telegraph systems, as well as the construction of radio stations. On his initia-

16 See their study under the title *"Secondary generators and transformers"* in the Electrical Review (London, 1885, 1886).

17 Cf. Cerchi power plants, Rome, Italy

18 Nemeskürty, Op. Cit., p. 151.

tion and under his presidency, the world's First Congress of Telegraph and Telephone Engineers was held in Budapest in 1908.

György Demény (1850 - 1917) was born into a Hungarian family living in France. He studied in Lille, then at the Sorbonne in Paris. He was an active sportsman and was interested in the theory of motion. Together with professor Jules Marey, in 1892 he developed and patented a camera and projector device that made a sequence of pictures of the motion of the face and mouth during speech. In his subsequent patent description he mentioned that this device, the 'Phonoskop', could be connected to a phonograph to record sound as well as moving picture. Later, Demény developed the first movie projector that used a perforated film rolled on a reel. Based on his patents, the French Gaumont factory manufactured the 'Bioscope', 'Biograph' moving picture cameras and the 'Crono-photograph' from 1896. In 1902 they introduced the 'Chronophon Gaumont', the first sound-recording moving picture camera.

Ferenc Tarján (1895-1956) was a mathematics and physics teacher in Budapest for forty years. His interest were in things electrical: he was the first person in Budapest owning a radio. His first patent was the electric pickup of record players. In 1924 he conducted the first radio broadcast demonstration at the Academy of Music in Budapest. In 1929 he demonstrated his first color movie in Berlin and Budapest, using red and green goggles. The movie was made with three objectives, one under the other, equipped with red, yellow and blue filters. In projecting the resulting film, the colors were combined, hence the natural color of the objects were seen. The film, of course, was three times longer than the equivalent black and white, therefore the parallel sound track was of much better quality than that on black and white films.

Kálmán Kandó (1869-1931) was a pioneer in railway electrification. The electric engine he designed (Kandó engines) made possible railway electrification. Between 1896 and 1898 Kandó constructed the first high-voltage three-phase electric railway (Evian-les-Bains). Then he converted Italy's Valtellina Railway into an electric line (1898-1902). Due to the technical accomplishments of the Valtellina Railway, the Italian government, with the aid of American capital, established the Societa Italiana Westinghouse and started manufacturing Kandó's electric locomotives. The Kandó system of railway electrification was so successful that it was called "Sistema Italiana." Kandó spent some years in the United States as consultant to Westinghouse. His literary activity centered on railway electrification. He wrote several articles about Italy's railway system[19].

Gusztáv Grossmann (1878, Budapest - 1957, Budapest) started his electrical engineering education in Budapest, but finished it in Zurich. He worked for Siemens-Halske, then became the director of the Siemens-Reininger-Veifa company, specializing in X-ray equipment development. In 1935 he developed the Tomograph, which provided a layered image of the human body in 1 - 2 cm thickness, without the shadow of nearby body components. Most similar other equipment was based on Grossmann's initial research. One group of developers working on this subject afterwards received a Nobel Prize. In 1942 Grossmann returned to Hungary and exerted his efforts to improve the X-ray technology in his own country.

Gábor Dénes (1900, Budapest - 1979, London) started at Budapest but finally graduated in electrical engineering at Berlin - Charlottenburg in 1924. He first studied transients in high voltage electric lines, using oscilloscopes. This background led him to study oscillographs and electron microscopes. While working for Siemens-Halske, he wrote his doctoral dissertation on cathode ray tubes. In 1937 he moved to Britain and worked for Thomson-Houston Company at Rugby. His wide interests, ranging from information theory to electron microscopy led him to the development of optical holography. The invention of laser in 1962, a co-

19 *"Der Betrieb der Valtellina-Bahn mit hochgespannten Drehstrom"* (Zeitschrift d. Vereins Deutscher Ingenieure, 1903), *"Neue elektrische Guterzugslokomotive der Italianisehen Staatsbahnen"* (Zeitschrift d. Vereins Deutsche Ingenieure, 1909).

herent light source, gave him the momentum to develop laser holography. From 1947 he was a professor at the Imperial College of London. In 1971 he received the Nobel Prize for his invention of holography. Throughout his career he was an avid writer of books on social nature, dealing with the fundamental problems of world culture and the economic system of the future.

László Kozma (1902-1983) graduated with an electrical engineering degree in the German University of Brünn (Brno). Between 1930 and 1943 he was research engineer at Bell Telephone in Belgium, helping to develop the automatic telephone systems of Switzerland, Belgium and the Netherlands. Bell Telephone has several patents with Kozma’s name on it, related to telephone systems and computers. From 1945 until 1949 he was technical director at the Standard Electrical Company in Budapest, working on the rebuilding of Hungary’s telephone system after the war. In 1949 he was awarded the Kossuth Prize for his work and was appointed as professor of the new department of communications at the Technical University of Budapest. In the same year, in the Communist show trial of Standard, a western owned firm, he was falsely charged and was jailed. During his years in prison he developed new concepts in computational theory and designed a digital computer. After the 1956 revolution he was set free. In 1958, based on his jailhouse plans, he built Hungary’s first digital computer, the MESZ-1. This machine, while primitive, was in practical use for ten years. He was active in the establishment of Hungary’s crossbar telephone system. In 1961 he was elected to the Hungarian Academy of Sciences.

Gábor Frank (1908-1944?) Graduated from the Technical University of Budapest with a mechanical engineering degree and began working at the Hungarian research laboratory of Philips. In 1938 he introduced a new method of X-ray technology, developing a set of sectional x-ray pictures for determining density differences in the human body, rather than the conventional plane picture. He received German and Hungarian patents for the idea. This became the basis of the computer tomography (CT). In his time no computer technology existed, so he had to develop an analog-based method, using photographic technology. Frank has perished in the Nazi concentration camps, his idea was forgotten and the CT X-ray scanning technology was developed independently by Hounsfield.

Dénes Mihály (1894-1953) is listed among the world's leading scientists of electronic image transmission[20]. Mihály began his historic photoelectric and sound recording investigations as early as 1912. In August 1928 he introduced the first television (transmissions of static photographs and very simple moving objects) to about 250,000 visitors at the official exhibition arranged by the German Post Office in Berlin. In November of the same year Mihály transmitted motion pictures. The historic culmination of Mihály's accomplishments came at 11 p.m. on March 8, 1929. At that time, the Berlin Witzleben radio station broadcasted the first moving television program in history.

Ferenc Okolicsányi (1894 -1954, London) interrupted his engineering studies during World War I and served as a pilot. After the war he completed his studies in Germany and obtained his doctorate at the University of Erlangen in 1935. In 1926 he worked with Dénes Mihály in Berlin, at Telehor A.G. on the development of television. In 1933 he designed a convex mirror system that was able to project large pictures and solved the problem of disassembling and reassembling pictures. After receiving his doctorate he moved to Britain and, in 1938, demonstrated the projecting of large television pictures. After the second world war he concentrated on developing color television. One of his inventions, a color cathode ray tube was manufactured in the United States. Later, working for R. W. Gunson Company, he designed a automatic device for the selection and classification of seeds. It became very successful, giving rise to the Gunson Sortex Ltd. that manufactures and sells this device to 100 countries of the world.

20 Knaur, Th.: *Fernsehbuch.*

Physicist Kálmán Tihanyi (1897-1949) in his Hungarian and 1928 British and French patent applications described the archetype of today's television picture tube. F. Schroeder[21], professor of the Berlin Technical College, gives a detailed account of the development of our modern picture tube. He stated that the first (1926, 1928) description of the heavy-duty charge storage tube was made by Kálmán Tihanyi, while its engineering was the work of V. K. Zworykin in the RCA Laboratory in 1933. Schroeder emphasizes that the inventor of the charge storage principle was Tihanyi, while Zworykin applied Tihanyi's principle to practice.

György Szigeti (1905-1978) graduated with a mechanical engineering degree from the Technical University of Budapest in 1926 and worked at Hungary's United Incandescent Lamp and Electrical Company. His main interests were cathode ray tubes and electro luminescent diodes made of silicium carbide. He was instrumental in the development of fluorescent light tubes. He was active in scientific organizations worldwide, among others, he was one of the founders of the European Physics Society. His name appears on many international publications and patents, one of which is the American patent "Electro-luminescent Light Sources" submitted together with Zoltán Bay.

Peter C. Goldmark (1906, Budapest-1977, Port Chester) was the descendant of the family of composer Károly Goldmark. In 1920 his family moved from Budapest to Vienna, where he started his engineering studies. He also took courses in Berlin, where Gábor Dénes encouraged him to go into research. After returning to Vienna, where he composed a paper under the direction of Ernst Mach, entitled *New Method to Determine Ionic Speed* and submitted it to the Academy of Sciences in Vienna. He expressed great interest in television development. At age 20, following research done at the BBC, he constructed a mechanical equipment with a 1

21 *Die neue Entwicklung insbesondere der deutschen Fernsehtechnik* (Berlin, 1937)

by 1.5 inch screen, on which he successfully received a picture. As a consequence of his results, he moved to New York in 1933 and joined CBS in 1935. Later he became the president of CBS Laboratories where, in 1940, he invented the 343-line color television system, the first to be used in practice and with which CBS TV network started test transmissions later that year. He also developed the long playing record, patented in 1948 and the practical home high fidelity equipment that played it. At age 71 President Carter awarded him the National Medal of Science[22].

Imre Bródy (1891-1944) was born in Gyula, Hungary and was educated in Budapest. He wrote his doctoral dissertation on the chemical constant of monoatomic gases. He became an instructor at the University of Budapest in the field of applied physics. For a short period he worked with Max Born at the University of Göttingen on the dynamic theory of crystals. In 1923 he returned to Hungary and spent the rest of his life working for Hungary's lamp factory, Tungsram (now owned by GE). His most important invention dates from 1930. He filled lamps with krypton gas in lieu of argon. It emitted more light and had a longer life span. Since the new gas was expensive, he developed a process with his colleagues to obtain krypton from air. Production of krypton filled lamps based on his invention started at Ajka in 1937. He died on December 20, 1944 in the Mühldorf concentration camp, a victim of the Holocaust.

Ottó Benedikt (1897-1975) participated in the 1919 Communist revolution in Hungary and emigrated to Vienna upon its collapse. He graduated in electrical engineering and received a doctorate in 1930. His interest was in electric motors. He invented a single phase motor, which became widely used in the Soviet Union, known as 'Benedikt Engine'. He was invited to the Soviet Union to assist in the manufacturing of his motor in 1932 and he became professor of electrical engineering in Mos-

22 *My Turbulent Years at CBS*, (New York, 1973)

cow in 1939. He designed the autodyne amplifier that has a superb performance among diesel engine control apparatus. In 1955 he returned to Hungary an became a professor at the Technical University of Budapest. He was the one who proposed the establishment of the Soviet style "National Technical Development Directorate" (OMFI) and became its first director. Incongruously, it is still a functioning government office in Hungary.

Charles F. Pulvári (b. 1907) graduated from the Technical University of Budapest in 1929. Pulvári held several leading positions in Hungary in the field of electrical engineering and was granted many patents for his unique achievements until 1949, when he emigrated to the United States. From 1953 until his retirement in the mid-70's, Pulvári was professor of electrical engineering at the Catholic University of America in Washington, D.C. and head of its Solid State Research Laboratory. He produced more than twenty patented inventions in the United States including the "Electric Automatic Circuit Breaker with Reclosing Means"; "Method and Apparatus for Recording and Reproducing Intelligence"; "Electrical Condensers". For decades Pulvári has been a principal investigator of many U.S. (Navy, Air Force, etc.) scientific and technological projects. He authored around 40 professional papers appearing in U.S. periodicals and presented a number of papers at scientific conferences.

Antal Csicsátka (1911, Érsekujvár - 1976, Utica, NY) after graduating from the Technical University of Budapest as an electrical engineer, he took a job at the Hungarian Post Office. He has developed Hungary's first tape recorder. In 1956, after Hungary's Revolution he immigrated to the United States and was employed by General Electric. He developed the stereo radio system, which is now in use throughout the world. From 1961 he developed 13 patents, they are employed in broadcasting technologies. In 1966 he received the "Modern Pioneer in Creative Industry" prize from the IEEE. The development of the first radio on a micro chip was one of his accomplishments.

Andy Grove of Intel Corporation was born in Hungary as András Gróf in 1936. During the 1956 Hungarian Revolution he left the country and came to the United States. He quickly obtained a degree in electrical engineering from the City College of New York and in 1961 he had his Ph. D. from the University of California at Berkeley. First he worked for Fairchild and later he joined Intel at the time of it's founding. As Silicon Valley's most celebrated executive, he gave Intel a major public relations boost when he became Time Magazine's Man of the Year. In 1998 he relinquished the CEO position after eleven years, but still labors full time, creating future strategies for Intel.

Mechanical Engineering

Sándor Svachulay (1875-1954) was educated as a technologist and had his own mechanics shop. He was keenly interested in the potentials of flying and built a number of airplane and helicopter models that had promise. In 1909, his steel-structured air frame was fitted with an engine by the Munich-based Fabris Ganz and became a success. Under the name of 'Colibri I', that had the world's first retractable landing gear, it was purchased by the Austro-Hungarian army. Building several other aircrafts, he became successful with the 'Colibri III' that had a 53 HP motor and a 6 meter wing span. In 1913 its pilot, István Dobos, won all flying records in the St. Stephen Day air show in Budapest. During the war Svachulay directed the aircraft manufacturing plant in Albertfalva. After the war he manufactured light experimental gliders. He spent the rest of his life in the aircraft construction field, developing such important inventions like the adjustable-pitch metal propeller, and the wing flaps to reduce landing speed.

Ferenc Zámor (1877-1960) graduated with a degree in mechanical engineering and joined the Ganz Factory in 1902, where he worked until retirement in 1945. At Ganz, he and his associates started designing railroad cars along theoretical, engineering lines. By 1910 he was chief engineer at Ganz, working on the development of modern components for railway chassis. During World War I he served in the Hungarian army and then spent six years in a Russian POW camp. When he returned from the Soviet Union in 1921, his job became both the design and the marketing of railroad wagons. In 1922, among the first in Europe, Ganz introduced railroad cars built with entirely steel frames, rather than the conventional wood. It was a successful product. Soon Ganz had orders for seventy tramway cars from Holland.

Zámor was concerned about the low quality and expensive passenger service in Hungary's secondary railway lines. By 1926, he and his engineering team developed new two and three axle railmotor cars, driven by gasoline or oil fired Ganz-Jendrassik engines (please see page 286). Zámor, director from 1928, proposed the design of an entirely new railmotor car the sleek, light, high speed and comfortable 'Árpád'. Ganz developed this product on its own, without any advance orders, during the depth of the Depression. The gamble paid off. The first demonstration ride was made in 1934. After showing it in neighboring countries, orders came from Argentina, Egypt, Uruguay South Africa, India, Romania, Yugoslavia, Poland, Spain and Belgium. All together 205 units were ordered, for a total of some 50 million dollars (1934 value), significantly contributing to Hungary's economic well-being.

Tibor Melczer (1879-1936) was Hungary's leading expert of aircraft design and construction. He studied mechanical engineering both in Vienna and in Budapest, graduating in 1900. After a stint of teaching—he was the assistant of Donát Bánki—he joined the Austro-Hungarian aircraft research center at Fischamend. Later he rejoined Bánki's department, assisting in aircraft stabilizer research. In 1914 he accepted the position of chief engineer at the new Hungarian Lloyd Aircraft and Motor Company at Aszód. His first design, the Lloyd L-1 reached the height of 6170 meters and won three world records at the 1914 race at Aspern. In the war Melczer was appointed to head the company's research division, where 18 different models were created until 1918. Many of them made in series not only by Lloyd but by other Austro-Hungarian aircraft manufacturers. The Lloyd reconnaissance planes were considered among the best at the beginning of World War I. On Melczer's design a few than huge, tri-motor airplanes were built also. As early as in 1912 he prepared plans for 20 seat passenger plane, which Melczer planned to build at Lloyd's

Aszód factory. However, the post-war Treaty of Trianon ordered the destruction of this plant. From 1926 Melczer returned to teaching at the Technical University of Budapest, training a new generation of aircraft designers. His book on the theory and construction of aircraft was the first Hungarian language text on this subject.

József Galamb (1881-1955) was born in Makó, and finished his education at the predecessor of present-day Dónát Bánki Technical College. After receiving his diploma in mechanical technology, he worked at the Diósgyör Steel Factory as a draftsman, then at the Hungarian Automobile Factory, where he won a post-graduate scholarship to Germany. In 1903 he worked in several German cities as a skilled worker. When he learned of the American Auto World Fair in 1904, he used his savings to travel to America. He first found employment as a toolmaker at Westinghouse. In 1905 he joined the two years old Ford Motor Company. Subsequent to re-designing the cooling system for the Model-N, he became the chief designer of the Ford Motor Company, and constructed a lot of parts of the famous Model-T. From 1915 he was responsible for the design of Fordson tractors. In 1921 he founded a scholarship for the poor students of his native town who wished to take up higher education at a trade school. During WW2 he designed military hardware, e.g. anti-submarine detection systems. On Henry Ford's suggestion he designed a small six cylinder car, which was completed in 1942. On doctor's orders, he retired from active work in 1944.

Albert Fonó (1881-1972) was a Budapest-born mechanical engineer who received his diploma in 1903 at the Technical University of Budapest. His main professional interest was in the field of energetics, though his theoretical preparation was extensive. He gained engineering experience working at factories in Germany, Belgium, France and Switzerland. His first invention was an aerial torpedo in 1915, which operated on the principle of jet propulsion. This invention would have increased the effective range of artillery, but it failed to receive attention from the authorities. His other inventions, more in accord with the technical level of his age, became successful. In 1923 he patented a new steam boiler and in 1928 an air compressor for mines. A patent application for his most important invention, the jet propulsion engine, was filed in Germany. This engine enabled aircraft to fly faster than the speed of sound. It took four years of preliminary examination before he received his patent in 1932. With this advanced invention Fonó proved himself ahead of his time. From 1954 he was a corresponding member of the Hungarian Academy of Sciences, received the Kossuth Prize in 1956 and from 1968 he was a corresponding member of the International Academy of Astronautics.

Aladár Zsélyi (1883-1914) graduated with a mechanical engineering and, while a student, turned to aircraft development. In 1909 he wrote a successful book with the title '*The technical fundamentals of airplanes*' which was twice republished and was also translated into German. He was the first in Hungary who designed and built an airplane entirely based on structural engineering fundamentals. It included several new concepts, a new control mechanism, spring supported landing gear, an the like. In 1912, with the help of Tibor Meltzer he have drawn the detailed plans for a 30 seat passenger plane, mentioned earlier.

Recognizing the shortcomings of cylinder type gasolines for aircrafts, Zsélyi experimented with gas turbines. In 1913 he published a book on it, entitled '*The gas turbine, experiments for the development of a new heat power engine*.' These experiments have preceded the development of practical gas turbines by some 25 years, when high strength materials became available for this application. In 1914 he broke his arm in a landing accident, as a result, he died of tetanus.

Péter Thorotzkai (1884-1942) obtained a mechanical engineering degree in Budapest. From his family holdings, he established the First Hungarian Electric and Tower Clock Company, which became one of the country's precision machining firm. He was very much interested in flying. In 1913 he designed and built a three cylinder, rotating 22 HP aircraft engine, but it has proven to be too weak for military applications. After the war, due to the peace treaty's demands in limiting aircraft capabilities, he turned to small, reliable and cheap engine designs. His two cylinder, 12 horsepower 'Alpha' engine was installed in Lampich's L-1 small glider.

He built several larger aircraft engines, contributing to the success of Hungary's sport aviation, until the 1930's Depression, which wiped out his company. In the 1930's he designed Hungary's first pilot training simulator, but it was not adopted.

Pál Járay (1889 - 1974) was born in Austria of Hungarian parents. He started his mechanical engineering career in aircraft design at the Austro-Hungarian aircraft development center at Fischamend. His first patent related to the design of a new, more effective wing profile. In 1913 the German Army borrowed Járay to work at their Friedrichshafen based Luftschiffbau Zeppelin organization, where he worked on the aerodynamic analysis of Zeppelin airships. He has developed the relationship between overall efficiency and air resistance, leading to the doubling of the operational efficiency of airships. After the war he built an air tunnel for Zeppelin, that was the largest in the world at the time. His studies of air-foil characteristics led him to design the world's first aerodynamically shaped, streamlined automobile. He has published his findings[23] in the *Der Motorwagen* magazine and another one on the power required to overcome air resistance on automobiles, his publications have scarcely any public reaction. In the same year, he performed air tunnel experiments on automobile models. In 1923 the Ley automobile factory built a model according to Járay's streamlined design, which finally appeared on the cover page of the *Berliner Illustrierte Zeitung* on June 23, 1923. Soon Mercedes, Audi, Bugatti and Voison automobile factories developed cars along his designs. In 1923 his car won a 225 km race. The Járay body built on Mercedes and Audi chassis reached 130 km/h speeds and a Maybach model, with a 3.5 liter engine reached the 170 km/h speed. Adler sport cars, as well as the Triumph Junior and Adler Triumph models built with Járay bodies won several speed records and placed well on international competitions. Modern studies show that Járay's design reduced the air resistance by 25 % compared to

23 *Stromlinienwagen, eine neue form der Automobilkarosserie*, 1922

the then con ven tional de signs, re duc ing the fuel con sump tion by thirty per cent. Af ter 1923 Járay lived in Swit zer land, where he had a ra dio factory and di rected a small de sign firm, con cen trat ing on im prove ments in air craft de sign.

József Mihályi (1889-1981 ?, Roch es ter) was trained as a tech ni cian in Vienna and immigrated to the United States in 1907. He worked at Bausch & Lomb, then at Crown Op ti cal and served in the U.S. Navy as an ex pert on op ti cal sys tems. In 1923 he joined East man Ko dak at Rochester, where he was associated with the development of several photographic cam eras. His idea was the Ban tam film size, 28 by 40 mm pic tures on a 35 mm film. His cam era con struc tions in cluded the Ko dak Med al ist (1938), Ko dak Ektar (1938-1941), which was one of the most ver sa tile at its time. His other con struc tion, the Super Ko dak Six 20 was first shown on the New York World Ex po si tion in 1939. It uti lized sev eral pat ents on au to matic ex po sure con trol by Ödön Riszdorfer, an other Hun gar ian and by pat ents of Mihályi him self. Af ter work ing at Ko dak for thirty years and ob tain ing more than 200 pat ents in the field of pho tog ra phy he retired as Kodak's chief con struc tor in 1954. In 1948, he re ceived a medal from President Truman for the development of the air defense range finder.

Kornél Szil vay (1890-1957) re ceived a tech ni cian train ing and joined the vol un teer fire de part ment in Bu da pest. In this ca pac ity he be came familiar with the first mo tor ized fire pump of the world, man u fac tured in 1903 by the Magirus cor po ra tion. From 1914 he was pro moted into the reg u lar Bu da pest fire de part ment as an of fi cer. He was concerned that in fire situ a tions the dam age caused by wa ter of ten ex ceeds that caused by the fire it self. To over come this, in 1923 he pat ented a chem i cal fire ex tin guisher. Two years later Szilvay was in charge of ex tin guish ing a fire in the tap estry room of the Na tional Ca sino, where he or dered the use of pow der (bicar bon ate of soda) ex tin guisher, and no wa ter at all. He man aged to save the en tire tap es try col lec tion. In an in ter na tional fire ex po si tion in Paris in 1929 an im proved ver sion of Szilvay's ex tin guisher, made by the Mavag factory grabbed the attention of French, American, and Canadian firefighting officials. Currently, Szilvay's technique is widely used in ships. He developed several other technical devices that are applied in firefighting, such as the automatic fire alarm and others.

Árpád Lampich (1891-1956) served during the first world war and studied for his mechanical engineering degree while on his leaves. In 1921, during his senior year, he founded the Sport Flying Association of the Technical University of Budapest. Between 1923 and 1931 he directed the airplane design and construction shop of the Association. Their first airplane was the first motorized glider in the world. It had a 12 meter span, light wood construction and a 12 HP two cylinder engine designed by Péter Thorotzkai. His next plane, the one-seater biplane made in 1925 won three world records. In 1929 the plane was flown to Karlstadt, Sweden, for a demonstration, a distance of 5 thousand kilometers. In 1931 he built several other models, including a two-seat lower winged training plane made of steel pipes. In 1931 the economic conditions have worsened. Lampich accepted a position at the Hopfner Flugzeugbau in Vienna, where he built Europe's first amphibian airplane. A total of 16 planes were sold. This served as the foundation to Austria's aircraft industry. He participated in the construction of a light helicopter also. Lampich's next position was that of technical director at Austria's state owned aircraft factory, WNF, where various transport and training planes were manufactured. After the Anschluss, he was deported to Hungary for his anti-German attitude. During the second word war Lampich directed the MVG aircraft factory in Györ. From 1950 he directed the planning of a high efficiency glider program, using aluminum frame. Then he was charged with establishing an aircraft program in Hungary with international marketing plans, that lead only to the sale of fifty Jak-18 type training aircraft to the Soviet Union.

Kálmán Juhász (1893-1972) graduated as a mechanical engineer with honors at the Technical University of Budapest in 1914 and left for England on a stipend. The outbreak of the war found him there, consequently he spent the war years in an internment camp. He used his time well, he developed a new type of carburetor which he patented later in Hungary, as well as an engine pressure indicator, later called the

Juhász point-indicator. On this success he had several job offers from abroad. First he went to Hamburg to help develop the manufacturing of his device at the Lehmann & Michels factory, then to Torino to work at Fiat. In 1927 he was invited to the University of Minnesota, from there he went to Pennsylvania State University. There he studied many aspect of diesel engines. In 1931 he received the Diesel Award from ASME. He was consultant to several major corporations like Fairbanks-Morse, Texas Oil, Fiat and Crosby Steam Gage and Valve Co. He wrote several books, his *The Engine Indicator* was known world wide.

Pál Schweitzer (1893, Miskolc - 1980, State College, PA) started his mechanical engineering studies in 1911. After serving a few years in the army during the war, he completed his studies in 1917. To gain practical experience, he traveled to the United States and worked in factories in progressively more responsible positions. After working at the Oakland Motor Co. in Pontiac, MI, as an automobile designer and publishing a couple of papers on diesel engines, he became an assistant professor at Penn State, where he built a laboratory for engine experiments. He spent his sabbatical year in Germany, at which time he completed his doctoral degree. After returning to Pennsylvania State University he became increasingly renowned expert on diesel engines. He was appointed full professor in 1936. He had a large number of publications and over thirty patents. His book, *Scavenging of Two-Stroke Cycle Diesel Engines*, published in 1949 became known world wide. The two cycle, air cooled Lycoming engine was designed by Schweitzer. He lectured throughout the world, in America, Japan and Europe. His greatest invention is the electronically controlled optimizer, which allows up to 40 % savings in diesel fuel. He had over 200 publications in eight languages.

Tihamér Nemes (1895-1960) received his engineering diploma in 1917. He worked at the Hungarian Lloyd aircraft factory, where he was introduced to communication theory. In 1929 he joined the Hungarian Posts' research center, working on telephone development. From the mid 1930's he concentrated on the development of television. In 1938 he submitted a patent application for a color television. Studying the analogies between machine and man, he developed a voice-writing device, patented in 1940 and a walking machine modeling human walk. In 1949 he described a machine that played chess. In 1951, as a professor at the Technical University of Budapest, he took part in the development of television in Hungary.

Lajos Rotter (1901-1983) received a degree in mechanical engineering in Budapest in 1923. While a student, he won the Swiss Füssli company's international contest for the technical design concept of a helicopter. He was the first in the world who proposed to over come the rotational momentum using transverse propellers. In 1921 he was one of the founders of the Technical University's Sport Flying Association. He designed several gliders, but lacking finances, they were not built. In 1923 he obtained financial support to establish the Feigl-Rotter Aircraft Company, under the name of FEIRO. Their first plane, the 'Daru' (heron), a four seat, single winged 160 HP air craft, but they were not able to market it and the company went into bankruptcy. In 1929 Rotter joined the Hungarian Boy Scout movement's flying division and built the 20 meter wingspan glider 'Karakán'. Rotter broke all Hungarian glider records with this plane. In 1934 he spent a continuous 24 hours flying over Budapest with his glider. With his explanation of thermal and air wave movements related to gliding, Rotter gained international fame. In 1936 he was invited to the Berlin Olympics, where he has flown a pre-announced 336 kilometer distance from Berlin to Kiel, a world record at the time. In his later years he worked at various Hungarian corporations in managerial positions.

Ödön Riszdorfer (1893-1944) studied law and worked in the commerce. During the first world war, as a reconnaissance pilot making numerous aerial photographs, he felt that making automatic exposures would improve the results. Using photocells, he obtained patents several exposure metering cameras. After demonstrating his invention, he received contracts from most major camera manufacturers of the world. Kodak, Voigtländer, Gamma, Bosch and Eumig all developed automatic exposure cameras based on Riszdorfer's designs. From 1934 he licensed Kodak's Kodalux and Superlux designs for manufacturing in Hungary, in his own factory. He died in the Holocaust.

Andor Rott (1897-1981) served in the Hungarian army during World War I and started his education afterwards. He graduated from the University of Breslau (Wroclaw) in 1923. From 1926 until 1962 he worked at the Belgian Gevaert photographic supply company. Rott's greatest contribution was the positive picture making, diffusion transfer reversal technique. It eliminated the need of first creating a negative photographic image which needs to be converted into a positive in a separate step. Rott patented his method in 1939. Tho years later, Gevaert's competitor, Agfa countered with a similar patent after the work of Edith Weide. Rott's priority was proven by the fact that Gevaert marketed the new direct photographic paper under the name 'Transargo' as early as 1940. The competitive fight was ended when Agfa and Gevaert united. From Rott's idea came the concept behind E. H. Land's ' Polaroid' photographic technology.

János Zámbó (b. 1916) and his study group obtained excellent results in the analytical examination of mining plants, while Gusztáv Tarján (b. 1907) and his associates made outstanding contributions to the solution of ore dressing and enrichment. Sándor Geleji (1898-1967) significantly improved the treatment of malleable metals.

László Gillemot (1912-1977) studied mechanical engineering at the Technical University of Budapest and meanwhile mathematics and physics at the Budapest University of Sciences. He obtained his doctorate in engineering in 1941. He was professor of mechanical engineering at the Technical University of Budapest and the director of the new Institute of Mechanical Technology and Material Science. He and his co-workers researched welding technologies and reaction kinetics. After World War II he worked on the long range plans of Hungary's heavy industry. He was member of a number of international organizations.

Theodore von Kármán (1881, Budapest - 1963, Aachen), the world-renowned scientist of aerodynamics graduated from the Technical University of Budapest in 1902 and was appointed as an assistant to professors Emil Schimanek and Donát Bánki. During World War I he worked at the Fischamend aircraft research center on experiments with helicopters and gliders. From 1915 until 1918 he was the chief of research in the aviation corps of the Austro-Hungarian Army. Later he was an advisor to the Junkers airplane company in Germany, from 1922 to 1928.

Theodore von Kármán earned international reputation by his contribution to heat and quantum theory: his modification, in collaboration with the University of Göttingen's Max Born, of Peter Debye's modification of Einstein's theory "that atomic heat diminishes more rapidly for low temperatures than is indicated by experiment" secured increased scientific acceptance of the theory.[24]

After spending several years in German aeronautical engineering research positions, von Kármán was appointed director of the Guggenheim Aeronautics Laboratory at the California Institute of Technology in 1930. In 1936 he became an American citizen. During World War II, he worked on rocket engine development. Between 1944 and 1945, von Kármán had a leading role in the development of the B-36, B-47 aircrafts. Subsequently he has established his own company, Aerojet, to produce jet engines. The company was later bought out by General Tire Company and was named Aerojet General.

In 1945 Kármán was made director of the Science Advisory Group of the United States Army Air Forces. Later he was chief of the Scientific Advisory Board and subsequently headed technical missions to examine German research projects in supersonic aerodynamics and guided missiles. He was an important participant of the development of the B-52 aircraft, as well as the Atlas, Titan and Minuteman rockets.

24 M. Born and Th. v. Kármán's study in *Physik. Zeitschr.*, vol. 13, 1912, p. 297 as quoted by Florian Cajori, *A History of Physics*, New York: Macmillan Co., 1929, p. 317.

Kármán made unique contributions to the theory of elasticity, mechanics of materials, aircraft structures, aerodynamics, hydrodynamics, as well as thermodynamics. He originated the practical application of Ludwig Prandtl's boundary layer theory, the theory of wing profile design, both for subsonic and supersonic aviation, as well as for the flow of fluids in pipes. Because of his wide-ranging work in aeronautics, von Kármán is often remembered as the father of supersonic flight. A comprehensive survey of his research work and theories, together with a well-compiled bibliography was published[25], as well as his autobiography.[26]

Miksa Hermann (1868-1944) and Károly Láng (1877-1938) are considered the architects of the theoretical foundations and practical application of steel rolling. Later, their theoretical concepts were improved by von Kármán.

László Verebélÿ (1883-1959), professor of mechanical engineering at the Technical University of Budapest and Ferenc Ratkovszky (1900-1965) improved Kandó's electric locomotive to a considerable degree.

György Jendrassik (1898-1954) completed his mechanical engineering degree at the Technical University of Budapest in 1922, then at the University of Berlin he attended lectures of the famous physicists Einstein and Planck. From 1927 he worked at the Ganz factory on the development of diesel engines. His design, the Jendrassik engine, was an internal combustion engine, transforming the thermochemical energy of gas first into heat, then to mechanical energy. As opposed to piston-type engines, the working process is stationary and each phase takes place in different

25 *Collected Works*, Rhode-St. Genese, Belgium, Von Karman Institute for Fluid Dynamics, 1975

26 *The Wind and Beyond: Theodore von Kármán - Pioneer in Aviation and Pathfinder in Space*, Boston - Toronto: Little Brown, 1967.

parts of the machine. (Compressor, heat exchanger, combustion chamber, turbine.) Later on he was active in improving gas turbines. In order to speed up research, he established the Invention Development and Marketing Company in 1936. From 1942 to 1945 he was Ganz's managing director. After the second world war he emigrated to Argentina and settled later in Britain where he established his own shop. He had 77 inventions on record in Hungary. His last significant invention was a pressure compensating device. Jendrassik deserves credit for recognizing the future of gas turbines in flying, without which long-distance military aircraft could not be imagined today.

Ábrahám Géza Pattantyús (1885-1956) graduated with a mechanical engineering degree in 1907 and worked for Zipernowsky in the electrical technology department. After working in private practice, in 1930 he was appointed professor of mechanical engineering at the Technical University of Budapest. He wrote eight textbooks and some 150 technical publications. His design process for sizing the air tank for reciprocating cylinder pumps was known as the 'Pattantyús method' world wide. He has several well regarded technical accomplishments in the fluid dynamics field. His reputation as an engineering teacher was unparalleled.

Mechanical engineer Oszkár Asbóth (1891, Pankota - 1960, Budapest) played a prominent role in helicopter research. Having completed his studies between 1909 and 1913, Asbóth was engaged in airplane construction at Arad (Transylvania), Szabadka (now Novi Sad, Yugoslavia) and Wiener-Neustadt. While experimenting with air screws at the Fischamend experimental institute during World War I he developed the so-called Asbóth-propeller. Pursuant to his experimentation, Asbóth himself constructed a helicopter. As early as September 9, 1928, made the first successful helicopter flight, witnessed by many foreign experts.

Asbóth's successes in helicopter research lent new impetus to relevant research throughout the world. His accomplishment has been acknowledged by the scientific community the world over, including the prestigious Fédération Aeronautique Internationale which awarded him the Paul Tissandier diploma in 1954[27].

László Heller (1907-1980) was born in Nagyvárad (now Oradea, Romania) and took a degree in mechanical engineering in 1931 at the famous Polytechnic Institute of Zürich. Then he worked as a research engineer at the same university, where he studies in enginerering mechanics. After returning to Hungary, he specialized in energetics. In the 1940's the first high-pressure industrial power station at Ajka was built according to his plans. At that time, with his collaborator, designer László Forgó (1907-1985) he developed the concept of the Heller-Forgó system, that is well known in the power generating industry. This secondary energy-recovering system utilizes cooling water more efficiently by condensing the vacuum steam with the injection of cool water. The still warm water is entered into a heat exchanger, where it is cooled down further and become usable again for cooling purposes.

After World War II, Heller established a company under the name of Egart. At the start of Communism it was nationalized and was renamed Institute of Energetics. It was placed under Heller's direction. He was awarded the Kossuth Prize 1951. He became a professor at the Technical University of Budapest, where he organized the Department of Energetics. He has actively participated in establishing the concept of entropy in engineering practice. From 1962 ha was a full member of the Hungarian Academy of Sciences.

László József (Ladislao José) Biró (1899 - 1985) had an unusual career, even for a Hungarian. He studied medicine but never finished it, studied hypnosis, became a successful painter, sculptor, went into automobile rac-

27 See Asbóth's works *Az elsö helikopter (The first helicopter*. Budapest: *Népszava*, 1965. 252 p., illus., ports.) and *Géprepülés* (Budapest: Zrinyi Kiadó, 1957. 278 p.).

ing and de signed a new gear shift. While work ing as a mag a zine ed i tor he was ir ri tated with the foun tain pens he had. This led him to de sign his own. In 1938 in vented the ball point pen. He or dered the steel balls from Swe den and ex per i mented to find an ink with the proper vis cos ity. In 1939 he moved his fam ily to Ar gen tina for safety. He con tin ued his re-search into the pen and obtained a patent for it in 1943. Biró built his manufacturing plant in Argentina in the following year with govern-men tal as sis tance. He called the pen Eterpen CA, for cap il lary ac tion. In 1945 he sold his pat ent to Eversharp for one mil lion dol lars.

There are many tech ni cal de vel op ments around us that are due to Hun-gar ian tal ent: Béla Schi ck, inventor of the safety razor, Ferenc Pávl ics, NASA en gi neer who de vel oped the Moon Rover; Ernö Rubik of the fa-mous cube and count less oth ers.

The tech ni cal prow ess of Hun gar ian firefighters was dem on strated on the burning Kuwaiti oil fields in 1991 after Desert Storm. The initial scorn of Texan oil fire ex perts on the site turned into amaze ment as the Hungarians' odd looking contraption—two MIG-21 jet turbines mounted on a T-34 tank chas sis—blew 45 gal lons of wa ter a sec ond at 600 mph speed dous ing a burn ing well in a cou ple of min utes.

Civil Engineering

In the age of in dus tri al iza tion, the rapid de vel op ment of Hun gary in the 19th cen tury was, to a large part, the ac com plish ments of the coun try's civil en gi neers. Take, for ex am ple, the con struc tion of rail roads. The first por tion of Hun gar ian tracks, about twenty miles be tween Bu da pest and Vác, was com pleted in 1846. Be tween 1849 and 1867 about 1.2 thou sand miles were built. This has grown to 13.6 thou sand miles by the be gin-ning of World War I. This tre men dous rate of growth was par al leled in the build ing of ag ri cul tural drain age chan nels (over 15 thou sand miles), flood control levees and similar earth works. The greatest credit for these ac com plish ments is due to Hun gary's laborer, the *kubikos*, who—

armed with nothing else but shovels, picks and wheelbarrows—have done this backbreaking work. Hungarian construction workers, bricklayers, masons and other tradesmen left their mark all over Europe before World War I. Whole streets in the modern parts of Ankara as well as a large portion of London's Park Lane were built by work crews consisting of the entire male population of some South Eastern towns of Hungary[28].

Ferenc Kossuth (1841-1914), first born son of Hungary's great revolutionary leader, Louis Kossuth, was one of the most respected railroad and bridge designers of Europe. Chairman of a Naples-based engineering design company in 1877, he designed and constructed steel bridges over the Nile river. At the peak of his engineering career he returned to Hungary, became a member of Parliament, then minister of commerce between 1906 and 1910.

Antal Kherndl (1842-1919) studied in Budapest and Karlsruhe. Obtaining his diploma in mechanical engineering at the Zürich Polytechnic Institute, he became assistant there to the world-famous Carl Culmann, professor of statics and founder of graphostatics. Antal Kherndl devoted all his life to statics, evolving a theory of bridge construction and even improving upon Culmann's methods in graphostatics.

Kherndl's assistant, Győző Mihailich (1877-1966) and his research associates—especially Károly Széchy—carried on Kherndl's work in bridge construction and excelling in, among other topics, the design of shell structures. In addition to bridge building, Győző Mihailich was well-known for his research in reinforced concrete design. Mihailich contributed many innovative articles to foreign journals—*Beton und Eisen* and *Bautechnik*, for instance. His book on reinforced concrete structures[29] is still regarded to be an important handbook.

28 Daniel Patrick Moynihan: *Pandaemonium: the Ethnicity in International Politics*, Oxford, 1993.

József Jáky (1893-1950) studied civil engineering in Budapest and received his doctorate in 1925. When the founder of modern soil mechanics, Karl Terzaghi first published his concepts in 1925 Jáky joined the field. After a year's visit at Terzaghi's laboratory at MIT in 1927, Jáky returned to Hungary and established Europe's first soil mechanics laboratory at the Technical University of Budapest. He has initiated a strong presence of scientific soil analysis before structural design and construction operations in Hungary. He also educated a large number of foundation specialists.

Pál Csonka (1896-1987) son of János Csonka, prepared for his university examinations while on combat duty in World War I. At the same time he successfully developed new techniques for military sound measurement to locate enemy artillery. As a result of this work, at the age of 22 he was offered the position of professor at the Schallmess Schule in Vienna. In 1920 he received his diploma in architectural engineering at the Technical University of Budapest. In the same year, he submitted a plan in the largest postwar design competition to redevelop Margaret Island in Budapest and to the great surprise of many, finished ahead of his professors receiving Second Prize. After several successful design competitions, he was invited to lecture on mathematics at the Technical University of Budapest. Later, he taught structural mechanics. In 1936 he was appointed to the Chair of Statics at the university. His lectures were noted for their convincing simplicity. He knew well how to make an abstract subject interesting and attractive for his students. He became one of the most popular professors. His expertise was widely acknowledged. During the period of Nazi persecutions in 1944, Csonka saved the lives of several of his Jewish colleagues. He actively resisted the Nazi's efforts to relocate the university to Germany toward the end of World War II. During the Hungarian Revolution in 1956, he was elected to the Revolutionary Committee. During those days he insisted that no person be removed

29 *Vasbetonszerkezetek.* Budapest, 1922

from his job or otherwise disciplined without due process of law. After the suppression of the uprising, disciplinary proceedings were started against him. He was dismissed from his position. Later he served as a consultant and led the research group on structural engineering of the Hungarian Academy of Sciences.

Csonka's scientific work started long before he joined the university faculty. It is published in journals, conference reports, in the form of books and in publications of the Hungarian Academy of Sciences. In 1975, the number of items of his publications passed 730, among them over 200 scientific papers in foreign languages, mostly in English and German, the rest in Hungarian. By 1975, Pál Csonka delivered over 180 scientific lectures in many countries, although for decades he was not allowed to leave Hungary by the Communist authorities.

One of Csonka's most important contributions was the extension of the theory of buckling of American professor R. F. Shanley (1952). In a series of papers he discussed the lateral buckling of beams (1955); this work attracted considerable international attention. He was the first to develop a theory for a chain of beams (1935). His concepts started intensive research activity in this field. He introduced a new step (which he named "distortion") in the relaxation calculation of multi-story structural frames (1948), thereby simplifying such calculations, as his method converges faster than any other method. Pál Csonka introduced the concept of proportional frame (1955). Several of his articles are devoted to membrane shells. He designed new methods to solve such problems. One of these is the method of undetermined shape (1958). He developed new types of shell structures, named after him in the literature[30]. In 1954 he received a Kossuth Prize. He was honorary member of international organizations, such as the International Association for Shell Structures (IASS). Csonka was honored with external membership in the Polish Society for Theo-

30 Csonka, J.: *Membranschalen* (Berlin: W. Ernst. 1966. VII, 92 p. illus.)

retical and Applied Mechanics (1969) and by an honorary degree from the University of Dresden, in 1975.

Károly Széchy (1903-1972) obtained his degree in civil engineering in 1927. In 1927/28 he studied at the University College at London. After returning to Budapest, he worked in various positions designing and building several major bridges in Budapest and elsewhere. In 1944 he obtained his engineering doctorate. After the war he directed the reconstruction of Hungary's bridges that were blown up during the war. From 1953 he was the chairman of the foundations and tunnel design department of the Technical University of Budapest until his death. He traveled throughout the world as an invited lecturer and guest professor and received numerous awards, honorary doctorates and other prizes. He wrote several books and over 150 other technical publications.

Árpád Kézdi (1919-1983) became the assistant of József Jáky until the latter's retirement and took over Jáky's academic post thereafter. His academic contributions were in the areas of soil physics and dynamics of pilings and earth pressure theory. His many books on these fields were published in English, Spanish, German and Hungarian. He was awarded with honorary professorships by the Peruvian universities of Lima and Ica and honorary doctorates at Vienna and Dresden. He was European president of the International Society of Soil Mechanics and Foundations between 1973 and 1977.

Water Resources Engineering

Contrary to other engineering specialties, hydraulic engineers tend to be employed as public servants, rather than in dustrial employees or scientifically trained entrepreneurs. Flood control, land reclamation, drainage of agricultural land, irrigation systems, water supply and sewerage, navigation, water power generation are usually matters of governmental policy and public funding. The design, construction and maintenance of such projects are the responsibility of hydraulic engineers. We shall discuss Hungary's eminent hydraulic engineers in this separate section.

As late as the middle of the 19th century, a large part of today's Hungary, the central plain of historic Hungary, was a malaria-ridden swamp, regularly inundated by the Tisza, Danube and other rivers emanating from the surrounding Carpathian mountains. As an integral part of modernization of the country, the flood control measures of Hungary's central plain were the greatest public engineering efforts during the 19th century in Hungary. Led by Count István Széchenyi, the flood control and land reclamation projects were financed and organized by private flood control societies composed of local landowners. The related surveying, hydrologic analysis and hydraulic engineering planning efforts involved a large number of Hungarian engineers. Most of these were trained at the *Institutum Geometricum et Hydrotechnicum,* the forerunner of the Technical University of Budapest.

As discussed in the introductory chapter, Milestones of Progress, the Institute of Surveying and Hydraulic Engineering was founded by Hungary's King Joseph II, reformer son of Queen Maria Theresa, in Budapest in 1782. Attached to the University of Pest that was founded in 1635, the Institute was Europe's first university-level engineering school. Its graduates were employed by the Hydraulic and Construction Directorate (vizi és épitészeti föigazgatóság) that, in 1810 initiated a major mapping project of the country. According to statistical data[31] he majority of the graduates of the Institute were engaged in flood control projects during Hungary's Age of Reform, 1825-1848 and afterwards. Owing to the life work of her water resources engineers, Hungary became the breadbasket of Europe by the end of the 19th century.

31 Dunka - Fejér - Vágás: *A veritékes honfoglalás, a Tisza szabályozás története,* Budapest, 1996.

Austrian born Francis Rausch (1743-1816) was the first director of the Engineering Institute. Rausch was trained in Pozsony as a Jesuit priest. After the dissolution of the Jesuits in 1774, he taught physics and higher mathematics at the Royal Academy in Györ. He was a prolific writer of technical and scientific books. In 1797 alone, five of his books were published. Owing to his Hungarian students opposition to using the German language, Rausch wrote his texts in Latin. In 1982, on the 200th anniversary of the establishment of the descendant of the Institute, the Technical University of Budapest, his *Compendium Hydrotechnicum* was republished in miniature form.

Pál Vásárhelyi (1795-1846) graduated at the Institute with a degree in hydraulic engineering in 1816. By 1829 he directed the mapping program of the Danube. In 1837 he was appointed chief navigation officer of the Hydraulic and Construction Directorate. His most important contribution was his conceptional flood control plan for the Tisza river. In 1846 he was appointed director of the Tisza flood control project. His design for the navigation channel through the Iron Gates, Danube's unnavigable narrow pass through the Western end of the Transylvanian Alps—a project first proposed by Széchenyi—was realized posthumously 1898. For his wide range of scientific publications, he was elected to the Hungarian Academy of Sciences.

István Türr (1825, Baja - 1908, Budapest) was an engineering officer in the Hungarian army during the 1848-49 revolution. After the war he emigrated to Italy, where he became one of the military leaders in Garibaldi's Revolution. After 1867 he received amnesty and returned to Hungary. Using his wide international experience and personal contacts, he was a leading proponent of the building of navigation canals and river navigation systems in Hungary. He was a prime mover in the construction of the canal at the Isthmus of Corinth, Greece.

Béla Gerster (1850, Kassa - 1923, Budapest) studied engineering in Vienna, where he was city engineer from 1874. From 1877 he worked on navigation canal construction in southern Hungary. He garnered worldwide fame as a member of the international expedition to determine the routing of the Panama Canal. Based on this experience he was appointed chief engineer at the construction of the Corinth Canal in Greece. Working with four other Hungarian engineers (Nyári, Pulszky, Kauser and Stéghmüller) and four thousand workers, they cut through the 80 meter high mountain ridge and dug a 6345 meter long, 25 meter wide and 8.5 meter deep channel. The project started in 1882 and was completed, together with a bridge and two ports, by August, 1893.

Jenö Kvassay (1850-1919) studied at Technical University of Budapest. As an engineering student in 1873, he published a visionary article in the *Sunday News* (Vasárnapi Ujság, Nov. 30, 1873) writing: *"the coal power will be replaced by new machinery ... we already know aluminum ... But whether the airship and the flying machine will bring about lasting peace, the answer can't be found in man, but in humanity."* He made several study tours of Germany, Switzerland and France and began publishing extensively in Hungarian, German (*Wiener Landwirtschaftliche Zeitung*) and French (*Annales des Ponts et Chausses*)—a paper in the latter language entitled *"Notes sur le moulinet de Woltman"* was well-received by professional circles everywhere. As the organizer of the National Water Resources Directorate (Országos Vizügyi Igazgatóság) Kvassay played an eminent role in devising nation-wide water regulation. In 1879 he authored a book which was regarded as a classic in agricultural hydraulics. It was Kvassay's brainchild to establish the International Danube Commission which came into being thirty years after his death. Kvassay also wrote in 1872 about the desirability of seafaring vessels using Budapest free harbor, a dream which was realized in the inter war years.

Hugó Lampl (1883-1976) graduated at the Technical University of Budapest. He was one of the organizers of the Cement Research Institute at Csepel. From 1935 he worked in the ministry of agriculture studying possibilities of irrigation in Hungary. As director of the statewide Irrigation Office he directed a number of major irrigation projects in Hungary.

Ödön Bogdánfy (1863 Torda, now in Romania, - 1944 Budapest) graduated at Budapest in 1885. He was the editor of *Vizügyi Közlemények* (hydraulic engineering news) between 1911 and 1916, was head on the government's civil engineering bureau in Budapest from 1916. He was a prolific writer. His major contribution was setting up Hungary's flood forecasting system.

Woldemár László́ffy (1903-1984) graduated in 1925 from the Technical University of Budapest with a degree in civil engineering. As an employee of the forerunner of today's Hydraulic Research Institute (VITUKI), he completed the hydrologic study of the Danube for the International Danube Commission, which gave him international respect. In 1931 he became the director of the Library of Water Resources, which became the informational basis of Hungary's hydraulic engineering service. After World War II, he developed wide ranging international contacts in the field of hydrology, published some 150 papers. The Toulouse Academy of Science awarded him the 'Fermat' Prize and the Technical University of Vienna the 'Precht' medal, naming him "the hydrologist of the Danube".

János Bogárdi (b. 1909) graduated from Technical University of Budapest, pursuing post-graduate studies at the Iowa State University in 1937/38. From 1962 Bogárdi has been professor of hydraulic engineering at the Technical University of Budapest. From 1958 to 1965 he was the president of the European commission on hydro meteorology of the World Meteorological Organization (WMO). 1964 brought him to the United States on a year-long lecture tour. The sciences of hydrology and hydraulics, among others, have been enriched by his theory concerning the sediment transportation in rivers, by his explanation of the role of groundwater and a wealth of other contributions. Bogárdi has published more than 100 items in Hungarian and foreign journals along with several books[32].

32 *Korrelációszámitás és alkalmazása a hidrológiában* (Correlation calculation and its application in hydrology. Budapest, 1952; *A hordalékmozgás elmélete*, The theory of sediment transport, 1955

A member of the Toulouse Academy of Science and honorary doctor of the universities of Grenoble and Padua, Endre Németh (b. 1891) has been honored by several other foreign professional institutions for his extraordinary accomplishments in hydrology, hydromechanics, and hydraulic engineering. He played a pioneering role in the planning and construction of the irrigation system of the Great Plains of Hungary. Németh devised up-to-date hydrological methods for modern agriculture, wrote a widely used handbook on hydrology and hydrometry and a high-level university textbook on hydromechanics[33].

Emil Mosonyi (b. 1910) attained international repute for his innovative design solutions of in water power utilization. His two-volume *Water Power Development* (Budapest: Akadémiai Kiadó, 1963) published in several languages, is appreciated by specialists in water-power generation and hydraulic machinery design. Owing to his singular expertise, Mosonyi was chosen to be the editor of the proceedings of the International Seminar and Exposition on Water Resources Instrumentation. Organized by the International Water Resources Association in cooperation with the American Society of Civil Engineers, the seminar was held June 4-6, 1974 in Chicago and the two-volume set of proceedings appeared under the title *Water Resources Instrumentation*, (Ann Arbor, MI: Ann Arbor Science Publishers, 1975). Emil Mosonyi also edited a polyglot dictionary of water-powered electric plans and waterways[34]. Mosonyi designed and supervised the construction of a major dam on the Tisza River, and was a consultant on dam projects around the world. A significant part of Emil Mosonyi's engineering career was the design of a much disputed dam on the Danube River at Nagymaros. The concept was first proposed by geographer Antal Balla in 1791 (see later). Plans concerning the flood control, navigation, and water power development of the upper range of

33 *A korszerü mezögazdaság vizi feladatai*, 1942; *Hidrológia és hidrometria*, 1959; *Hidromechanika*, 1963.

34 *Vizierömüvek és viziutak.* Budapest: Terra, 1960. 204 p.

the Danube were prepared as early as in 1905. In 1942 Mosonyi was appointed to the directorship of the National Waterpower Utilization Authority. The realization of his work, building the dam at Nagymaros, were prevented by World War II. Mosonyi was awarded with numerous prizes and medals throughout the world.

The Danube is an integral part of the recently completed 3500 kilometer (over 2100 mile) international waterway across Europe. The International Danube Commission (an organization originally suggested by Hungary's Kvassay, see above) recommends a 2.5 meter (8.2 ft) minimum navigational depth. This cannot be maintained on the Hungarian part of the Danube during the dry season—lasting usually a third of each year. The non-Hungarian segments of the river are already fully regulated. There are already 39 dams built above the Hungarian portion of the Danube, controlling the flow and generating electricity. In 1989, public opposition to the partially completed Nagymaros project was employed as a successful ploy to kindle nationwide outrage against Communist rule. It was less dangerous to demonstrate in the streets against a dam than against one party rule, or against Soviet occupation. Ever since the topic is a political gimmick in Hungary, rather than a technical concept. To some Hungarian environmental fanatics, the promotion of this dam, or any control on the flow whatsoever, is tantamount to high treason.[35] But since the rest of the river is already controlled, the eventual necessity to complete the project is beyond any reasonable doubt.

Just as these words were written in the Fall of 1998, three interrelated news items appeared in rapid succession in Hungarian newspapers. *Item 1*: "Ukranian government officials announced that four dams will be built on the upper reaches of the Tisza river." Plans for these dams to reduce downstream flooding were drawn up in the time when this was still part of Hungary. *Item 2:* "Hungarian Green organizations have written a

35 Gy. Moldova *: Ég a Duna!*, Budapest: Kertek 2000, 1998.

joint letter to the Hungarian government with the recommendation that it urge the Ukranian government not to build dams on the Tisza." *Item 3*: "The most devastating flood of the past hundred years obliterated the mainly Hungarian-populated upper Tisza valley of Carpatho-Ukraine. 39,592 homes were flooded, 22 bridges destroyed." If they only built those dams...

Geosciences

Geography

During the Renaissance the beginning of geographical literature in the Middle Danube Valley was pioneered by a Transylvanian Saxon, Johannes Honterus (1498-1549). Honterus' *Rudimenta* (1530), a treatise on cosmography, appeared in numerous editions and was a bestseller throughout Europe.

Samuel Mikoviny (1700-1750), mentioned among Hungary's early engineers on page 249, attained European fame by his introduction of astronomical studies into scientific cartography.

In the world arena of cartography as early as the second half of the eighteenth century a Hungarian mapmaker had attained the highest level of execution. It was surveyor and hydraulic engineer Antal Balla (1739-1815) whose administrative and hydrographic maps of Hungary (Tisza - Berettyó Valley, Danube branch at Pest, Pest County, etc.) were studied as models by future generations of international cartographers. Aside from this Antal Balla was first to draw a plan for a navigable Danube-Tisza Canal[36].

Lajos Lóczy (1849-1920) earned his engineer's diploma at the Polytechnic Institute of Zurich. He was ostensibly the first scientist in Hungary who systematically trained himself in geology and geography. In the years 1877 to 1880 Lóczy participated in Béla Széchenyi's Asiatic expeditions. His relevant observations and discoveries received worldwide

36 See his *Cum propositione Navigationem Danubialem cum Tibiscale per erectionem canalis navigabilis connexionis*, 1791.

recognition. Concerning the genesis of the Mid-Asiatic deserts, Lóczy surprised the world with an entirely new hypothesis. Lóczy successfully proved that the stone and sand materials of the deserts in the Middle Asia are not the remnants of the sea bottom. He theorized that they are the process of accumulation, which opinion has been shared by scientists since. Lóczy's investigations into the geological nature of South-East India's mountain ranges are also of a pioneering character. For details see his description of China's physical geography[37].

Two-time prime minister of Hungary, Pál Teleki (1879-1941) gained international fame and a prestigious prize from France by compiling in 1909 an atlas to the history of cartography of the Japanese Islands[38]. One of its recent reprints in German appeared[39] in 1966.

Pál Teleki's prize-winning treatise of the historical survey of geographical thought [40] added significantly to his international reputation. He also wrote a standard work on America's economic geography[41] and compiled a much-used ethnographic map of historical Hungary based on population density[42]. Teleki was prime minister of Hungary in two instances. In 1941, in his second term, he committed suicide on the eve of Germany's invasion of Yugoslavia, in protest of Hungary's involvement. Churchill made a speech in Parliament, promising to leave an empty chair for him at the peace table. It did not materialize.

37 *A khinai birodalom természeti viszonyainak és országainak leirása* (Budapest, 1886)

38 *Atlasz a japán szigetek cartográphiájának történetéhez* . Budapest, 1909

39 *Atlas zur Geschichte der Kartographie der Japanischen Inseln* (Nendeln, Liechtenstein, 1966. 184 p.)

40 *A földrajzi gondolat története* . Budapest, 1917

41 *Amerika gazdasági földrajza.* Budapest, 1922

42 *Magyarország néprajzi térképe a népsürüség alapján*. Budapest, 1919

Jenö Cholnoky (1870-1950) exerted possibly the greatest influence on the education of geographers engaged in Central European studies. Jenö Cholnoky was instrumental in answering many questions about the physical geography of the Danube Basin. Both geographers spawned a great number of gifted disciples. Béla Bulla (1906-1962) followed the path of Jenö Cholnoky and carried out important investigations into the Middle Danube Valley's physical geography as well as geomorphology, elucidating its glacial epoch and climatic morphology. Márton Pécsi (b. 1923) surpassed even his predecessors in the area's physical geography research. Tibor Mendöl (1905-1966) was one of Europe's best-trained scientists in the methodology of settlement geography. Mendöl's very first monographic publication[43] was regarded a model for studies in settlement geography and history.

Pál Zoltán Szabó (1902-1963) dealt chiefly with karst hydrology, while Sándor Radó (b. 1899) published notable works in economicgeography and earned an international reputation as a cartographer.

The Kogutowicz family occupies a special niche in the long line of noted geographers. Manó Kogutowicz (1851-1908), founder of scientific cartography in the Middle Danube area, prepared its first county atlas in 1885. In 1890 Kogutowicz established the Hungarian Institute of Geography (*Magyar Földrajzi Intézet*), a center of high-level geographers and cartographers training. His son, Károly Kogutowicz (1886-1948), long-time professor at Szeged University, wrote works of lasting value in anthropogeography and the best book to date on the regions of the Dunántúl and the Little Alföld[44]. Károly Kogutowicz also produced a very useful map on the complex settlement structure of the Danube Basin's ethnic entities[45].

43 *Szarvas földrajza*. Debrecen, 1928

44 *Dunántúl és Kisalföld*. Budapest, 2 vols., 1928-1932

Eugene Fodor (b. 1905) finished his secondary school studies in the Hungarian-language gimnázium at Losonc (now in Slovakia). He attended a series of foreign higher educational institutions, among them the Sorbonne and Grenoble where he obtained a political science diploma (1927), the Hochschule für Welthandel, Hamburg (1928) and the London School of Economics (1929). Fodor is the editor, publisher and president of the world-renowned *Fodor's Modern Guides, Inc*., which has published both in the United States and Great Britain exhaustive and magnificently illustrated travel guides to over 50 countries with translations in French, German, Italian, Spanish, Dutch, Hungarian, etc.. From 1948 he has been a member of the World Tourist Organization, the Authors League, etc., Fodor has been the recipient of several international writers awards.

Explorers

As a rule, the Hungarian explorers of Asia shared the inspiration of theories that the ancient home of the Magyars may be located somewhere on that continent. As early as the thirteenth century, Julian, a Hungarian friar and outstanding explorer of his day, was sent to Asia in search of a tribe of the Magyars separated from the main body during their westward migrations three centuries before. Friar Julian did indeed locate them and had no difficulties understanding their spoken Hungarian. But after the Mongol Onslaught in 1241, when he returned to the site and found no trace of the relatives. Interestingly, during the construction of a giant automobile factory by Fiat in the Kama River valley in the Soviet Union during the 1960's, archeological finds indicated settlements identical to those in Hungary dated to be after the Conquest.

Márton Szepsi Csombor (1595-1623) was an eminent figure among late Protestant humanists. Szepsi Csombor distinguished himself by his trav-

45 *Magyarország néprajzi térképe*, 1928

els through out Eu rope and a widely read book on his jour neys un der the title *Europica varietas* (Kassa, 1620). In this he described not only the places he vis ited, but the dif fer ing na tional char ac ter is tics of Eu ro pean na tions. Well ahead of his con tem po rary travel book writ ers, he took a firm stand on na tional lib erty of the masses against any kind of op pres - sion by no ble classes and for eign el e ments.

István Budai Parmenius (1552, Buda - 1582) was a stu dent in Eng land when he signed up for a North American expedition as a notary. He drowned in a storm off the coast of what later be came Nova Sco tia, but his notes de scrib ing the trip were saved.

László Orosz (1697-1773) stud ied in Kassa and joined the Je suit or der. He was first sent to the Col lege of Graz. In 1726 he was sent to mis sion work in South Amer ica at his re quest, to bap tize "wild" In di ans. Af ter two years of language studies in Spain, he arrived to Buenos Aires in 1729. Rec og nizing his ad vanced ed u ca tion, he was as signed to teach at the new college at Cordoba. In 1746 he returned to Spain for a short while and re cruited a group of sci en tists to join the Col lege of Cor doba. Re turning in 1749, he es tab lished a print ing shop at the Col lege. Af ter the Je su its were banned from the col o nies, he was im pris oned in Cadiz, Spain, but was soon set free and he re turned to Hun gary.

Ignác Szent mártony (1718-1793) studied at the College of Graz and sub se quently en tered the Je suit Or der. While learn ing the ol ogy in Vi- enna, he took courses in mathematics, natural science and astronomy. When the king of Port ugal, John V asked the Je su its for as tron o mers and map mak ers for his col o nies, Szentmártony was in cluded in the team. He ar rived to North ern Brazil's Je suit head quar ters at Marahao and was as signed to make maps of the area bor der ing Peru and Bolivia. He spent ten years tour ing the area, the jun gles of the Amazon river, the up per wa- tersheds of the Jaru, Araguaia and Tocantin rivers and the area of Paraíba. As the mis sion was se cret, the maps and doc u ments of the trip are prob a bly some where in the abysses of some royal li brary in Por tu gal. Their devoted work came to a bad end when the Jesuit order was banned. Szentmártony was thrown into the jail of the Sao Julian for tress near Lis bon, where he spent 18 years. Af ter he was fi nally freed, he re-turned to Hun gary and served as a priest in the vil lage of Belica in West-ern Hun gary.

Ferenc (Xavér) Éder (1727-1772) was ed u cated at the Je suit Col lege of Nagyszombat and joined the or der in 1743. In 1750 he was sent to Peru to serve as a mis sion ary. He worked in the south-eastern part of the col ony, in the Mamoré river re gion, (now in Bolivia) among the Mojo (Moxo) In-dians. He spent fif teen years there, learn ed the lan guage of the In di ans and wrote down their so cial cus toms. He be came fa mil iar with other In-dian tribes, Mo res, Itonamas and Chiriguaos. He made notes and draw-ings on the lo cal flora and fauna. In 1769 he re turned to his home town, Selmecbánya and served as a par ish priest. His writ ings were pub lished only af ter 1791 and re pub lished in Span ish in 1888, by that time oth ers have pub lished on the same sub jects.

Móric Benyovszky (1741-1786) participated in the Polish Revolution, reached the rank of gen eral and was cap tured by the Rus sians in 1769. He was deported to Si be ria. In 1771, ac com pa ny ing the lo cal gov er nor, he trav eled on the Kamchatka pen in sula. Based on the nar ra tives of ear lier visitors, he wrote a de tailed de scrip tion of the place in his mem oirs. In 1771 he broke free with a few of his col leagues and made his es cape on ship to Alaska's Ko diak Is land. They then vis ited Ja pan and Tai wan and ar rived at Por tu guese Macao. Benyovszky wrote a de tailed de scrip tion of the places he visited. This was the first Western de scrip tion of Tai wan. He then trav eled to the is land of Mau ri tius (called Ile de France at the time) in 1772. In 1774 he reached the Northeastern shore of Madagascar, where he set tled. France's King Louis XV ap pointed him to lead a group of vol un teers and de velop com merce with the na tive malgas. He founded the town of Louisbourg at the mouth of the Antainambalana river, from where he led expeditions around the country, organized public works pro jects, like draining swamps. He be came very pop u lar among the na-tives, so that they elected him their king. Upon this he re signed his French com mis sion. In 1776 he re turned to Eu rope, par tic i pated in the Ba var ian war of suc ces sion and was made a count by Em press Maria Theresa. In

1784 he left for America. In Baltimore he received 1000 pounds worth of trade goods, weapons and agricultural tools from American investors. Stopping to visit Brazil on the way, he returned to Madagascar. But even though the natives supported him, the French decided to remove him from their colony. In the ensuing battle Benyovszky died. His memoirs were published in 1790 in London under the title *Memoirs and Travels*.

Pál Rosti was an officer in Hungary's army during the 1848-49 revolution. After the war he emigrated to the barely populated Venezuela. He traveled the country between the coastal regions to the Andes mountain range and published his experiences in a book in Hungarian. Later, the Central University of Caracas had the book translated into Spanish, as the first accurate description of the country.

László Magyar (1818, Szombathely - 1864, Angola) joined the Naval Academy in Fiume in 1842. After graduation he was appointed as a cadet to the crew of an Austrian postal vessel, traveling to Africa and South America. In 1845 he joined the Argentinian Navy and fought in the Argentina - Uruguay war. He was taken prisoner and received a death sentence, but a French naval officer, Lainé saved him. Magyar learned Spanish and Portugese, as well as some Indian languages. He proposed to the Hungarian Academy of Sciences to lead a three year exploration of South America, but his proposal did not receive support. Magyar then moved to Africa and became the naval commander of the black king of Calabar (Nigeria). During this time he led a two month expedition up the Zaire river, making a diary on his trip. His travels in the Congo ruined his health, therefore he moved to Benguela (Angola) for healthier climate. While learning the languages of the natives in preparation to an exploration into the depths of Africa, the local king of Bihé offered his daughter in marriage to him. He accepted the 14 year old bride, who arrived with numerous slaves and guards. Magyar used his new family contact to facilitate his explorations. Up to 1857 under the protection of his father-in-laws body guards, he visited large segments of Central Africa. He wrote his father in 1853: "I think no other white man traveled a bigger range in Africa then me". In 1856 he prepared his report for the

Hungarian Academy of Sciences, sending it with the help of Portuguese authorities. His report, uniquely combining the geography and the sociography of the Central-Western Africa region he studied, was well received and he was elected corresponding member of the Academy in 1858. The Viennese Geographic Society also made him a member. His book was published in 1859. However, in 1857 his father-in-law was murdered in a putsch and he had to escape into Portuguese colonial protection. He completed the second and third part of his book there, but the material was destroyed in a fire after his death in 1864. But even what remains of his life works stands as a testament to his accomplishment az an early Africa explorer[46].

János Sajnovics (1733-1785) lost his parents at an early age and having been educated by the Jesuits, joined the order in 1748. His superiors noted his intellect and taught him mathematics and astronomy. When in 1769 Venus eclipsed the Sun, Sajnovics was loaned to the king of Denmark and Norway, as an assistant to Miksa Hell, to travel to the northern island of Vardö for astronomic observations. One of the side-aspects of the difficult trip was to visit the Lapp colonies living there. As early as in 1448 Pope Pius II in his *Cosmography* and in his autobiography, named *Commentarii* raised the possibility of linguistic relations between Lapps and Hungarians. Sajnovics was a linguist. He quickly learned the Lapp language, meanwhile making astronomical observations, tidal measurements and geographic and geologic observations. Having completed the measurements during the eclipse on June 3, 1769, Hell and Sajnovics returned to Copenhagen and delivered their report, *Demonstratio*. In this report he demonstrated the linguistic similarities between Hungarian and Lappian languages. In this work, Sajnovics used, first, the methods of comparative linguistics. In 1770 the Danish Academy elected both Hell and Sajnovics as members. After his return to Hungary, Sajnovics was

46 Listowel, Judith: *The other Livingstone*, London, 1974

appointed professor of mathematics at the newly transferred University of Buda.

Sámuel Teleki's (1845-1916) expedition is of great significance in the discovery of Africa. Teleki traveled to Africa in the autumn of 1886 in the company of Ludwig Höhnel, an Austro-Hungarian Navy officer from Pozsony. On April 12, 1887 they became the very first explorers ever to reach the Kilimanjaro. And in October of 1887 they became first among explorers of Africa to scale the Kenya Mountains. Then came Sámuel Teleki's greatest achievement: the discovery of Lakes Rudolf and Stephanie. They were named after Emperor Franz Joseph's children. Sámuel Teleki and his exploring and hunting expedition traveled about 3,000 kilometers in Africa, which journey he described in minute detail in his three journals[47]. These journals themselves are day-by-day accounts of the expeditions, including encounters, friendly and hostile, with the native population, description of climate and topography, hardships in travel, etc.[48]

Béla Széchenyi (1837-1918), son of Stephen Széchenyi (the "Greatest Hungarian") and an outstanding geographer and geologist, completed his higher studies in Berlin and Bonn. Then he traveled throughout England, France, Italy, the Balkan Peninsula, the United States and Canada. Between 1865 and 1870 Béla Széchenyi was in Africa as a big game hunter on four occasions. His three year-long expedition to Asia began in 1877 and its most important accomplishment was the exploration of those mountain ranges which border the Tibetan plateau on three sides. The latter is all the more noteworthy because Sven Hedin in 1906 dis-

47 Tagebuch 1: Dec. 30, 1886-Feb. 17, 1888; Tagebuch 2: Feb. 18, 1888-Oct. 3, 1888; Tagebuch 3: March 17, 1895-April 11, 1895

48 The Samuel Teleki materials are held by the Michigan State University Library, East Lansing, Michigan. The material was purchased from Charles Teleki by the Michigan State University's African Studies Center.

covered the Trans-Himalayas on the basis of the results of the Széchenyi expedition. Among many other specialists, geologist Lajos Lóczy (1849-1920), linguist Gábor Bálint and topographer Gusztáv Kreitner took part in the Széchenyi expedition. Twenty Hungarian and foreign scientists participated in classifying and evaluating the material collected by the expedition. Béla Széchenyi's publications include his United States travelogue[49] and the three-volume detailed, scientific description of his East Asia expedition[50].

One of the world's great explorers, archaeologist and linguist (orientalist) Sir Aurel Stein was born in Budapest (1862 - 1943 in Kabul, Afghanistan). Having completed his higher studies in Vienna, Leipzig and Tübingen, Aurel Stein went to England and became much influenced by the orientalist Sir Henry Rawlinson and Sir Henry Yule, the outstanding expert on Marco Polo's travels. Stein immediately entered into Great Britain's service and later became a naturalized citizen. In 1888 he took a job at the Punjab University in Lahore, as professor of Sanskrit philology. In 1900 he set out on the first of his numerous expeditions. His greatest historic journey occurred in 1907 when he discovered the westernmost portion of the Great Wall of China and after making their way 200 miles eastward the expedition arrived at the "Caves of the Thousand Buddhas". His expedition found more than 900 Chinese manuscripts, many paintings and other art relics. Most of them are now housed in the British Museum in London. Stein's expeditions yielded materials of great archaeological value in exploring the Central Asian desert areas. Aurel Stein maintained unbroken contact with his native land, especially with the Hungarian Geographical Society (Magyar Földrajzi Társaság). Returning to Europe in 1909, Aurel Stein by the invitation of the Hungarian

49 *Amerikai utam*. Pest, 1863

50 *Gróf Széchenyi Béla keletázsiai utjának tudományos eredménye, 1877-1880)* with Lajos Lóczy. Budapest, 3 vols., *1890-1897.* In German: *Die wissenschaftlichen Ergebnisse der Reise des Grafen Béla Széchenyi in Ost-Asien, 1877-1880.* Wien: E. Holzel, 1893-1899. 3 vols.)

Geographical Society delivered a lecture in Budapest and in 1922 was the first scholar to receive the Society's Lóczy Medal established that very year. In his will he presented his invaluable private library to the Hungarian Academy of Sciences. Beginning with his first scholarly publication which appeared in 1894, Aurel Stein's publications were extensive and overwhelmingly in English.

László Ede Almásy (1895-1951) started his education in Hungary, but was sent to an English 'public' school between 1909 and 1913. He was fascinated by automobiles and airplanes. He received his first pilot certificate at the age of 17, flying a plane he built himself. During the first world war he was a well decorated pilot in the Hungarian Army. After the war he raced cars and became the representative of the Austrian Steyr automobile company in Hungary. In 1926 he drove his company's car along the Nile to Sudan. From then on, he represented Steyr Werke in Egypt and led several automobile safaris into the desert. In 1929 he drove, with two Steyr cars, from Mombasa to Alexandria. In the 1930's he led several international automobile expeditions into the Libyan desert, where he used light airplanes for reconnaissance purposes. He worked for the Egyptian government in exploring and mapping the deserts and was instrumental in developing Egypt's civilian aviation. He built the Al-Maza airport in 1932 and taught flying there. During the second world war, Almásy was borrowed from the Hungarian Army by general Erwin Rommel's Africa Corps and served there as an advisor. After the war he was charged as a war criminal, but was acquitted. He returned to Egypt, where he was appointed to direct the Desert Institute of Cairo. However, he died of typhoid fever in Salzburg before he could take on the position. In 1997, a grossly distorted story of his life was screened under the title *English Patient*.

József Nagy (1908, Nagyvarsány - 1990, Miyazaki, Japan) became an electrician and then joined the Salesian order. In 1936 he was sent to Japan to work in the Tokyo - Suginami mission school of the order (since 1963 Ikuey Junior College of Technology) where first he worked as a printer and then as a teacher. He learned Japanese and four other languages, obtained several academic degrees. He was appointed university professor in the 1950's. His book on Western style printing, written in Japanese in 1954, is a classic. He worked as a consultant for Matsushita Corporation, developing Panasonic and NEC radio and stereo systems (e.g. RJX-4800D, RF-9000). Allegedly he also worked on the development of the Japanese stereo postcard. In 1968 he was sent to the Salesian mission home in Miyazaki, where he served as a librarian until his death.

Geology and Mineralogy

Ádám Tomcsányi (1755-1831) graduated from the Institutum Geometrico et Hydrotechnicum. Tomcsányi, in cooperation with Pál Kitaibel (1757-1817), was the first scientist to utilize isoseismic concepts in the interpretation of earthquakes. He first applied these concepts in the analysis of the earthquake of Mór (Hungary) in 1810 which he described in a book[51].

Miksa Hantken (1821-1893) studied philosophy in Vienna and then completed his mining engineering degree at the College of Mining at Selmecbánya in 1846. Between 1848 and 1850 he studied analytic chemistry in Vienna. In 1876 he became a professor at the University of Budapest and in 1882 he was appointed to direct the new Department of Paleontology, the third such institute in Europe. His books on micropaleontology are classics. He has written over 56 monographs and studies. He was the first to call attention to the crucial importance of geologic dating using microfossils, the *Foraminifera*. He has taken an important part in developing the international standards for coloring geological maps. His studies on microscopic analysis of limestones are forerunners

51 *Dissertatio de terrae motu... in genere, ac in specie Moorensi anno 1810* (with Pál Kitaibel, 1 map. Buda, 1814)

of the microscopic fossil analysis. He received many international awards and many paleontologic find ings were named in his honor.

József Szabó (1822-1894), mineralogist, mining engineer and the founder of the school of petrology earned world rep u ta tion for sev eral of his accomplishments: namely, for his pioneering work concerning the trachyte system, for his investigations into Hungary's Tertiary volcanism and for his study of the geological conditions of the Great Hungarian Plains. His several published monographs deal variously with the geo log i cal struc ture of the Tokaj-Hegyalja re gion[52], his trav els in the United States[53], his lectures on different topics of geology[54]. Elemér Vadász eval u ated József Szabó as a ge ol o gist in his trea tise[55].

József Krenner (1839-1920) func tioned as a pro fes sor of min er al ogy and petrology from 1870 to 1894. As the head of the Hungarian National Mu seum's Di vi sion of Min erals, Krenner cre ated one of the world's best min eral col lec tions. He was es teemed as one of Eu rope's finest min er alo-gists for his descriptions and definitions of minerals. He discovered many new min er als: to name but a few, a new gold-silver tel lu rium ore called Krennerit dis cov ered in 1877, fol lowed by Semsey, Lorandit and Avasit in 1881, Kornelit in 1888 Andorit in 1889, Warthait in 1909 and Schafarzikit in 1915. József Krenner sum ma rized his work in a book on mineralogy[56].

52 *Tokaj-Hegyalja és környékének földtani viszonyai*. Pest, 1866

53 *Északamerikai utam vonala*. Budapest, 1883

54 *Elöadások a geológia köréböl*. Budapest, 1893

55 *A magyar földtan útja Szabó József nyomában* (*Hungarian geology and József Szabó.* Budapest, 1967)

56 *Magyarország ásványai* (*Hungary's mi nerals*. Budapest, 1908)

Radó Kövesligethy (1862-1934) was educated in Vienna as an astronomer. From 1881 he was employed in Hungary, first at the astronomical observatory at Ógyalla, then he became an assistant of Eötvös at the University of Budapest, followed by an appointment as associate director at the observatory. By using spectral analysis, he developed a method to measure the surface temperature of celestial objects. He was the first to determine that there are stars with ultraviolet radiation that cannot be seen with the naked eye. He took part in an expedition to the Southern Hemisphere to measure the spectra of stars seen from there. Upon his return, he organized a seismological network including eight Hungarian observatories. In 1906 the International Seismologic Association elected him permanent secretary. His unusual facility with languages—he spoke six languages fluently—made him an excellent candidate. His work in earthquake forecasting included not only organizational matters but theoretical ones as well. He pointed out the importance of measuring the celerity of waves in the rocks under stress. His formula for the determination of the hypocenter of a quake is still attributed to him in scientific literature.

Hugo Böckh (1874-1931) completed his studies in Budapest and Munich. He was professor of geology at the College of Mining in Selmecbánya, then he was appointed to head the mining research office at the Ministry of Finance. He was instrumental in finding the gas fields in Kissármás, in Transylvania. His international fame, however, came from locating the oil fields of Iran.

Simon Papp (1886-1970) completed his degree in geology at the University of Kolozsvár. He became Hugo Böck's assistant at the College of Mining at Selmecbánya, concentrating on oil and gas exploration in the Carpathian basin. In 1920 he left for abroad and took a job with the Anglo-Persian Oil Company. He returned to Hungary in 1932 with a great deal of experience in the area of petroleum exploration. When the American company, Eurogas Co. took a concession in Hungary, Papp joined it. When in 1937 his first exploratory hole came in, Hungary became a petroleum producing nation. This was Simon Papp's greatest success. The Hungarian-American Oil Company, MAORT appointed him to be chief geologist. Papp used his personal contacts to prevent the Germans from taking over and exploiting the oil fields. The Hungarian oil fields became Hitler's obsession toward the end of the war, he wanted to defend them at all costs, which prolonged the hostilities in the country. After the war, in 1848 Papp was the primary defendant in a Communist show trial and was convicted to life in prison. He was forced to continue his scientific work in prison. In 1955 he received amnesty, he was rehabilitated in 1961 and worked in the oil industry until his death. Papp was active in teaching as well. He was Hungary's first university professor specializing in petroleum geology.

Aladár Vendl (1886-1971), professor of Geology at the Technical University of Budapest and Miklós Vendel (1896-1977) professor at the College of Mining in Sopron, conducted investigations into rock and ore formation in Hungary and abroad and elucidated many relevant scientific questions. Both were recognized petrologists throughout the world.

Elemér Vadász (1885-1970) surveyed the geology of bauxite and coal and was the first to recognize the nature of stratigraphy and sediments of manganese ores in the Bakony Mountains. He wrote a well-documented treatise on the 150-year history of Hungary's geological research[57].

Mine surveying and geophysics were the specialties of geodesist Antal Tárczy-Hornoch (b. 1900). With his associates he constructed a superior triangulation method for geodesic area measurements. Tárczy-Hornoch and his co-workers also substantially improved the correction calculations. The following of his many publications (books and cca. 250 periodical articles published in Hungary and elsewhere) contain his noteworthy contributions[58]. Antal Tárczy-Hornoch has substantially

57 *Magyarország földtana* (Geology of Hungary. Budapest, 1953), also published in Russian (*Geologiia Vengrii*. Moscow: Mir, 1964. 531 p.)

improved the making of geodetic instruments and promoted the application of electronics in geodesy.

Horst Bandat (1895, Budapest - 1982, Paramus, NY) graduated in geology at the University of Science of Budapest. He has done geologic field work in Hungary, Poland, Austria and Albania in the 1920's. In 1929 he joined Shell Oil and worked on Sumatra, Borneo and the Celebes Islands. In 1938 he developed the large scale (100,000 square kilometer) geological air-photo interpretation technique. His 1936 report, written jointly with N. E. Weissbord, was internationally noted. From 1938 through 1940 he worked in Cuba, New Guinea and Java. In 1940 he returned to Hungary. Using his geologic air-photo interpretation, he found significant gas deposits in Transylvania. In 1947 we moved to the United States and took a position at Gulf Oil Corporation and explored Cuba, Saudi Arabia, Tunisia, Yemen, Libya, Italy, Guatemala, Peru, Bolivia, Belize, the United States and other countries.

Elemér Szádeczky-Kardoss (1903-1984) completed his studies in geology and geochemistry at Budapest University and has been a university professor there from 1934. He was a member of several domestic and foreign professional organizations such as the International Union of Geological Sciences, the U.S. Geochemical Society, the World Academy of Art and Science, corresponding member of the Vienna Geological Society and honorary fellow of the Mineralogical and Geological Society of the Czechoslovak Academy of Sciences and of the Finnish and East German geological societies. He has done outstanding research in sediment (deposit) formation, formation of magnetic rocks, geochemistry and related fields. Szádeczky-Kardoss conceived an entirely new theory of rock

58 *Das Verwerfenproblem im Lichte des Markscheiders* (Berlin, 1927), *Kiegyenlitöszámitás* (Correction calculation, 1930), *A Gauss-Krüger koordináták számitása* (Calculation of the Gauss-Krüger coordinates, with István Hazay, 1951), *Tablitsy dlia ellipsoida Krasovskogo dlia zony 40° do 55°* —Tables for Krasovskij ellipsoid between 40th and 55th parallels, 1959); *Markscheiderische Studien (1963)*.

formation based on the principle of transvaporization. As a result of his research work, new concepts were formulated as to the origin of bauxite and the localization and extension of ore deposits. He has published over 300 scientific papers in his native land and abroad. His monographs of chief importance discuss the formation, chemistry and mining of coal geochemistry and the structure and evolution of the earth, an introduction to petrology[59].

András Tasnádi Kubacska (b. 1902) has written 28 books, several of them in foreign languages and over 200 articles in geology and mineralogy.

László Egyed (1914- 1970) originated a totally new theory concerning the expansion of the earth's inner structure which has attracted considerable support in the world's scientific community.

Agricultural Sciences

During the last decades of the eighteenth century, a great number of books on agricultural sciences were printed. It was quite a natural phenomenon because the intellectual movement of the Enlightenment and the transition from semi-feudalism to the early phases of capitalism pushed new forms of agricultural production to the fore. During this period the Faculty of Agriculture was organized at the Pest-Buda University.

59 *A köszén képzödése, kémiája és bányászata* , 1952;, *Geokémia.* Budapest: Akadémiai Kiadó, 1955. 680 p.; *A föld szerkezete és fejlödése, bevezetés a közettanba* ,Budapest, 1968. 339 p.

The first professor of the Faculty of Agriculture was Lajos Mitterpacher (1734-1814) who in his *Elementa rei rusticae* (1777-1794) summarized at a high contemporary level all branches of agricultural sciences.

In the closing phase of the Enlightenment, entirely new institutions came into being. Around 1780 Sámuel Tessedik (1742-1820), a Lutheran pastor of Szarvas, founded a practical school for farming in his hometown, predating by years the founding of such schools in any country of Europe. In addition, he was literarily very active, publishing much to promote agricultural knowledge. Sámuel Tessedik's enterprise was widely known and praised as a model for agricultural schools. Patterned after Tessedik's school, the Keszthely Academy of Agriculture, called "Georgikon", was established in 1797 by György Festetics. A similar academy of agricultural sciences was founded at Magyaróvár in 1818.

Ágoston Haraszthy (1812-1869) was a young landowner with a strongly liberal persuasion. In 1840 he came to the United States and settled in Wisconsin, founding a town on the Wisconsin river, which later became Sauk City. From there he traveled—mostly through Indian country—to New Orleans, returning to Washington, where he met the President, to New York, from where he went back to Hungary. He wrote a book on his American experiences, but by the time it was published in 1843, he sold all his holdings and took his family to Wisconsin permanently. He introduced the growing of hops there, which gave an impetus to the famous beermaking in the state. During California's Gold Rush he moved there, first to be the sheriff in San Diego, then, with a presidential appointment, the director of America's second Mint, in San Francisco. Linking up with Hungarian refugees of the 1848/49 revolution, he set up a private gold refining plant, which operated until 1857. At that time, he began concentrating on the creation of vineyards around Sonoma. He became so well known in the state that by 1861 he was sent to Europe to bring grape cuttings back to California. He brought one hundred thousand cuttings from 300 varieties, which commenced to establish California's wine culture, playing a very important role in America's economic growth. On the 100th anniversary of his death, Ronald Reagan, Governor of California at the time, paid tribute to Haraszthy in these words: "Colonel Agoston

Haraszthy can well be called the Father of the Wine Industry in California... Ever since that time, from the 300 varieties of grapes he brought to California and planted, the wine industry of our Golden State has been improving until in the past few decades California wines have become renowned around the world as second to none. Eighty-five per cent of the wine produced and consumed in America comes from California, with California vineyards producing 160 million gallons of wine a year. ... we certainly acknowledge our debt to Colonel Haraszthy for launching the industry into world wide fame."[60]

On the same occasion, Maynard A. Amerine, professor of enology, University of California at Davis, also discussed the importance of Ágoston Haraszthy's activities for the development of viticulture in California. According to professor Amerine's opinion: "In retrospect, we can not measure with accuracy the total influence of Haraszthy on the California grape and wine industry, but it was very great. His enthusiasm for grape growing and wine making must have influenced many settlers. "[61]

Péter Treitz (1866-1935) and Elek 'Sigmond (1873-1939) were the architects of modern agricultural science in Hungary. The agrarian crisis that was chronic around the turn of the nineteenth and twentieth centuries presented new problems for soil science. In Hungary, alkaline soil hindered the development of intensive farming. Péter Treitz applied geological methods to the improvement of alkaline soil while 'Sigmond applied chemical ones. Both Treitz and 'Sigmond are responsible for laying the foundations for the study and improvement of alkaline soil.

60 Message from Gov. Ronald Reagan, of California, published in the Congressional Record. Proceedings and Debates of the 91st Congress, First session. Thursday, June 19, 1969.

61 Ibid.

Lajos Kreybig (1879-1956) has earned recognition for investigating the biological aspects of soil fertility.

Gusztáv Adolf Manninger (1880-1954), a professor of agriculture developed new techniques of soil cultivation directed to conserve soil moisture. For his work he was awarded with a Kossuth Prize. His book on shallow cultivation was published posthumously in 1957.

Gyula Magyar (1880-1945) was among the very first scientists to improve plants by applying scientific horticultural methods and Mátyás Mohácsy (b. 1881) a renowned pomologist, was a pioneer of growing fruit by modern methods.

Many other contributions to agricultural science in Hungary are already mentioned in chapters on science and engineering.

Veterinary Medicine

In 1782, Emperor Joseph II issued a decree setting up the Veterinary Institute at the Pest-Buda University's Faculty of Medicine. Sándor Tolnay (1747-1818), the head of this newly established Institute, published several works on the prevention of animal diseases.

Paralleling the general advancement of the agricultural sciences since around the end of the 19th century, veterinary medicine has also shown great progress. The most important role in the latter trend was that of Professor Ferenc Hutÿra (1860, Szepeshely - 1934, Budapest) whose activities helped elevate the independent Budapest Veterinary College to the rank of a university. His research into pathology of contagious diseases of animals earned him and his country an international reputation in veterinary science. His successful investigations helped clarify greatly and control such animal diseases as glanders, swine fever, swine erysipelas and several others. Among his most successful book[62] was later revised and partly enlarged by co-authors Rezsö Manninger and János Mócsy. It was published in several editions in English, Italian, Russian, Spanish, Turkish and Finnish languages.

Hutÿra's co-worker, József Marek (1868-1952), shared in the extraordinary accomplishments of his master. János Mócsy (b. 1895), also an internationally recognized scientist of veterinary medicine, obtained highly significant results in the therapy of swine scabies, while Sándor Kotlán (b. 1887) is well known for creating a new method for preventing coccidiosis in fowl.

Aladár Aujeszky (1869-1933) studied in Budapest and received his medical degree in 1893. He worked in the Hungarian Institute of Bacteriology. He completed his studies in veterinary science and became a professor at the College of Veterinary Science. His interest in research was centered on microbiology and immunology. His first important success was the diagnosis of a viral brain inflammation (1902), since named after him. His studies in rabies led to the development of a dog vaccine, which eliminated this disease in Hungary, a first in the world. He wrote a textbook on bacteriology and published several hundred scientific papers.

Rezsö Manninger (b. 1890), doctor of veterinary medicine, university professor and vice-president of the Hungarian Academy of Sciences was an international authority on bacteriology and epidemiology. He acquired a world reputation for inventing an immunization procedure against swine erysipelas. He was instrumental in the establishment of the National Institute of Animal Hygiene (Országos Állategészségügyi Intézet) in Budapest. Manninger enriched veterinary literature particularly with his monograph on bacteriology, immunology and general epidemiology[63].

62 *Spezielle Pathologie und Therapie der Haustiere* , 2 vols., Jena, 1905

63 *Állatorvosi bakteriológia, immunitástan és általános járványtan.* Budapest, 1960

Oszkár Wellmann (1867 - 1943) was a veterinarian and professor of animal husbandry whose field of research focused on the diagnosis and treatment of rachitis (rickets), an inflammation of the spine. His greatest contribution was the design of registration and certification system of pedigreed breeding animals that was applied statewide, contributing to the growth of Hungary's export of cattle throughout Europe.

Medicine

János Balsaráti Vitus (1529-1575) had been associated with the University of Wittenberg and some Italian universities, subsequently practicing medicine for a while in Rome. He authored the *De remediis pestis prophylacticis* as well as the *Magyar Chirurgia* (Hungarian surgery).

Tamás Jordán of Kolozsvár, a contemporary of Balsaráti Vitus, was the first Hungarian physician to study typhoid fever.

Károly Rayger (1641-1707), a Pozsony physician, was the first in medical literature to describe influenza scientifically (1677). For this accomplishment Károly Rayger was appointed a Court physician and became one of the few Hungarian scientists named to the prestigious *Academia naturae curiosorum (Academia Leopoldina)* founded in Vienna in 1652. Rayger wrote several scientific papers for the journal of the Academia.

Ferenc Miskóltzi (1697-1771), well-known surgeon and physician of the city of Györ, prepared a surgery handbook[1] which was generally based on the book of E. Norr, a famous German surgeon. Several sections of Miskóltzi's work are noteworthy, especially the one on embryology which is significant from a biological standpoint.

János Dániel Perliczy (1705-1778) studied at German, Dutch and French universities. He graduated from Utrecht University. Between 1731 and 1754 Perliczy was head physician of Nógrád County, Hungary. He published several volumes on medicine, among them the *Medicina pauperum*... (Buda, 1740), a greatly informative and widely read Hungarian-language treatise, with a Latin title. Perliczy also contributed articles

1 *Manuale chirurgicum, avagy chirurgiai utitárs*. Györ, 1742.

in the annals of Berlin scientific societies. In order to improve public health conditions, Perliczy sent a memorandum to Empress Maria Theresa in 1751 in which he recommended the founding of a faculty of medicine and academy of sciences. As a consequence of the Vienna Imperial Court's failure to respond to his request, Perliczy, with the aid of Ferenc Merkhot and others, founded the School of Medicine at Eger.

István Hatvani (1718-1786), a polymath-physician, as early as the middle of the eighteenth century applied the theory of probability to the field of hygiene.

István Weszprémi (1723-1799) published his pioneering work entitled *Tentamen de Inoculate peste* in London in 1755. Weszprémi's *Tentamen* advocated inoculation (antitoxic therapy)for the first time in history for the purpose of producing immunity to the fatal epidemic of the time: the plague. Weszprémi also prepared over the years 1774 to 1787 a multi volume set, in Latin, entitled *Succincta medicorum Hungariae et Transylvaniae biographia* which is a collection of bio-bibliographical data on medical researchers and practicing physicians in Hungary and Transylvania. Weszprémi's Hungarian-language books on pediatrics (1760) and midwifery (1786) were also of great significance in the time of their publication.

Dávid Gruby (1810 - 1898, Paris) was born as the ninth child of a poor peasant family. He studied at the Piarist school in Pest and took his medical degree at the University of Vienna in 1839. In the following year he published his first work: *Observationes miscroscopicae ad morphologiam pathologicam*, the first work by a Hungarian author on microscopic technology. He soon moved to Alfort, France, where he continued his microscopic studies. With a homemade microscope he was the first to make micro-photographs. In "The History of French Medicine" (Guiart, 1947) Gruby is recognized as the forerunner of microscopic photography. He left behind 15,000 microscopic plates and three thousand photographs. He identified several diseases of the skin, found a new bacillus that he named *trypanosoma* (still named as such). Fifty years later a relative of this bacillus was identified as the cause of sleeping sickness. Gruby firmly believed in the influence of natural events and illnesses. In his laboratory in Paris he set up a meteorological station and an astronomical observatory. He was the first to recommend the use of cotton pads in surgery[2] and prepared plans for ambulances. In addition to the Academy of Sciences in Vienna, he was elected to twenty scientific associations around Europe.

The Hungarian-born Ignác Fülöp Semmelweis (1818, Buda - 1865, Vienna) made one of the greatest discoveries in the universal history of medicine. Semmelweis forebears lived in the Hungarian village of Szikra, as early as the seventeenth century. His two brothers fought against Austria in the Hungarian War of Independence of 1848-1849. His education up to and including his third year of medical studies was in Buda and Pest. He finished his medical studies at Vienna University. Afterwards Semmelweis was attached to the Vienna Hospital which was divided into two parts: the First Division (Clinic), comprised of medical students and physicians involved in surgery, and the Second Division (Clinic) made up of midwives and physicians who were not engaged in surgery immediately prior to attending maternity patients. The mortality from puerperal fever had shown a remarkable difference between the First Division and the Second. This fact was clearly observed and strikingly delineated by Semmelweis himself in the statistical table shown on the following page.

Evidently, as observed by Semmelweis over those six years, the average mortality in the First Division was three times that of the Second. It was simply cadaverous material from autopsies adhering to the hands of those physicians in the First Division, subsequently attending mothers in childbed. The cause was

2 Guerin, a Paris surgeon re-invented it 12 years later .

cadaveric poison and that alone, which was further demonstrated by the fact that, with the exception of the introduction of chlorine disinfection, no other change had been made in the conditions prevailing in the First Division. By requiring physicians of the first group to scrub with chlorine disinfectant, the cause of puerperal fever had been removed and its effect, puerperal mortality, disappeared. Until then the system of instruction for midwives was such that neither the Second Division physicians nor their pupils, the midwives, had so frequent an occasion as those in Group I to come into contact with cadavers, thereby contaminating their hands. Semmelweis' fight against childbed fever led to one of the greatest discoveries of all time: that disease was spread by *germa* (bacteria) and no other causes. For his discovery in 1847 of a new etiology of childbed fever, Semmelweis is honored not only as "the Saviour of Mothers" but as one of the greatest physicians of all time.

First-Division Second-Division

YEAR	Cases	Deaths	%	Cases	Deaths	%
1841	3,036	237	7.7	2,442	86	3.5
1842	3.287	518	15.8	2,659	202	7.5
1843	3.060	274	8.9	2,739	164	5.9
1844	3,157	260	8.2	2,956	68	2.3
1845	3,492	241	6.8	3,241	66	2.0
1846	4,010	459	11.4	3,754	105	2.7

Semmelweis' Statistical Data

In 1851 Semmelweis was named head of obstetrics at Rókus Hospital in Pest and was appointed professor of gynecology at Pest University. On the advice of his physician friend, Lajos Markusovszky (1815-1893), Semmelweis wrote about his lifework first in the Hungarian medical journal, *Orvosi Hetilap* (1858) and later published a book in German[3]. *Semmelweis' collected works* (*Gesammelte Werke*) were edited by Tibor Györy and reprinted under the title *Semmelweis' gesammelte Werke* (Jena: Fischer, 1905; Wiesbaden: Sändig, 1967).

Moric Kaposy (1837-1902) was born and educated in Hungary but finished his medical degree in Vienna. In 1875 he was appointed to the directorship of the Clinic of Dermatology in Vienna. His research into syphilis and malignant tumors were notable. His description of *Sarcoma indiopathicum multiplex haemorrhagicum* (1872) is known today as "Kaposy's sarcoma", which is related to AIDS.

The Lenhossék family promoted medical science for three generations. University professor Mihály Ignác Lenhossék (1773, Pozsony - 1840, Buda) published Latin and German works on medical biology. His *Physiologia medicinalis* (Pest, 1816 and 1818, 5 vols.) influenced a generation of physicians in Hungary and abroad. His son, József Lenhossék (1818, Buda - 1888, Budapest) was professor of topographical anatomy at Pest. His research into the anatomy of the spinal cord was internationally appreciated[4]. József Lenhossék was also well known as an anthropologist, for which the French Academy awarded him the prestigious Monthyon prize.

Mihály Lenhossék (1863, Pest - 1937, Budapest) was József's son. Director of the No. 1 Institute of Anatomy at Budapest University from

3 *Die Aetiologia, der Begriff und die Prophylaxis des Kindbettfiebers* (Pest, 1861).

4 *Neue Untersuchungen über den feineren Bau des zentralen Nervensystems des Menschen* (Vienna, 1855) *and Mémoire sur la structure intime de la möelle espiniére* (Paris, 1859)

1899 to 1934, he was a pioneer of neuron theory. Mihály Lenhossék also earned reputation through his well-prepared university textbooks on histology as well as anatomy. He published several books in German.

Imre Ullman (1861-1937) was raised in Pécs and graduated with a medical degree in Vienna in 1884. He practiced surgery in Vienna. In 1885 he worked alongside with Pasteur in Paris. Working with dogs on transplant surgery, he was the first to successfully perform a kidney transplant on a dog in 1902. Next he tried to transplant a dog kidney into a goat. In was temporarily successful, but immune reactions soon rejected the kidney.

The Korányi family also occupy a position among the most eminent figures of modern medicine. Frigyes Korányi (1827-1913) was the director of the No. 1 Clinic of Internal Medicine (in Budapest) until his retirement in 1908 where he engaged in laboratory research as well as chemical, bacteriological and x-ray investigations. Author of a comprehensive work on tuberculosis (1880), Frigyes Korányi pointed out the relationship between certain diseases and social conditions. He founded Hungary's first TB-clinic at Budakeszi and authored over 150 publications in addition to contributing to several foreign handbooks on internal medicine.

His son, Sándor Korányi (1866-1944). was acknowledged throughout the world as a leading authority on physiology, gerontology and renal pathology. Honored by several foreign universities and medical institutions, Sándor Korányi also became an honorary member of the prestigious *Academia Leopoldina*. He published several highly regarded books[5].

Endre Högyes (1847-1906) obtained his medical diploma at Budapest and was associated as a professor with Kolozsvár and Budapest universities. In 1879 Högyes discovered the mechanism of associated ocular motions. In 1890 he modified Pasteur's procedure for preventive inoculation against rabies and his new method has since been adopted world-wide. Endre Högyes was also instrumental in the founding of the Budapest Pasteur Institute. His research work was highly appreciated in Hungary and abroad alike and his foreign language publications were widely read[6].

Tibor Verebélÿ (1875-1941) as a professor of surgery and director of the No. 1 Surgical Clinic of the Budapest University founded a highly regarded school of surgery. He did significant research on the surgery of tumors, vascular- and neurosurgery and applied successful surgical treatment in the case of gastric ulcers. His four-volume set of university lectures on surgery were a veritable backbone in the curriculum of his school of surgery[7].

György Hevesy (1885, Budapest - 1966, Freiburg) started his studies in Budapest, but graduated with a degree in chemistry in Germany. He obtained a doctorate in Zürich with a thesis topic about electrolysis of solvents. In 1911 he worked in Manchester with Rutherford and was introduced to the budding science of radioactivity. During this time Hevesy met and became a lifelong friend of Niels Bohr. In 1912 he has done research in Vienna in the new field of isotopes and that led him to invent the use of isotopes as tracers. After the 1919 Communist revolution he left Hungary for Copenhagen where he worked in Niels Bohr's laboratory. He identified the 72rd chemical element, the hafnium, using Bohr's atomic model. In the same year, he introduced the use of tracers in biological experiments, using lead and thorium isotopes. In 1926 he accepted a teaching position from the University of Freiburg, where he began tracer experiments on animals. He was able to show that bismuth

5 *"Beiträge zur Theorie und Therapie der Niereninsuffizienz* (in Berliner klinische Wochenschrift, 1899) *; Physikalische Chemie und Medizin* (2 vols., Leipzig, 1907-1908) *; Funktionelle Pathologic und Therapie der Nierenkrankheiten* (Berlin, 1929, in Hungarian 1930, Budapest).

6 *"Le virus rabique des chiens des rues dans ses passages de lapin à lapin"*, published in *Ann. de l'Inst. Pasteur ,* Paris , 1888*; Die experimentelle Basis der antirabischen Schutzimpfungen Pasteur's* (Stuttgart, 1899) .

concentration in tumors is higher than in healthy tissue. Hevesy's scientific field has broadened after the invention of artificially created isotopes. After deuterium became available, with heavy water he was able to show the chemical exchange between the goldfish and the water in which it swims. Owing to his Jewish faith, he had to leave Germany for Denmark and in 1940 he went to Stockholm. From 1940 he was able to use his tracers to identify cancerous growth. In 1943 he received the Nobel Prize for his work. Hevesy is considered the founder of nuclear medicine. The Society of Nuclear Medicine's Hevesy Nuclear Medicine Pioneer Award is named after him.

Ödön Krompecher (1870-1926) obtained his medical degree in Budapest. After working at the Budapest Institute of Pathology, he spent nine months studying at the Pasteur Institute in Paris. In 1914 he became the director of the Institute of Pathology in Budapest. His research focused on the growth of tumors. He became a noted expert of cancerous growth. He criticized the contemporary cancer theories and formulated new methods of identifying precancerous conditions, contributing to the prevention and cure of cancer.

Róbert Bárány (1876-1936) was the son of a bank officer in Rohonc who was transferred to Vienna. Bárány was born and educated there and became a physician in 1900. Afterwards he went to German universities for further studies in internal medicine, neurology and psychiatry. From 1905 he taught at the Ear Clinic of Vienna. After volunteering to the army at the beginning of World War I he was soon captured on the Russian front. With the assistance of the neutral Swedish authorities he was granted special treatment, such as the use of a Siberian medical library while a POW. Subject to a prisoner exchange, he was allowed to go to Sweden in 1916, where he received the 1914 Nobel Prize in Physiology and Medicine for his studies concerning the physiology and pathology of

7 *(Sebészklinikai elöadások (*Lectures on clinical surgery. Budapest, 1930-1934*)*

the vertibular apparatus, the balancing function of the inner ear. After the war he taught at the University of Uppsala until his death.

Another laureate of the Nobel Prize in physiology and medicine was Georg von Békésy (1899-1972) for his research into the mechanism of stimulation of the human inner ear. Békésy was born into a Austro-Hungarian diplomatic family, who studied French in Constantinople, Italian in Switzerland, German in Munich, but did not have an ear for languages; he could never learn any foreign language quite well, aside of his native Hungarian. In 1923 he obtained a Ph.D. in physics from Budapest University. Until 1946 he worked in the Research Laboratory of the Budapest Telephone Department of the Hungarian Post Office and simultaneously, between 1939 and 1946, he was professor of experimental physics at the Budapest University of Sciences. Then for a while he pursued his research in Stockholm at the Karolinska Institutet. In 1947 Georg von Békésy emigrated to the United States, where, up to his death, he was associated with the psycho-acoustic laboratory of Harvard University. There, he fully elucidated the energy conversion process taking place in the cochlea. Although a physicist, he received honors for his contributions from a variety of disciplines: among the many, the Gold Medal of the American Otological Society (1957), the Gold Medal of the Acoustical Association of America (1961) and even honorary M.D. degrees from Münster and Bern universities. Békésy's landmark auditory-physiological research accomplishments are described in detail in his *Experiments in Hearing* (1960).

Tivadar Huzella (1886-1950), histologist and biologist, professor of anatomy, later histology, at Debrecen and Budapest universities. He was honored for his extraordinary achievements by election to the presidency of the 3rd International Congress of Experimental Cytology at Cambridge in 1933. Huzella pursued research into intercellular substances and cellular structure. His main works attracted international interest [8].

Imre Hermann (1889-1984) obtained his medical degree in 1913. He spent the first world war on the front. A student of Révész and Ferenczi, noted psychologists of his time, his interest turned to psychoanalysis and experimental psychology. He worked at a Budapest mental clinic and in his own practice. His first psychoanalytic publication appeared in 1920, his last one in 1980. During these sixty years he was permanent contributor to many psychological journals around the world. He published many books in Hungarian, German, French and Italian. His theories on human instincts—the cyclically connected joining, breaking up, searching, hiding—the success or failure during the years of growth, and that of life's first social unit—between mother and child—were the topics of Hermann's writings during his long and successful career.

Géza Hetényi (1894-1959) was assistant to professor Sándor Korányi at the No. 3 Clinic of Internal Medicine in Budapest. In 1947, Hetényi was appointed full professor of Internal Medicine at Szeged University. His research on the metabolism of patients suffering from liver diseases and diabetes is of considerable significance. Hetényi spearheaded successful research into the pathogenesis of ulcerous diseases, discovering the central role of the nervous system in the development of such diseases. His research team also revealed and proved scientifically, that the histamine released by the gastric mucous membrane plays a very important part in the development of ulcers. One of his main works dealing with the pathology and therapy of ulcers[9] also appeared in German.

Jenö Ernst (1895-1981) started his studies in medicine in 1913. Interrupted by the war and five years of prisoner of war camp in Russia he finally graduated at the University of Pécs in 1923. His research interest was in the field of physical processes in human biology. His studies on

8 *Der Mechanismus der Kapillarkreislaufs und der Sekretion im Bindegewebe* (Berlin, 1925), *Általános biologia*. (Budapest, 1933)

9 *A fekélybetegségek idöszerü kérdései*. Budapest, 1958

muscular mechanics brought him international recognition. In 1939 he worked with Albert Szent-Györgyi initiating research on the biochemistry of muscles. After 1945 he was appointed to a professorial position at the University of Pécs, directing his Institute of Biophysics until his retirement in 1971. He was one of the initiators of the International Biophysical Union. His scientific work was published in 200 papers and three monographs[10]. He received many awards for his work.

Antal Babics (b. 1902) and his co-workers, especially Ferenc Rényi-Vámos (b. 1910), researched the anatomy of the lymphatic vessels of most organs. Their work elucidated from entirely new angles the structure of renal ducts, the renal pelvis and inspired new surgical procedures.

György Ivánovics (b. 1904) has spent the bulk of his career at Szeged University where in 1940 he became director of its Institute of Microbiology. In 1960 Ivánovics pursued his research at Harvard University and in 1965-1966 at Glasgow University as guest professor. Ivánovics has dealt with the general biology of bacteria, genetics, virus research and chemotherapy. While engaged in studying the variability of the tubercle bacillus (Mycrobacterium tuberculosis), the Ivánovics team discovered completely new laws. His monograph[11] has been widely read. In addition to several Hungarian-language books, Ivánovics has authored well over 200 scientific papers published in Hungary and abroad.

József Dallos (1905 ? - 1979, London) was educated in ophthalmology in Budapest. His research work at the Budapest No. 1 Eye Clinic led to the development of a glass technology that enabled him to build contact lenses. By being able to create lenses that corresponded to the eye's

10 *Die Muskeltätigkeit* (Budapest, 1958), *Biophysics of the Striated Muscle* (Budapest, 1963), *Biology without Mysticism* (Budapest, 1976).

11 *Chemotherapie der bakteriellen Infektionen* (1944)

asymmetry, he made them comfortable to wear all day. In 1937 he went to London to continue his research. After his death, the British Contact Lens Association announced a yearly award named after him. Incidentally, the development of the soft contact lens in attributed to another Hungarian, István Györffy.

Kálmán Lissák's (b. 1908) name deserves special mention for his outstanding work in nerve physiology, which has been internationally recognized.

Zoltán Zsebök (b. 1908) spearheaded research resulting in advances in lung surgery.

In medicine-oriented biological research, János Szentágothai (b. 1912) was regarded as a leading world authority. His results are all the more noteworthy because the country's biological research for a long time focused only on taxonomy and some related zoological and botanical topics, although experimental biology was popular to a certain extent in the various branches of the medical sciences. The experimental studies of János Szentágothai resulted in significant advancement in the functional analysis and nervous correlations of histological structures. Founder of a new school of experimental pathology, János Szentágothai has been a leading figure at international congresses since the conclusion of the second World War and has published extensively in foreign journals. In his later years, he was the president of the Hungarian Academy of Sciences.

Frigyes Verzár (1886-1979) graduated in Budapest in 1908. As a medical student, he was interested in experimental physiology. Just before the end of the first world war, he was appointed to the biology department of the University of Debrecen as professor. He studied abnormal reflex movements and gerontology. Later he became professor at Basel, Switzerland. Excelling in biochemistry, Verzár is best known for his work on blood grouping and the chemistry of absorption and of vitamins.

Kálmán Sántha (1902-1956) received his medical diploma at the Budapest University of Science in 1927. His early publications in neurology, written while he worked at the Psychiatric Clinic in Budapest, were internationally noted. With a Rockefeller Foundation award he worked at McGill University in Montreal in 1936, where he has developed a thermal technique for the measurement of blood flow. After he returned to Hungary he received a professorial appointment. He introduced modern neuro-surgical procedures and has set up an independent surgical unit at the clinic. His research included the study of the differences between the left and right part of the brain. At the end of the war he was elected to preside over the Temporary National Assembly, was invited to be a member of the National Academy of Science and received the Kossuth Prize in 1949. He, however, objected to the rapid takeover of the Communism in Hungary. As a result, in 1951 he was removed from his positions on false charges and was assigned a medical position in a minor hospital. He created a highly regarded psychiatric program there and even continued his research into aphasia. In 1956 he regained his earlier positions but soon died.

Hungarians have been traditionally active in morphological studies. In this time-honored tradition dating back to István Apáthy and Mihály Lenhossék, Ferenc Kiss (1889-1966), professor of human anatomy at Szeged and later Budapest, compiled in cooperation with associates a most modern anatomic atlas. Kiss' atlas of anatomy (1946) has been issued in all European languages and has been acknowledged by the international community of morphologists as a top-flight contribution.

Lajos Nékám (1868-1957) taught a whole generation of dermatologists as director of the Clinic of Dermatology from 1906 and professor of dermatology at Budapest University up to his retirement. His investigations on poikiloderma, and the appearance of myeloid leukemia in the skin are of great significance. His main work[12] is still regarded as a source book. His son, also Lajos (1909-1967), followed his father into medicine.

12 *Corpus Iconum Morborum Cutaneorum* (Budapest, 1938)

Graduating in 1932, he studied at several European universities before he returned to Hungary to practice dermatology. His research results related to hormones and vitamin K were widely publicized in Hungary and abroad.

Béla Schick (1877-1967), was co-discoverer, with Clemens von Pirquet, of the new medical science of allergy. He was born in Boglár, Hungary and died in New York City. He is best known for the Schick test for diphtheria.

World-renowned Dezsö Kassay (1899-1981) took his degree in medicine at the University of Szeged, spending two and a half years in its Department of Pathology, subsequently. He was certified in surgery and otolaryngology in 1927 by the University of Pécs. He took a six-month postgraduate course in Vienna and Graz in 1928. Kassay was chief of otolaryngology respectively, at Hódmezövásárhely from 1930 to 1941, at Nagyvárad in 1941 and from 1941 to 1950 at the White-Cross Children's Hospital of Budapest. In 1948 he was awarded a UNESCO fellowship to conduct research in Philadelphia, Boston and New York. Afterwards Kassay returned to Hungary to assume chairmanship of the Department of Bronchology and Otolaryngology from 1950 to 1956 at the University of Budapest. Kassay escaped from Hungary in 1956 after the Hungarian Revolution. Upon his arrival to the United States in 1957, he was offered a fellowship by the Rockefeller Foundation. In 1957 he was appointed professor of broncho-esophagologic research at the Jackson Clinic of Philadelphia's Temple University. Later he worked in the Lankenau Hospital of Philadelphia as researcher and physician and several other medical institutions all situated in Philadelphia. Named honorary member of the American and International Broncho-esophagologic Associations in 1948 and 1960, he was also named member of the Philadelphia Bronchoscopic Club in 1957. Fascinated by mechanics from early childhood, he invented an instrument which prevented bleeding during and after tonsillectomies. He also created a bronchoscope with proximal illumination, that was far better than previous attempts by Brünings and Haslinger. On the basis of his scientific observations and findings, he created the "Kassay Lankenau Authentic Lung Reproduction." This lung model is distributed all over the world to universities, teaching institutions and physicians by the Medical Plastic Laboratory, Inc. of Gatesville, Texas. Among his surgeries, his 1950 circular resection of a thoraic part of the trachea with András Bikfalvi bears the distinction of being the first in Hungary and one of the first of its kind anywhere. Dezsö Kassay also developed a simple method for bronchoscopy in newborns and infants. He published 86 scientific papers in Hungarian, English, German and French, three books in Hungarian and one in English entitled *Clinical Applications of Bronchology* (New York: McGraw-Hill Company, 1960).

One of the giants of modern day medicine and psychology, Hans (Hugo Bruno) Selye (b. 1907 in Vienna of mixed Hungarian and Austrian parentage, died in 1982, Montreal), attended the Hungarian-language secondary school of the St. Benedictine Order in Komárom for eight years, continuing his studies in Prague, Paris and Rome. Later awarded a Rockefeller research fellowship, he was associated with the Johns Hopkins University at Baltimore. A Canadian resident for a few decades, Selye has held a professorship at the University of Montreal and has served as director of the University's Institute of Experimental Medicine and Surgery. In 1936, Selye's revolutionary concept of stress opened up entirely new avenues of treatment for several diseases, including coronary thrombosis, brain hemorrhage, hardening of arteries, certain types of blood pressure and kidney failures, arthritis, peptic ulcers and to a certain degree even cancer. His theory of stress was introduced to the layman in Selye's *The Stress of Life* (New York: McGraw Hill, 1959). Later, Selye worked on a new theory relating the process of aging to the body's disposition of calcium, which research holds the potential of countless medical applications. Known as the father of the stress theory, Selye has published several dozen books (e.g. *Stress without Distress*, 1974) and many hundreds of scientific papers. He has delivered papers at a great many international conferences in the Americas, Europe and Asia. Selye was also active in developing the system for computer based medical data banks.

Kálmán Laki (1909-1983) assisted Albert Szent-Györgyi in his research while a medical student in Szeged. After completing four years there, he switched to natural science and mathematics, obtaining a degree in chemistry in 1935 and a doctorate in biochemistry in 1936, the first such degree in Hungary. He taught on the importance of molecular structure in biochemistry. In 1948 he was guest professor at the University of Leeds and did not return to Hungary, but accepted an invitation to the National Institutes of Health in Washington. His central topic of interest was the chemistry of blood clotting. He had over 150 scientific papers and three monographs published.

Major contributions to pharmacological research and allied fields have been made by Stephen Szára (b. 1923, Pestújhely) who obtained his M.D. from the Budapest University of Medical Sciences in 1951. Known in professional circles the world over for his discovery of the hallucinogenic effect of N.N-Dimethyltryptamine (DMT) on human beings while he was on the staff of Budapest State Mental Hospital, Szára followed up his work in the United States, first as a visiting scientist, then as a staff member of the intramural research program at the National Institute of Mental Health in Bethesda and Washington, with the collaboration of Nobel Prize laureate Julius Axelrod and others. Their research team clarified the metabolism of this compound and proved that DMT may be endogenously formed toxin which may play a role in some forms of schizophrenia.

In 1970 Stephen Szára accepted an administrative position with the extramural program of the National Institute of Mental Health, taking responsibility for directing clinical and basic research support for biomedical studies on marijuana and narcotic drugs. One of the most intriguing accomplishments of this research has been the discovery that marijuana lowers intraocular pressure. Nowadays further basic and clinical investigations are underway to explore the potentials of marijuana and of its ingredients as a new and effective therapeutic agent for the successful treatment of glaucoma. These pioneering studies and other relevant findings are described in detail in a 915-page, 2-volume monograph under his editorship[13]. According to reviewers, this collective work was the most complete and up-to-date discussion by the world's leading specialists on the pharmacology of marijuana at its time of publication. From 1974 he has been chief of the Biomedical Research Branch of the Division of Research at the National Institute on Drug Abuse in Rockville, Maryland. In addition to his monographs, Stephen Szára has published about 70 papers, the overwhelming majority of them in English, and has taken an active part in a number of international scientific symposia.

László Kátó has long been associated with the University of Montreal, and was the head of the Department of Experimental Leprosy in the Institute of Microbiology and Hygiene. He authored with Béla Gözsy the *Studies on phagocytic stimulation* (Montreal, 1957. 135 p.) and several other scientific publications.

One of the world's major figures in orthodontics, the Hungarian-born Miklós Cserépfalvi (b. 1905) attended universities at Prague (1924-1926), Vienna (1926-1928), Paris (1928-1930), Debrecen (1930-1932), Budapest (1932-1935) obtaining an M.D. in 1932 and a D.D.S. in 1935. He emigrated to the United States and attended the Georgetown University School of Dentistry between 1957 and 1959 where he earned another D.D.S. degree. His American postgraduate specialty training was in the fields of oral surgery and orthodontia. Cserépfalvi's appointments included directorship of the Central Institute of Orthodontics and Dental Research in Budapest. During 1957 and 1958 he was a research associate of the Rockefeller Foundation. Cserépfalvi's research work has resulted in internationally acknowledged accomplishments which have been published in Hungarian, Swiss, German, French, Spanish and English scientific periodicals. He has lectured about his work at international conferences in the U.S., Mexico, Venezuela, Argentina, France, Spain and Portugal, among other places. Cserépfalvi has simplified and

13 *Pharmacology of marijuana*. New York: Raven Press, 1976

improved orthodontic methods, especially for using on his pioneering methodology. His publications on this subject are numerous[14].

The 45 years of Communist rule did not favor medical research in Hungary. New developments in Western medicine were introduced years—sometimes decades—later. Heart transplants, introduced in the United States in the 1960's were not performed successfully in Hungary until the 1990's, for instance. Much of this came from lack of finances. The system insisted on universal, free medicine, but the finances to make it a quality service were not available. Obsessed by quantitative results, the number of hospital beds have grown constantly, but the necessary infrastructure, the working conditions of health service workers and patient services lagged. In the recent past Hungarian medical researchers almost invariably had to go abroad to be successful.

14 "Experimental homogenous transplantation of human teeth obtained from human cadavers", *Journal of Oral Implant and Transplant Surgery* , vol. 12, 1966*;* 'Transplantation of a Preserved Human Tooth to a Monkey: Preliminary Report of a Case ", *Journal of Dental Research*, vol. 47, no.4,1968; "Pulp Viability and the Homotransplantation of Frozen Teeth", *Journal of Dental Research,* vol. 51, no. 1, 1972.

Nobel Prize Laureates

In 1901 Alfred Nobel, Swedish industrialist and inventor of dynamite established the Nobel Prize to be awarded yearly by the Swedish Academy of Sciences in literature, chemistry, physics, medicine and peace. The field of economics was included in 1969.

The first Hungarian scientist who has received the Nobel Prize was Philipp Lénárd. He got it in Physics, in 1905, for his research on cathode rays.

Robert Bárány received the Nobel Prize in the category of Physiology or Medicine in 1914. Actually, he received it two years later when he was released from a Russian prisoner of war camp. He studied the physiology and pathology of vertibular apparatus of the inner ear.

In 1925 Richard Zsigmondy got the Nobel Prize in Chemistry for the elucidation of the heterogeneous nature of colloidal solutions.

Albert Szent-Györgyi was awarded the Nobel Prize in Physiology or Medicine for his work on biological combustion in 1937.

In Chemistry, George Charles de Hevesy received the Nobel Prize for developing the use of isotopes as tracers in chemical research in 1943.

Georg von Békésy, in 1961, obtained the Nobel Prize in Physiology or Medicine. He studied the functions of the human inner ear.

One of the builders of the atom bomb, Eugene P. Wigner, got the Nobel Prize in Physics in 1963. He has clarified the principles, governing mechanics and interaction of protons and neutrons in the atomic nucleus.

For the invention and development of holography, Dennis Gábor was awarded the Nobel Prize in Physics in 1971.

Nobel Peace Prize recipient in 1986, Hungarian born Elie Wiesel was recognized for his exemplary work against violence, oppression and racism.

In the same year, John C. Polányi was awarded the Nobel Prize in Chemistry for his work in chemical reaction dynamics.

In 1994, George Oláh got the Nobel Prize in Chemistry for developing new ways to use hydrocarbons.

John Harsányi received the Nobel Prize in Economics in the same year, for his proof of equilibrium in the theory of non-cooperative games.

In 1998 the Organization Against Land Mines received the Nobel Peace Prize. One of the five leaders of this organization was Judith Majláth, a 1956 refugee from Hungary.

Sports

Athletes

Several Hungarian athletes are quite well known in America, including golfer Julius Boros, football stars “Broadway Joe” Namath and Larry Csonka and the Gogolák brothers, tennis star Monica Seles, gymnast coach Béla Károlyi and many, many others. In this chapter, however, only those who competed in Hungarian colors will be mentioned. For the lack of space we can mention but a few athletes out of several hundreds who have made extraordinary contributions to the world of sports.

One of the reasons Hungary has produced so many European- and world-caliber champions is the fact that its official circles have supported sports and physical education almost since the Middle Ages. In the Middle Ages, for instance, fencing was widely practiced among knights and soldiers. As early as the seventeenth and eighteenth centuries, physical education was taught, although at a rudimentary level, in many of the country’s schools. The most decisive step in this direction was taken in the century of the Enlightenment when in 1777 the Queen Maria Theresa’s law, *Ratio Educationis* prescribed certain measures relating to the teaching of physical education in Hungarian schools. (Strangely, this law forbade swimming for school children.) Fortunately, the most popular leaders of the Reform Era (1825-1848), namely, István Széchenyi, Lajos Kossuth and Miklós Wesselényi, were themselves practicing athletes. What’s more, Széchenyi and Kossuth were among the founding members of the Physical Training Institute in Pest, created to promote physical fitness. No wonder that when international competitions begun decades later, Hungary immediately entered the field. Seven Hungarian athletes participated among those of thirteen nations at the first modern Olympic Games in Athens in 1896 and won 2 gold, 1 silver and 2 bronze medals.

One of the main factors underlying the spectacular achievements in sports has been the College for Physical Education (Testnevelési Föiskola) founded in Budapest in 1925. This is a four-year college for physical education teachers and offers a three-year curriculum for coaches. To day, physical ed u ca tion is com pul sory in all schools and more than a million people participate in a variety of athletic activities. The gov ern ment pro motes sports with gen er ous sub si dies.

The num ber of coun tries par tic i pat ing in the Olym pic Games and the number of competitors has risen significantly over the years. In 1896 four teen coun tries par tic i pated. By 1936 this num ber has risen to 49, by 1976 to 92 and by 1992 to 169. Al most 200 coun tries have shown up at the

Year of Games	Hungary's Ranking	Year of Games	Hungary's Ranking
1896	6	1952	3
1900	10	1956	4
1904	5	1960	7
1906	12	1964	6
1908	6	1968	4
1912	9	1972	8
1924	13	1976	10
1928	9	1980	6
1932	6	1988	6
1936	3	1992	8
1948	4	1996	n.a.

Hun gary's Rank ings on Olym pic Games; 1896 - 1996

1996 games in Atlanta. In that year Hungarians maintained their traditions by winning a total of 21 medals.

In terms on total number of medals—gold, silver and bronze—Hungary maintained a very respectable position among the world's nations. The table above shows these rankings on Olympiads on which Hungary has participated. These figures would be even more remarkable if the total population of all competing nations would be considered. For example in 1956 on the Melbourne Olympic Games Hungary ranked fourth behind the United States, the Soviet Union and Australia. The date is memorable, 1956, the year of the Hungarian Revolution. After the finalist game of water polo—between Hungary and the Soviet Union—the pool ran red with blood.

In all-time medal placings for the games of 1896 to 1996 Olympiads inclusive, Hungary won a total of 141 gold, 123 silver and 151 bronze medals, a total of 415 medals, securing Hungary's position among the leading nations.

Water polo is one of the sports in which Hungary generally excels. Here are some historical data on Hungary's ranking in water polo between 1912 and 1992: Hungary won the most gold medals in this sport among all contestants. Of the five water polo players of the world who won

1912	5	1936	1	1960	3	1976	1
1924	5	1948	2	1964	1	1980	3
1928	2	1952	1	1968	3	1988	5
1932	1	1956	1	1972	2	1992	5

Hungary's Ranking in Olympic Games - Water Polo three gold medals each two were Hungarians: Dezsö Gyarmati and György Kárpáti. Both won their med als in 1952, 1956 and 1964.

In Olym pic soccer Hun gary had the most wins among na tions on three oc ca sions: 1952, 1964 and 1968.

As early as 1896, the year of the first Olym pic Games, Hun gar i ans made a good show ing in Olym pic swim ming: Al fred Haj ós swam a gold medal performance in the 100-meter freestyle as well as the 1200-meter freestyle. In 1904 Zoltán Hal may won two gold med als for the 100-meter freestyle and the 50-yard freestyle. In water sports the name of István Bárány (b. 1907) is no ta ble since he was the first in Eu rope and the sec ond in the world af ter the Amer i can Johnny Weismüller[1], to swim 100 me ters freestyle in less than a min ute. Bárány was sec ond af ter Weismüller at the Am ster dam Olym pic Games in 1928. In 1936 it was Ferenc Csik who fol-lowed the precedent of a gold medal in the 100-meter freestyle. Csik (1913-1945), a med i cal doc tor, was first in the 100-meter freestyle at the Paris Grand Prix in 1934 and in that same year he won the European championship in the same event at Magdeburg. In 1935 Csik set a new Eu ro pean re cord of 57.8 sec onds, a re cord he im proved by two-tenths of a sec ond to win the gold medal in the 1936 Olym pics.

1952 was a re cord year for the Hun gar ian women's Olym pic swim ming team. They scored an across-the-board win in all swimming events of-fered with the sole ex cep tion of the 100-meter backstroke. Katalin Szöke won the 100-meter freestyle gold medal, Valéria Gyenge the 400-meter freestyle, Éva Székely the 200-meter breast stroke and the team of Ilona Novák, Judit Temes, Éva Novák and Katalin Szöke clinched the 4 by 100-meter freestyle re lay.

1 Actually, Weismüller was born in Hungary to Transylvanian Saxon parents.

Krisztina Egerszegi and Tamás Darnyi continued the tradition of swimming excellence. Both received gold medals in the 1988 Olympics. In an article entitled “*Who is the very best of the very best*”[2] he was described as ‘the only man in history to win both the 200 and 400 meters individual medleys at consecutive Olympics and consecutive world championships from 1986 to 1992. In 1992 Darnyi received double golds in the men’s races and Egerszegi tripled in the women’s. In 1996 she won a gold medal in the 200 meter race again. In the article quoted above, she was described as “arguably the greatest backstroker of all time. Youngest person to win an Olympic swimming gold medal at the age of 14.”

Hungary has a long, distinguished record in boxing in a surprising variety of classes. László Papp (b. 1926) was a history-maker, being the only person up to now ever to win three gold medals consecutively. Papp captured the gold medal in the 1948 middleweight boxing event in London, the 1952 light middleweight event in Helsinki and the 1956 light middleweight event in Melbourne. He was a member of the national team 95 times and also won several European amateur as well as professional championships.

In Olympic competition Hungary’s performances in Greco-Roman wrestling demonstrate an edge over those in free-style wrestling. Most of Hungary’s Greco-Roman championships have been in the heavyweight class, with István Kozma being two-time consecutive gold medalist in 1964 and 1968.

Hungarians have always maintained a respectable record in men’s gymnastics. István Pelle (b. 1907) rose to world’s best on the parallel bar at the world championship of 1930. Pelle participated in three Olympic Games in 1928, 1932 and 1936, his most successful accomplishment being the Los Angeles Olympic Games of 1932 where he obtained 2 gold

2 *The Age*, August 10, 1998.

medals in floor exercises and pommeled horse gymnastics, along with 2 silver medals (parallel bars; combined exercises, individual), 2 fourth places (horizontal bar; combined exercises, team) and 1 sixth place (long horse vault). He is very much responsible for the country's present-day excellence in gymnastics. After World War II, Pelle emigrated to Argentina. In 1976 the gold medal in the pommeled horse again went to a Hungarian: Zoltán Magyar who treated judges and spectators to a performance of unique, inimitable exercises.

Fencing seems to be one of the sports best befitting the Hungarian temperament, male and female alike. Hungarians won in the individual saber in 1908, 1912, 1924, 1928, 1932, 1936, 1948, 1952, 1956, 1969, 1964 and 1992. Among the greatest international amateur fencers in history are Aladár Gerevich, Pál Kovács and Rudolf Kárpáti. Aladár Gerevich (b. 1910) and Pá1 Kovács (b. 1912) were regarded as the best saber fencers. Gerevich took part in six Olympic Games between 1932 and 1960 and was awarded the bronze medal in 1936, the gold in 1948 and the silver in 1952. He was a six-time member of the gold-winning team and an eleven-time member of the world champion team. Kovács participated in five Olympic Games, each time as a member of the gold medalist Hungarian team, while in 1952 he won the individual championship in Helsinki.

The title of greatest woman fencer of all time probably belongs to Ilona Elek of Hungary who was Olympic champion in 1936 and 1948 and world champion in 1934, 1935 and 1951. It should be pointed out that women use exclusively the foil, while men use a variety of foil, epee and saber.

The table below shows the accomplishments of the world's most successful fencers in terms of the numbers of gold medals won at Olympic and world championships.

The ideal athlete of the ancient Olympics of Greece was the *pentathlos.* A 5-way contest comprising athletics, the equestrian arts, fencing, shooting and swimming, the modern pentathlon is one of the most challenging and grueling of Olympic competitions, if not the most difficult. Its rules were set up on the 1911 meeting on the International Olympic Committee held in Budapest. Hungary boasts a distinguished record in this field.

Hungarian Fencing Champions	Individual Gold	Team Gold
Aladár Gerevich	4	16
Pál Kovács	3	12
Rudolf Kárpáti	4	9
Inona Elek (women's foil)	5	8
Endre Kabos	3	6
György Jekelfalussy Piller	5	5

World's Greatest Fencers in History: Olympic and International Competitions

Hungary, in the persons of Ferenc Németh (1960), Ferenc Török (1964), and András Balczó (1972), has won first place in 3 of fourteen years' competition and as a team won first place on 3 occasions (1952, 1960 and 1968) out of a total of 7. Two countries won the team event four times, Hungary (1952, 1960, 1968, 1988) and the Soviet Union (1956, 1964, 1972, 1980). In World Championships Balczó won the record of 13 world titles, including 6 individual and 7 team titles.

Hungarians have garnered medals in a wide variety of events in shooting, but Károly Takács (b. 1910) will long be remembered as a unique symbol of will power combined with phenomenal talent. He was already a famous shooter when during the 1938 military exercises a hand grenade shattered his right hand. But the totally handicapped Takács doggedly pursued his training in shooting with his left hand and soon attained the excellent form enabling him to win 76 competitions between 1940 and 1944. It is moving to contemplate the monumental will-power which led Károly Takács to become Olympic champion in rapid-fire pistol (silhouette) shooting (25 meters) in London (1948) and in Helsinki (1952), setting new Olympic and world records.

Besides the Olympic Games, Hungarian athletes have regularly participated with remarkable success in world as well as European championships, winning gold, silver and bronze medals in a great many events. Thus, between 1896 and 1996, they took 143 gold, 174 silver and 180 bronze medals at world championships and 140 gold, 154 silver and 202 bronze medals at European championships. Naturally, they could boast superb accomplishments in their traditionally best-fitting sport, fencing (saber), winning 36 gold, 43 silver and 35 bronze medals at world championships also in the aforementioned period. They were also highly rated in water polo, soccer, wrestling and swimming to mention a few others.

Hungarian soccer teams have won many international—Central European, European, Olympic and world—championships since the thirties. For example, Hungary's Olympic team won three gold medals (1952, 1964 and 1968). Soccer players like György Sárosi and Géza Toldi—later both were internationally recognized coaches living outside of Hungary—became legendary personalities during the inter-war period. After the war, László Kubala and Ferenc Puskás along with dozens of others embodied the best traditions of soccer playing. In recent years, László Kubala has been the captain as well as coach of the Spanish national soccer team. Ferenc Puskás (b. 1927) was on the Hungarian national team eighty-four times and scored goals on eighty-three occasions. Puskás left Hungary in 1956 and joined the Real Madrid playing several times on the national selected team of Spain.

Although landlocked Hungary is not a country of sailors, in 1870 Ödön Batthyányi took part in the sailing race across the English Channel and won two of the three trophies offered by Queen Victoria and won twice in the Thames delta race. As a result of these, he was elected to be the captain of the Royal Albert Yacht Club.

Soon after the ping-pong ball was introduced in 1899, the first national table tennis championship of the world was organized in Hungary in 1905. Even though Austrian and English coaches also participated, it was won by Béla Redlich, a young Hungarian engineering student. The first International Championship organized in London in 1926. Surprisingly, all the five tournaments were won by Hungarians. In the following three championships, in 1930, 31, 33 Hungarians won all medals. Even in the 1935 game the majority of the world championship titles went to Hungarians.

In automobile racing, the first French Grand Prix in 1906 was won by the Hungarian Ferenc Szisz while on a study tour at the Renault factory. He drove a Renault. The first car race organized by the new Royal Hungarian Automobile Club was held in 1901. It was won by Károly Csetme driving a Fiat.

Coaches

Hungarian coaches have immortally emblazoned their names on the honor roll of the world arena of sports in the service of their native as well as adopted homelands, especially the United States. Hungarian-born coaches have long been a part of the fabric of the American sports scene. They have helped bring America to glory as the leading medal winner in the history of the modern Olympic Games—1896-1976. Among the earliest of them was Joseph Öszy who coached the 1936 U.S. Olympic team in men's gymnastics. All these coaches are accomplished athletes in their own right and they perpetuate the tradition of excellence by their dedication to actualizing the promise of the young American athletes in their charge.

Nicholas Tóth was born March 22, 1908 in Hungary. He was coach-trainer in the pentathlon for the 1956 U.S. Olympic team and functioned as a member of the Modern Pentathlon Committee of the United States Olympic Committee in 1968.

Sándor Ferenczy (b. 1925, Szolnok) was co-head coach of the 1968 and 1976 women's athletic (track and field) team for the Olympic competitions and head coach of the 1973 U.S. first junior team in Europe. He was also assistant coach of the 1970 National Amateur Athletic Union team in Europe. Testimony to Ferenczy's coaching abilities are one Olympic, 5 Pan-American and 43 National AAU championships.

Bertalan de Némethy (1911, Györ) was a former Olympic rider of Hungary and former international competitor in cavalry riding, de Némethy has been *chef d'équipe* of the U.S. Olympic equestrian team from 1956. He has also coached the U.S. show team in the 1959, 1963, 1967 and 1975 Pan-American games, leading them to first place in the 1959 and 1963 games and second place in 1967. An instructor and permanent coach of the U.S. Equestrian Team, Bertalan de Némethy has molded such superb jumpers as Bill Steinkraus, who in 1968 became the first and only American thus far to win the Olympic gold medal for show jumping and Kathy Kusner, who among other distinctions captured first place in the 1967 Women's European championships and second prize in the Ladies' World Championships.

Stephan von Visy (b. 1906) was U.S. Olympic Equestrian Team coach for the Three-Day Event in 1964 and for the same event at the 1967 Pan-American Games.

Hungarians have established a time-honored tradition of coaching the U.S. Olympic Fencing Team, beginning with the world-famed George Santelli in 1928, 1932, 1936, 1948 and 1952, followed by Lajos Csiszár in 1956 and the next coach, Csaba Élthes from 1960 to 1976.

Élthes, born in Csikszereda, Transylvania in 1912 also coached the Pan-American team in 1959, 1967, 1971 and 1975, along with the World Championship Team in 1958, 1963, 1967, 1973 and 1975. This boundlessly talented, devoted and energetic man has also been affiliated as fencing master with the New York Athletic Club, the New York Fencers Club, Pace College in New York City and St. Peter's College in Jersey City, NJ.

Béla Károlyi dominated the limelight among coaches in from the Olympic Games from his first appearance in Montreal. He was the coach of the Romanian women's gymnastic team and of the 14-year-old child wonder of the 1976 Olympics: Nadia Comaneci. Later, Károlyi came to the United States and became the coach of several Olympic winners: Mary Lou Retton in 1976 and Kerri Strug in 1996.

The one-time brilliant player of the Hungarian Olympic water polo team, Dezsö Lemhényi was coach of Canada's national water polo team.

Chess

In the light of contemporary chronicles and other sources we can trace the beginnings of chess playing in Hungary back to the late Middle Ages. Hungary's king Charles Robert Anjou is known to have presented king John of Bohemia with an ornate chess set in the 15th century. Daughter of the king of Naples Ferdinand of Aragon, Beatrix, the wife of King Matthias I, was considered one of the best chess players in the second half of the fifteenth century. She has often played chess with king of Bohemia after the peace of Olmutz in 1479. According to chronicles, King Matthias liked to play simultaneous chess against twelve opponents. No doubt he won every time.

In modern times, József Szén finished fifth at the first international chess tournament arranged in London in 1851.

Géza Maróczy (1870-1951) captured the title of international grand master with his victory in Hastings in 1895. Afterwards, Maróczy won first place at several international chess tournaments (in Monte Carlo in 1902 and 1904, in Munich in 1903, in Ostende in 1905, etc.). Under the leadership of Géza Maróczy the Hungarian team won gold medal at the 1927 London World Championship and defended its title in the Chess Olympics at the Hague and again took first place in the 1936 Munich World Championship.

Since the end of World War II, the Hungarian chess team has often attained second place—right behind the former Soviet Union.

In the 1990's three Hungarian teenage sisters, Susan (b. 1970), Judith (b. 1976) and Sophie (b. 1975) Polgár attained international celebrity status with their prowess in chess. At the age of 13, Susan ranked first among the world's woman chessplayers. By 1998, Judith was a international Grand Master in chess.

Postscript

The preceding work, based on documentary evidences and historical facts, outlined the birth and growth of Hungary's cultural heritage. It is apparent that neither the Mongol invasion of the thirteenth century nor the long-lasting Turkish occupation of the sixteenth and seventeenth centuries could deflect the course of cultural events: Hungary has undergone—with some delay—the same stages of cultural development as Western Europe. This is a highly significant because it represents, to quote Harvard's Samuel P. Huntington[1] "*Western ideas of individualism, liberalism, constitutionalism, human rights, equality, liberty, the rule of law, democracy, free markets...*". Huntington's map showing the boundaries of the West are the Eastern borders of historic Hungary. Nations to the South and the East did not experience the developmental milestones that characterize the West. They remained in the Slavic-Orthodox Christian cultural sphere, entwined with the corrupting influence of the long-lived Turkish occupation.

The high level of statecraft development in medieval Hungary helped evolve Hungarian culture in the multinational Danube Valley. An early indicator of this precocious statesmanship was King Andrew II's "Bulla Aurea" (golden seal). Issued in 1222, it was preceded by the English Magna Charta of 1215 by only seven years. Both these documents became milestones in European constitutionalism. They provided the foundation of a parliamentary system of government, the rule of law. Even though Hungarians followed Western patterns, they somehow succeeded in preserving the basic characteristics of their ancient, original culture that are so manifest in their folk music, folk art and literature.

1 Clash of Civilizations, *Foreign Affairs*, Summer 1993.

At the time of the Conquest, eleven centuries ago, the original population of the area—Seklers, Slavs, Avars, Germans, Turks and others—numbered about the same as the invading Hungarians. Rather then subduing them, Hungarians by and large absorbed them. One thousand years ago this ethnically tolerant philosophy was reinforced by Saint Stephen's laws: newcomers are to be welcomed. During the centuries that ensued, refugee nations from the East—Pechenegs and Cumans[2] for instance—were admitted and settled in the country. Settlement from the West was also encouraged. Saxon miners were invited to Transylvania by the early kings. Swabian peasants were moved in by the Habsburgs to till the southern regions depopulated by the Turks. Immigrants also came from the turbulent Balkans. Romanian sheep herders ran from their own despotic boyars, Serbs escaped from the occupying Turks in great numbers. Many of these immigrants became Hungarians over the years, while some retained their primary ethnic traits. Going back to the earliest years, names indicating various ethnic origins abound: Horváth, Oláh, Németh, Tóth mean, in the same order, Croat, Romanian (Vlach), German and Slovak in the Hungarian language. Similar examples can be shown for many other nationalities. These persons were Hungarians for many generations, only their surname reminds us of their ancient, non-Hungarian roots. Even those who perhaps were fully cognizant of their non-Hungarian ethnicity considered themselves part of the Hungarian nation.

Due to Hungary's elastic concept of nationality, these assimilated non-Hungarian elements faced no difficulty in melting in and they made important contributions to all segments of life. For centuries, they had accepted Hungary's political and cultural values as their own and enriched them significantly. It is clear that no nation had exclusive priority in establishing Central Europe's culture, though the Germans had an indisputable role concerning the area as a whole. For example, Hungary's

2 *Besenyök* and *kunok*, in Hungarian.

excellent educational system is largely based on German roots. German progress rather affected mathematicians and natural scientists, while French, English and American influenced the humanities.

By the end of the 19th century, Hungary, to a large extent, reached cultural and economic levels equal to Western European countries. For example, the Budapest's electric subway was the first on the Continent, so were the electric street lights of Temesvár.

After a prosperous start in the twentieth century, a pistol shot at Sarajevo brought about the First World War. After four years of brutal war, the rational, tolerant, multi-ethnic, culturally vibrant, economically progressing Austro-Hungarian Monarchy of 52 million collapsed into total chaos. To paraphrase British parliamentarian Lord Gray, the lights went out all over Europe—but particularly in Hungary—and darkness prevailed for a very long time. President Wilson's ill conceived principle of national self-determination after World War I tore apart the fabric of symbiotic, harmonious living among the varied people of the old empire. The land where in 1914 mobilization orders were issued in 15 languages became a artificial quilt of countries that became breeding grounds for racism, intolerance, xenophobia and totalitarianism.

In the past eighty years, the remnant of historic Hungary has lived through a second world conflagration, German, then Soviet occupation, Communist oppression, economic misery, political persecution and systematic destruction of civic values. In spite of all these, successes in science, humanities, arts and sports show that the Hungarian spirit is still alive and flourishing.

The United States has been one of the principal beneficiaries of Hungarian cultural contributions. For many years thousands of Hungarian scientists, scholars, artists and sportsmen have rendered their services in all phases of America's cultural and intellectual life. Most often they came as political or economic refugees.

For instance, after the Hungarian Revolution of October 1956 more than fifteen hundred Hungarian university and college graduates came here. Owing to the exceptional generosity of the American people, most college students and recent college graduates among the Hungarian refugees received scholarships at universities. Many of those benefitted have attained leading positions in America's scientific arena in the following decades. Names like George Oláh, winner of the Nobel Prize in Chemistry and Andy Grove, founder and later CEO of Intel, head a long list of successful Hungarian-American scientists. In the political arena New York Governor George Pataki and Congressman Tom Lantos come to mind. In the most important area, America's defense, Hungarian born, Harvard educated Huba Wass de Czege need to be mentioned. A brigadier general of the U. S. Army, he headed the team that designed the Army's new "Air-Land Battle" military doctrine[3] that led to the brilliant victory in Desert Storm in 1991. Besides these outstanding individuals, thousands of well-educated scientists, artists and sportsmen now work and make their homes outside of Hungary on five continents, mainly in the United States.

A fundamental question could be posed: what is the reason for the uncommonly prodigious cultural and scientific contributions of Hungarians to universal culture? Perhaps Enrico Fermi, Nobel Laureate, designer of America's atomic bomb, got it right. When he was asked if he believed in the existence of extraterrestrials, he asserted: but of course, "they are already here ... they are called Hungarians!"[4]

Fermi's jest notwithstanding, there is a very clear cause to the unusual productivity of Hungarians over the years in virtually all areas of science and art. It comes from the traditional ethnic tolerance, acceptance of all

3 The fight to change how America fights; *U.S. News & World Report*, May 6, 1991.

4 Laura Fermi: *Illustrious Immigrants: The Intellectual Migration from Europe 1930 - 41*, Chicago: University of Chicago Press, 1968.

comers. Looking over the names listed in the Index that follows one finds a veritable all-European telephone directory. For instance, there were many scientists of Jewish heritage proudly asserting their Hungarian nationality—Szilárd, Wigner, Teller, von Neumann and von Kármán are but a few examples. Significantly, the latter two were of hereditary Hungarian nobility.

One can conclude, therefore, that the success of "Hungarian" talent lies in the traditional ethnic acceptance, national tolerance, the willingness to embrace. Hungary's ever-conscious blending of human potential was the underlying cause of not only the nation's excellent scientific and artistic achievements but the mere survival of the nation as well for over 1100 years. Big-hearted acceptance, this characteristic Hungarian attitude toward newcomers is diametrically opposed to the intolerance of the typical xenophobic nation-state. The idea of a united Europe is immensely more powerful today than the concept of the extreme nationalism of the 19th century. This gives us hope for the future.

Appendix: The Kings of Hungary

by Stephen Pálffy

For nine and a half centuries of her history, from 1000 to 1945, Hungary was a Kingdom (although the throne had no occupant during the last two decades of this period). Most of her kings were not mere ceremonial figureheads, but active rulers—even if they sought the advice of the Royal Council from the earliest times (by about 1100 royal decrees invariably include some phrase such as *having taken the advice of our Council*), and were constrained to pay heed to the views of Parliament from the late 13th century on—whose dynastic marriage alliances, moreover, also tended to influence events. Thus it mattered who the kings were.

Three main periods can be distinguished. During the first of these the **House of Árpád** ruled Hungary (for a century as 'dukes') until it died out in the male line in 1301; during the last, from 1526 to 1918, Hungary's kings came from the **House of Habsburg**. In between these two long-lasting dynasties Hungary had kings from several royal houses, and one of non-royal descent. This overall pattern is shown below:

The House of Árpád

The first dynasty to rule Hungary were the descendants of **Árpád**, whom the chieftains of the seven tribes that then constituted the Hungarian nation had in 895 elected supreme chief over all of them, if but as *primus inter pares*. In Hungarian he was designated *vezér*, a term deriving from the verb *vezet* meaning leads, and thus perhaps best rendered in English as duke (from Latin *dux*, from the verb *ducere* = to lead), or *fejedelem* (which derives from *fej* = head). He led his people into the Carpathian Basin, and settled them there; in mediæval times his burial place was believed to be in what is today Óbuda.

He was followed in the supreme office by several of his descendants, but not necessarily by eldest sons taking over from their fathers: the adult males of the ruling family, brothers and cousins, elected whichever of their number they judged to be the ablest and most competent. Since records for the period are incomplete, it is not possible to identify all of Árpád's descendants who ruled after his death with certainty.

The last to rule Hungary as its Duke was **Géza** who, in effect, prepared the ground for the subsequent Kingdom, both by asserting central authority to a degree hitherto unknown and by establishing friendly relations with the two great powers either side of his country: the Byzantine Empire to the south-east and, in particular, the Holy Roman Empire of the German Nation, then ruled by Otto the Great, to the west. Missionary priests were invited to make converts for Christianity; his own son was baptized Stephen and brought up a Christian, and finally the hand of Gisella of Bavaria, a niece of the Emperor's, was obtained for him. (See Table 1, across - NB: kings in **bold**, pretenders/usurpers in *italics*. Dates: years of reign.)

Following his father's death **Stephen** firmly asserted his right to become ruler, attacking and defeating those who dared dispute it: first his cousin Koppány; next the powerful Ajtony, who controlled much of the country's south and was apparently in favour of a Byzantine political orientation; and finally his mother's overmighty brother the Gyula, master of Transylvania.

Table 1. The House of Árpád

The tables accompanying this chapter are not included in this electronic version.

In parallel he sought, and received, a royal crown from the Pope: crowned with it as the first millennium turned into the second, he established Hungary as a Kingdom. Two archbishoprics and eight bishoprics were founded, several Benedictine monasteries (of Cluniac persuasion) endowed, parish churches built, and the people converted to Western Christianity. The country was divided into *counties* governed by officials appointed by the Crown—**not** by feudal counts—and two volumes-worth of decrees, regulating the rights and duties of his subjects (notably as regards property and inheritance) were issued. All of this provided the foundations on which subsequent kings could and would build.

Foundations that proved strong enough to withstand the turbulence that followed Stephen's death without an obvious heir: the only one of his sons to survive into adulthood, Imre, predeceased him, killed in a hunting accident. After four decades of almost incessant strife and civil wars over the succession, and half a dozen brief reigns, the country was finally consolidated again by **László**, subsequently canonised. He restored internal order, expanded St Stephen's legislation, and beat off attacks from the east by the nomadic Cumans. And, at the request of his sister Helen, the widowed Dowager Queen of Croatia and Slavonia—riven by factional fighting because there was no heir of the royal house—László joined their Crowns to that of Hungary.

László had no son (only a daughter, Piroska; renamed Helen when married off to the later Emperor John II Comnenos of Byzantium, her Árpád genes contributed to the brilliance of Emperor Manuel I Comnenos) and was followed on the throne by his nephew **Coloman**, surnamed *the Bookish*, who had been bypassed at the time of his father's death, being then a sickly boy of about ten. He extended, consolidated and rounded off the legislation of Stephen and László, introducing, in particular, much new law to regulate trade and commerce, besides revising legal procedures anew (in the latter context he forbade the prosecution of witches *quia strigiis non sunt*). Having married Brusilla of Sicily to cement his alliance (against Byzantium) with the Norman rulers of Southern Italy, he added the Dalmatian littoral of the Adriatic to the possessions of Hungary.

Coloman, while wisely abstaining from participation in the enterprise, had already entertained the leaders of the First Crusade, notably Geoffrey of Bouillon and his entourage, on their way to the Holy Land. His great-nephew **Géza II**— Coloman's son **Stephen II**, who had married a Norman cousin, failed to father any children—found himself entertaining first the Emperor Conrad III Hohenstaufen, and then King Louis VII of France and his Queen, Aliénor of Aquitaine (later the Queen of Henry II of England), on their journey to the Third Crusade. The two young kings seem to have struck up a warm friendship, Louis standing godfather to Géza's newborn son Stephen. The amity of the two Kings also appears to have led to an increase in the number of young Hungarian clerics sent to complete their studies in Paris: for most of the 12th century Hungary's leading clergymen—bishops, priors, etc.—were Paris-educated.

Stephen III (Louis' godson) was still a minor when his father died, and both his uncles usurped the throne briefly, with Byzantine backing. However, neither could establish his legitimacy, since Archbishop Lucas of Esztergom (a student contemporary of Thomas à Beckett at the University of Paris), who alone was entitled to do so, steadfastly refused to crown them, even when repeatedly incarcerated for his obstinacy. Manuel I Comnenos then withdrew his support and made peace with Stephen III, inviting his younger brother Béla, then in his mid-teens, to be educated at the Court of Byzantium (where, after earlier hints of a Comnena for a bride, he eventually married Agnès de Châtillon, descendant of the Crusader Princes of Antioch and a kinswoman of Manuel's Empress).

Béla III became King while still in Constantinople, on his brother's sudden death after a reign of less than ten years, leaving no children. Initial apprehensions that he would prove a Byzantine stooge—voiced by, amongst others, Archbishop Lucas, who feared that the Church in Hungary would be subordinated to the Orthodox Church, and needed a Papal prod to perform the coronation—were soon dispelled. But Béla had clearly learnt a lot while at the Byzantine Court, not least about written administrative procedures and the advantages of diplomacy over force; he had, no doubt, also become fluent in Greek, and might well have acquired some familiarity with classical Greek learning too, neither then known by and in the royal courts of Western Europe.

Applying the practical lessons he had learnt, Béla made written documents compulsory in all formal transactions, both official and between private citizens, and managed to avoid involvement in any major wars, despite considerable provocations from, in particular, the Western Emperor Henry VI Hohenstaufen *Barbarossa* (who, however, eventually spent the last summer of his life, while *en route* to the Holy Land and his death, as Béla's guest, hunting on the Csepel Island in the Danube, just south of today's Budapest). Widowed, Béla soon married again, for political reasons more than any other: following, in the event fruitless, negotiations with Henry III of England for a Plantagenet wife, he took Margaret, a sister of King Philip Auguste of France, for his second Queen. To this circumstance we owe the preservation of a detailed inventory— now in the Biblothèque Nationale at Paris: it was presumably sent there for the marriage negotiations—of his revenues, worth the equivalent of almost 45 tons of pure silver per annum (equalling, and possibly surpassing, those of the Kings of France or England).

The short reign of Béla's eldest son **Imre** (whose Queen, Constance of Aragon, later became the Empress of Frederick II Hohenstaufen *stupor mundi*) was embittered by the repeated rebellions of his younger brother, who eventually came to the throne as Andrew II, a singularly disastrous monarch. The royal patrimony was squandered, most of it distributed to favourites, whose descendants grew into a powerful baronage addicted to defying the Crown, a phenomenon previously unknown in Hungary. His first Queen, the ambitious Gertrude of Meran (of a cadet branch of the Bavarian House of Wittelsbach), was assassinated by leading office-holders largely because of the way she thus enriched her brothers and other German hangers-on. Participation in the Fifth Crusade—if not in any actual fighting in the Holy Land—and a succession of pointless wars waged in Galicia (today's Western Ukraine) further impoverished the Crown. To deal with his constant financial difficulties Andrew had the coinage depreciated and ever more inventive new taxes imposed (to be promptly borrowed against from tax-farmers). All of this drove the country's free men to the verge of open rebellion, only averted when he granted them a charter of rights, known as the

Golden Bull (1222); however, Andrew consistently flouted it, earning him repeated excommunication.

His son **Béla IV,** who had headed resistance against Andrew's policies when still heir, tried to restore the conditions that had prevailed during the reign of his grandfather Béla III. He was, however, thwarted in his efforts by the attack of the Mongols, now led by Genghis Khan's successors, in 1241. Western monarchs, the Emperor Frederick II and the Pope in the lead, limited their assistance to pious phrases of horror; the Babenberg Dukes of Austria used the occasion to annex adjacent portions of Hungary.

By the time the Mongols departed Hungary was devastated, one half to two thirds of its population slayed or enslaved, its towns and villages reduced to rubble (some never to be rebuilt), its fields untilled. It is to Béla's eternal credit that he succeeded in re-building the country, repopulating large areas with immigrant farmers (mostly from Germany), issuing a reliable coinage to encourage trade—management of the mint was entrusted to a Jewish entrepreneur: a royal decree of the time granted Jews rights equal to those of other city-dwelling burghers—and causing new stone fortresses to be built, since only such had been able to resist the Mongol onslaught, as well as towns to be enclosed by strong stone walls. The fortified hilltop town of Buda, soon to become the capital, was founded and built at this time.

The last years of Béla's reign also saw the first stirrings of a Parliament, and the beginnings of self-governing counties. His heir, the later **Stephen V**, had forced his father to cede him the eastern half of the country to rule over independently. Two rulers, two power centres, resulted in the weakening of central authority, which exposed the freemen to baronial rapacity. To counter this, elected representatives of the freemen of all counties came together, at their own initiative, to agree on a common stand. Béla acceded to the requests they formulated, and submitted as 'a humble petition', sending Commissioners into the counties to right wrongs; here these co-opted locally elected freeman assessors to advise them on local matters. Within a couple of decades the Crown was regularly inviting the counties to send elected representatives of their freemen to join the bishops and barons in advising the King, and the body thus constituted soon came to be designated *parlamentum publicum*. And, the assessors who had joined Béla's Commissioners soon evolved into bodies of elected county officers and magistrates, who rapidly took charge of all local administration.

László IV came to the throne, not much above ten years old, when his father Stephen V died of a broken heart following the boy's kidnapping by a trusted official. Known as *László the Cuman* (his mother was of that people, who had settled in Hungary fleeing the Mongols), his was a reign of unmitigated chaos. To begin with he was treated as a puppet by competing baronial factions, none of which managed to hold on to power for more than a few months (in five years the Regency Council, i.e. the government, changed twelve times). Then, when the country's senior clerics—most of them by now educated at Bologna rather than Paris—convened a Parliament in his name, prevailed on it to declare him of age, and the first steps towards restoring order were being taken, an overzealous and ill-informed Papal Legate arrived to undo it all. Seeking a cause, he browbeat the King, still only in his late teens, into backing action against his most reliable supporters, the Cumans (who, it is true, were not inclined to conform to accepted notions of proper Christian appearance and behaviour). László appeared to agree to everything—then departed from Buda, to go and live among the Cumans, where wine and women were plentiful but Papal Legates remote.

The barons had a field day, carving up the country amongst themselves, waging war on one another and against what royal troops Archbishop Ladomér of Esztergom, who was trying to hold the country together, could still find to send against them. Then László, by now excommunicated, was assassinated in his sleep by Cuman cronies and the throne seemed up for grabs: László—who had steadfastly refused to sleep with his unfortunate Queen, Isabella of Anjou, to father any children with her, and whose younger brother had already died—was generally considered the last legitimate male descendant of Árpád. Archbishop Ladomér, however, knew better: the third Queen of Andrew II, Beatrice d'Este, had returned to Italy a pregnant widow, and had there borne him a posthumous son, Stephen, who in turn had had a son, born and brought up in Venice (his mother was Thomasina Morosini).

Andrew III, this rightful heir, was at the time a prisoner at Vienna, having been treacherously captured, and then 'sold' to the Habsburg Duke of Austria, by a Hungarian baron. Undaunted, the Archbishop arranged for his escape (disguised as a mendicant friar), acclamation by Parliament and coronation. There was a constitutional price to pay: Andrew had to accept that *he* had to swear to uphold the rights and privileges of the nation before it swore loyalty to him, and also that his coronation could not be performed until Parliament had approved of it. These conditions became standard practice thereafter, and all later Kings had to swear a Coronation Oath, and have their coronation approved by Parliament, before they could occupy the throne (giving rise to the mistaken view that all Kings of Hungary were 'elected'). A subsequent Parliament of Andrew's introduced a further innovation: it submitted its enactments to him as a set of numbered articles, for him to confirm and issue as they stood, giving rise to the principle that the monarch merely brought Acts into force by his royal assent.

His Venetian upbringing might have made it easier for Andrew to accept such novel trends in kingship, but he still had to contend with overmighty and defiant barons. However, his Venetian background came to the fore in this respect too: realising that he lacked the means to overcome the barons by force, he resorted to diplomacy, negotiating with them, dividing them against one another, gradually breaking up factions and creating new ones that would support him. Then, just when he appeared to be slowly gaining the upper hand, he caught a chill during the Christmas festivities of 1300, retired to his bed and, a fortnight into the 14th century, died.

With the death of Andrew III the House of Árpád—fifteen generations of which had ruled Hungary for four centuries, creating a powerful Kingdom in the Carpathian Basin—had truly died out in the male line: his first Queen had only borne him a daughter, Elizabeth, before she died; his second, Agnes of Austria, he had married only a few months earlier. This unsettling pattern was to repeat during the next two centuries: only two of the ten kings who followed Andrew III on the throne were to have a son to succeed them. In consequence the next section has to deal as much with how kings came to the throne as with what they did once on it.

From Árpád to Habsburg

Anjou, Luxembourg, Hunyadi, Jagello

Two claimants for the Crown of Hungary, both descended from the House of Árpád in the female line (*see* Table 2, across), were already waiting in the wings. Both as yet merely teenagers, each was backed by a powerful baronial faction, neither of which was inclined to waste time on legalistic parliamentary procedures to sanction its candidate's claim.

Charles (Carobert) Anjou of Sicily, already in Dalmatia, was rushed to Hungary and crowned first, but with a makeshift crown, since the Holy Crown (i.e. that believed to have been used by St Stephen) was in the hands of the opposing faction. Soon after **Wenceslas** of Bohemia, betrothed to Andrew's daughter Elizabeth, was brought to Hungary and crowned too, with the Holy Crown. After some years, during which each held part of the country, Wenceslas withdrew to Bohemia, ceding his claim, and physical possession of the Holy Crown, to his cousin **Otto** of Bavaria. The latter came, had himself crowned, and was then taken captive by the Governor of Transylvania; glad to be released after a while, he hurried home to Bavaria, leaving the Holy Crown behind. After almost a decade of competing claimants fighting it out, a Parliament was finally convened and formally recognised Charles, who was now (1310) crowned again, this time with the Holy Crown.

During the following decade Charles gradually subdued those barons who continued to defy him; the bulk of their confiscated estates enriched the Crown, while some were given to 'new men' loyal to the new King. By the second half of his reign peace and prosperity returned to the country: trade, especially with Italy, flourished, high-value gold coins, modelled on the Florentine *fiorino*, were issued, the peasantry enjoyed exceptional liberty and well-being. In foreign affairs he established excellent relations with all of his neighbours: Poland, its King Casimir III his brother-in-law; Bohemia, now ruled by John of Luxembourg (who later, by then old and blind, fell fighting the French at Crécy); and even the Habsburgs of Austria, who actually asked Charles to arbitrate in a dispute over the division of their heri-

Table 2: from Árpád to Habsburg

tage. His second son Andrew, moreover, stood to eventually take over the Anjou heritage in Southern Italy, as the husband of its heiress, his cousin Joanna.

The reign of Charles' elder son **Louis the Great** (the only King of Hungary to have received this epithet from posterity) began with two campaigns down Italy—all the way to the occupation of Naples—to avenge his brother Andrew, whom his wife Queen Joanna had had assassinated. Southern Italy was too distant to be held for long, but Louis continued to intervene in North Italian affairs, drawn into them by the enmity of Venice, which resented his restoration of Hungarian supremacy over all of the Croatian and Dalmatian coast (from Fiume down to Ragusa) and the annual tribute of 7000 pieces of gold he had imposed on her. To his south he extended Hungarian suzerainty (i.e. his recognition as their overlord by the local rulers) to most of the area that is today Bosnia, Serbia and Romania; it was in the course of campaigns in these regions that Hungarian forces first clashed with Ottoman Turks pushing up through the Balkans. Finally, on the death of his uncle Casimir III, who had had no sons, he inherited the Crown of Poland too (whose governance he entrusted to his mother).

At home, meanwhile, Louis had a splendid new royal palace built at Buda, the first on the present site (earlier ones had been at the opposite end of the Castle Hill, while his father had moved the Court to Visegrád, further up the Danube), and founded a university—which, however, failed to survive long—at Pécs. Trade, industry and agriculture continued to thrive, while the barons sought the King's favour and aimed to shine in tourneys at Court. The only shadow was the lack of an obvious heir.

One brother had been assassinated, the other had died of natural causes (as had his infant son), while the Queen, Elizabeth of Bosnia, appeared to be barren, although some ascribed this to the King's rumoured leprosy. Finally, after some two decades of marriage, the Queen unexpectedly bore three daughters in a row. The first died in infancy: Mary, the second-born, became heir and was soon betrothed to Sigismund of Luxembourg, the younger son of Charles IV (as Emperor), King of Bohemia. Also descended from the House of Árpád (*see* Table 2/a below), Sigismund, barely in his teens, moved to Buda, to be brought up at the Court of his future father-in-law.

On the death of Louis Mary, by now a teenager herself, was acclaimed by Parliament and crowned Queen Regnant; her younger sister Hedvig inherited the Crown of Poland. Several years of mounting chaos followed: a number of powerful barons preferred the claims of the late King's Anjou cousin Charles, King of Naples, while the Queen Mother indulged in complex if ill-conceived intrigues to supplant Sigismund by other marriage alliances. In the end the worsening situation forced her to abandon these, and Mary married Sigismund; he was, however, given no role beyond that of Consort.

Charles of Naples now appeared at Buda with a numerous following, forced Mary to abdicate in his favour, and had himself crowned **Charles II** (known as *Little Charles* in Hungarian historiography). But as soon as his supporters had dispersed the Queens—allowed to keep their apartments at Buda—staged a counter-coup: Charles was deposed and imprisoned at Visegrád; a month later (and within less than three of his coronation) he died.

On news of Charles' approach Sigismund had hastened to Bohemia to seek assistance from its King, his brother Wenceslas. Returning at the head of an army, he helped restore order, except in Croatia-Dalmatia and adjacent south-western areas, where Charles' infant son László was being proclaimed. Overconfident from the success of their coup, the Queen and her mother set out south to face down the rebel barons by the authority of their presence; the rebels took them prisoner, and strangled the Queen Mother (in her daughter's presence). Queen Mary a captive, Sigismund was now elected and crowned King—subject to a restrictive covenant with the barons—to reign alongside his wife, whom he eventually managed to release by force of arms. Mary, broken by her experiences, lingered on a few more years, but from now on Sigismund was the effective ruler, although it took him some time to establish himself firmly (at one point he was locked in a castle pending his deposition, but supporters liberated him while his opponents were still debating whom to replace him with).

The Ottoman Turks, having annihilated the Serbs at Kossovo, were by now pushing against Hungary's southern borders. Sigismund sought assistance from Western Europe, the Pope declared the venture a Crusade: in 1395 the flower of European chivalry gathered at his Court at Buda, for a campaign to evict the Turks from the Balkans. Their initial triumphant advance along the lower Danube was, however, checked by heavily fortified Nicopolis; having no siege equipment, they settled to starve it out. Then the Sultan arrived from Asia Minor at the head of a vast army. Bored by the siege and overconfident, the western knights chose to disregard Sigismund's counsel: one morning, without even bothering to inform Sigismund, they launched a frontal attack on the Turkish army in the spirit of a courtly tourney. As soon as he became aware of what was happening, Sigismund hurried to their assistance with his Hungarian troops, but by then the knightly attackers had been routed: most of the commoner sort were killed, the richer and their leaders held for ransom. Sigismund himself managed to escape to the Black See, whence a Venetian galley eventually carried him back to the Adriatic.

For long Sigismund has had an undeservedly bad press in Hungary. Yet, the effective line of defence that he set up against the Turks to the south of Hungary, after Nicopolis, held for over a century. He was also the first monarch to appreciate the advantages of working *with* Parliament, which he expanded by enfranchising Royal Free Cities and, unlike his Anjou predecessors, called with commendable regularity. Three major waves of legislation—dealing with commercial matters (weights and measures, tolls, duties, and so forth), with reorganisation of the country s defensive forces, and instituting a thorough overhaul of the courts and other aspects of the legal system—were passed during his reign. Legislation was prepared with care, he himself drafting much of it and, in particular, taking the trouble to sound out interested parties (merchants, soldiers, judges) before presenting it to Parliament.

The royal palace at Buda was extensively rebuilt, architects and other artists from Italy being invited to Hungary for the purpose; many of them then received additional commissions from private patrons too, often ecclesiastic ones. An order of chivalry, the Order of the Dragon, was created to match Burgundy's Order of Golden Fleece and to flatter loyal barons at no cost to the Crown. And, to replace the by now defunct university at Pécs, he founded a new one at Óbuda (which, however, foundered after his death).

Sigismund did, however, make a disastrous second marriage. Barbara, the young and sexy daughter of a favourite courtier (Cillei, who had stuck with him during and after his flight from Nicopolis), was the opposite of a useful dynastic alliance. Moreover, of limited intellect but great ambition, she indulged in frequent political and amorous intrigues, which repeatedly compelled Sigismund to have her confined under guard in remote castles (the last time from his death-bed). Nor did she bare him any sons, only one daughter, Elizabeth.

During the second half of his reign Sigismund spent ever less time in Hungary. Elected King of the Romans (i.e. Emperor-elect) following the deposition of his brother Wenceslas, whose mental instability had become evident, he busied himself with preparing (in which context he visited Henry V of England), convening, and presiding at the Council of Constance, which finally put an end to the Great Schism in the Church: by the time it met three individuals claimed to be the rightful Pope. Unfortunately it also condemned Jan Huss to be burnt at the stake; Bohemia and Moravia, which he had just inherited from his brother, now rose against him, and the consequent 'Hussite Wars' soon spilled over into Northern Hungary too.

After a reign of four decades, and having been crowned Emperor by the Pope in Rome, Sigismund died in Moravia, directing that he be buried next his first Queen, Mary, at Nagyvárad in Hungary. His daughter Elizabeth, more like her mother than father in character, expected to succeed him, on the precedent of Queen Mary Anjou. But Parliament, mindful of Sigismund's wishes, elected her husband **Albert** of Habsburg to the throne (who followed Sigismund on the Imperial throne too). Since he owed his crown to Parliament he conceded much to it, then set out south to fend off a Turkish attack. In camp he caught a contagious disease, started home, but died on the way. Four months later the widowed Queen gave birth to a son (they already had a daughter), who was baptised László; seeing herself as Queen-Regent during a long minority, she arranged for a serving-woman of hers to steal the Holy Crown from Visegrád, where it was kept, and then fled to Vienna with infant and regalia.

However, by then Parliament had already offered the throne to the younger brother of Poland's Jagello King, who came to reign as **Ulászló I** (the first King to have no claim by blood: *see* Table 2); in the ensuing civil war the generalship of John Hunyadi (of whom more below) secured his victory. Soon after the Turks, wishing to cover their backs while dealing with matters in the East, offered an extended truce. Ulászló accepted, swore on the Bible to keep the peace, and then—egged on by the Papal Legate, who absolved him from his oath to an 'infidel'—launched an attack down along the Danube. By the time the Hungarian army got to Varna on the Black See the Sultan and his army had also hurried back there. Battle was joined, and John Hunyadi, in *de facto* command, just might have carried the day, had not Ulászló, eager for glory and impatient of Hunyadi's effective but insufficiently 'knightly' tactics, decided to attack the Turkish centre with his personal entourage of knights. Fighting bravely, he fell on the field, having reigned less than four years; the King's death demoralised the rest of the army, and the battle turned into a rout.

The posthumous son Elizabeth had borne Albert was now universally recognised as **László V,** despite still being in his nursery at Vienna, the ward (his mother had also died in the interim) of his remote cousin, the recently elected Emperor Frederic III Habsburg, who also kept physical possession of the Holy Crown. Since the Turks were rampaging along the southern borders, remnants of Moravian Hussites were extending their control over the northern Highlands, and the rest of the country remained unsettled by recent civil wars, everyone with a say in the matter eventually accepted the need for a firm hand on the spot, and **John Hunyadi** became Regent for the duration of the King's minority.

Hunyadi may have been the son of Sigismund, fathered on the wife of a minor official (of ultimately Wallachian origins) in Transylvania. However, although rumoured to be so at the time already, all evidence is circumstantial: when he was barely a year old Sigismund settled the extensive Vajdahunyad estates on him and his father (not known to have performed any—other?—signal service); he was carefully educated in the household of the Bishop of Zagreb, Chancellor of the Realm, whom he accompanied to the Council of Constance; later he was constantly present in the entourage of Sigismund, including campaigns in Italy and Bohemia, the Council of Bâle, and the imperial coronation at Rome; and his promotion to increasingly senior offices was rapid. Finally, later in life Hunyadi quartered his arms with the lion of Luxembourg, albeit reversed to face right rather than left. These days a DNA test could perhaps settle the matter, if it were possible to identify their remnants, scattered by later wars.

During Hunyadi's regency the country was internally consolidated again, and the Turks repeatedly beaten in brilliantly executed *Blitzkrieg*- like offensive campaigns deep into the Balkans. But by the time he was in his teens László V fell under the influence of a scheming Cillei uncle (his mother's first cousin, nephew of Sigismund's Queen Barbara), declared that he would rule himself, and Hunyadi was dismissed. That same year Constantinople finally fell to the Turks; three years later, Hungary no longer properly governed, the Sultan invested Belgrade, then the centrepiece of Hungarian defences in the south. Hunyadi was recalled; against all expectation his largely *ad hoc* forces, fired to superhuman efforts by the Franciscan John Capistrano, beat off the Turks, who fled leaving their camp, artillery and baggage train behind. But, within a month, a contagious disease picked up in camp carried off Hunyadi too.

The King (or his uncle), suspicious of the widespread popularity of Hunyadi's two sons—László and Matthias, one slightly older, one slightly younger than the King—invited themselves to visit László Hunyadi at Belgrade. During a *tête à tête* discussion the uncle tried to stab him dead, failed, and was instead hacked to death himself by members of his host's household. In no position to do otherwise, the King pardoned László, and then invited him to Court. Matthias was soon invited to come too and, although their father had impressed on them the unwisdom of both of them ever being together in the same place with the King, he joined his brother at Buda. As soon as both brothers were there, a hastily convened court, packed with sycophants, condemned László, who was beheaded that same evening. The King then departed for Prague (he had inherited the Crown of Bohemia too), taking Matthias with him as a prisoner.

Shortly after László V reached the safety of the Hradzyn the plague carried him off. On news of his death a Parliament met at Buda, and Matthias maternal uncle stage-managed his nephew's election to the throne, proposing himself as Regent until the boy came of age. Not much management was needed to sway the county members, enthusiastic for any Hunyadi, but it needed some hard bargaining with the magnates, many of whom were concerned about their role in the condemnation and execution of László Hunyadi. (Although Parliament was not yet formally divided into two chambers at that time, the magnates—as the barons had better be called from now on—and county members already tended to meet separately).

A couple of months later **Matthias I** got back from Prague and was enthroned: not crowned, since Frederic III refused to hand back the Holy Crown, arguing that *he* was entitled to his late cousin's thrones of Hungary and Bohemia, although neither country wanted him (in Hungary, some years later, a small group of disgruntled magnates did proclaim him King, on the strength of which he so styled himself for the rest of his life; in Bohemia George Podjebrad, its Governor during the previous reign, soon established himself as King).

With remarkable energy and efficiency Matthias—just turned sixteen—soon sidelined his uncle, and when he objected banished him to a distant estate. He next filled key offices with loyal Hunyadi supporters, removing all who had served his predecessor all to sycophantically, and restructured the management of Crown revenues in a fashion that gave him personal control over them. Then, within a couple of years, he persuaded Parliament to vote money and soldiers for a campaign against the Turks—Parliament then, as at all later times, insisted that it alone could impose taxes and raise troops—and, leading his army south in person, pursued the Turks into, and cleared them out of most of, Bosnia (which remained under Hungarian control for the next half century). Meanwhile, after lengthy and strenuous bargaining, his Chancellor, Bishop (later Archbishop) Vitéz, managed to buy back the Holy Crown back from Frederic, always pushed for money, and now Matthias was finally crowned with it. Only the death of his young Queen, Catherine Podjebrad, in childbirth overshadowed these early successes.

Matthias carried on as he had begun. He imposed his will on Parliament, initiated several successful campaigns against the Turks (displaying conspicuous bravery when present in person), established an effective and fair administration, increased Crown revenues far beyond those of any of his predecessors, kept restive magnates under firm control, promoted loyal and effective 'new men', and gradually created a disciplined and strong standing army (which came to be known, from the colour of its armour, as the Black Army). The last Hussite strongholds in the northern Highlands, their presence long since devoid of any religious connotation, were also reduced and eliminated.

Meanwhile the royal palace at Buda was yet again extensively enlarged, refurbished and surrounded by hanging gardens, using architects and artists invited from Italy, as was the riverside palace at Visegrád (where Charles I had had his Court a century earlier). Matthias, who was familiar with the ideas of the Renaissance since his boyhood education, now founded a great library—the *Corvina*, ultimately more extensive and richer than that of the Medici in Florence—at Buda, staffed by hundreds of copyists (somewhat later, in 1473, the first printing press was also set up), and invited increasing numbers of Italian writers, artists and savants, delighted to serve so enlightened and generous a prince, to his Court. Indeed, one of his Hungarian officials, later Bishop of Pécs, had been a well known member of Italian humanist circles, under the name Janus Pannonius, before returning to Hungary to serve Matthias.

Turkish pressure against his southern borders did, however, remain a continuous preoccupation. Matthias came to see that, rich and strong though he had made Hungary, on her own she was no match for the growing power of the Ottoman Empire. Ever a realist, he also knew that, despite promises and Papal injunctions, he could not expect voluntary assistance against them from his western neighbours, least of all from the nearest and largest, the Holy Roman Empire—in effect: the lands of Germany—whose ruler, Frederic III, was his sworn enemy. Such considerations led to a bold conclusion: to command the Empire's resources against the Turk *he* had to become Emperor, an idea not as far-fetched as it may seem, since two of his predecessors, Sigismund and Albert, had been Kings of Hungary before becoming Emperors; and Frederic was no longer young.

To aim for the Imperial dignity he had to establish his standing within the Empire. The first stepping stone was the Crown of Bohemia: the Imperial throne was elective, the King of Bohemia one of the seven Electors, and three more votes could doubtless be bought (Matthias was rich and the Electors not above venality). Thus much of the second half of Matthias reign was taken up with attempts to acquire Bohemia and become its King. The overtly publicised excuse for these wars was that King George Podjebrad had by now openly declared himself a Hussite, upsetting both the Papacy and some of his most powerful subjects who, therefore, seemed willing to back Matthias. However, although he occupied and held on to most of Moravia (long joined to Bohemia), and was indeed proclaimed King of Bohemia by a portion of the nobility, Bohemia itself eluded him, as did universal recognition of his new title. Moreover, ultimately Frederic outlived him by several years.

Looking for allies against the Turks elsewhere too, and in need of an heir, Matthias married Beatrice, daughter of Ferdinand of Aragon, King of Naples, who was in principle equally committed to fighting the Turks, in the Mediterranean. However, this dynastic alliance was a disappointment on both counts. In the event Ferdinand's contribution to the war against the Turks was negligible, and Beatrice proved to be barren; his long recognised and legitimised bastard, John Corvinus, remained Matthias' only son. Moreover, besides her failure to produce an heir, Queen Beatrice also introduced the least salubrious aspect of Renaissance Italy, its rampant nepotism, to Hungary (obtaining the Primatial See of Esztergom for her brother, aged ten, was but the worst instance). Unfortunately Matthias appears to have doted on her, and was unable to refuse her any request, while she promoted the interests of those who flattered her most.

Not yet fifty, and plagued by gout, Matthias died (by poison, whispered some)—not in his splendid palace at Buda, but in the Hofburg at Vienna, which he had taken from Frederic III some years before—without a legitimate heir. Matthias had wished John Corvinus to succeed him but the widowed Queen, who hated him, worked against this; with few supporters (and his heart, perhaps, not in it) John renounced and retired to his extensive estates. Parliament looked elsewhere: the new Jagello King of Bohemia(who—or rather: whose father, with the backing of Frederic III—had succeeded where Matthias had failed) was a nephew of László V (*see* Table 2), and had the reputation of being pliable, which commended him to the mightier magnates in particular; moreover, hardly widowed, Queen Beatrice now offered to marry him. Thus he was elected to the vacant throne as **Ulászló II** (repudiating Beatrice's offer of marriage as soon as he was crowned).

True to expectations he proved to be singularly lacking in any will of his own, and has gone down in Hungarian history as *Ulászló Dobje*, since he rarely exerted himself beyond muttering "dobje, dobje" ("good, good" in Czech, his preferred language) in response to any proposal put to him. It took rather less than the quarter century of his reign for everything that Matthias had achieved to fall apart again: Crown revenues dwindled—to the point that the Court often had to rely on the credit of Buda's merchants to feed itself—although office-holders grew rich, dust and mould gathered on the splendid volumes of the Corvina library, while the country's neglected defences fell into disarray. Three events of his reign nevertheless merit mention.

He commissioned, if under some Parliamentary pressure, Stephen Werböczy—a senior judge, who owed his initial advancement to Matthias—to prepare a compilation of key features of Hungarian law. This work, completed in 1514 and known as the *Tripartitum* (since its author chose to divide it into three main parts), remained a fundamental text of Hungarian jurisprudence for centuries thereafter. Its main thrust is practical guidance for judges (whose decisions, it says, must be based exclusively on the evidence presented to them in court, without regard to any extraneous knowledge, information or influence they might be aware of).

That same year saw a bloody peasant rising, and its equally bloody suppression. Cardinal Bakócz, Archbishop of Esztergom (himself the son of a tied peasant wheelwright, also 'talent-spotted' by Matthias), had returned from the Conclave at Rome—where he had hoped to be elected Pope and had, indeed, been runner-up in the first ballot, but the Medici Leo X was finally chosen—with a Papal Bull announcing a crusade against the Turks. Large numbers of peasants, increasingly discontented with their lot, gathered outside Pest to take the cross, but no one took the trouble to lead them against the Turk. Armed, and given such an opportunity to compare grievances, they soon turned against the landowning classes instead, looting, burning and killing across the country. The rising was crushed, its leaders cruelly executed, and in its immediate aftermath Parliament enacted harsh measures, imposing perpetual servitude on the peasantry (which were, however, repealed a couple of decades later).

Finally, in the year following, Ulászló and the Emperor Maximillian (son and successor of Frederic III) concluded a dynastic treaty. Maximillian's grandson Ferdinand, then a young boy living in Spain, was to marry Ulászló's daughter Anne, Ulászló's son Louis Maximillian's granddaughter Mary, and—this was the crux—it was agreed that should either couple fail to produce an heir the other (or their descendants) would inherit its thrones. The treaty had no standing in Hungarian public law, it being well established that in the absence of a male heir the right to elect a new King reverted to Parliament, but this worried neither Ulászló nor Maximillian; in any case, there was little reason to doubt that, once they had grown up and married, Louis and Mary might have plentiful issue.

A year later, on Ulászló's death, **Louis II**, aged all of ten, was duly crowned King. If his father had been lackadaisical, he was a spoilt child who grew into a weak young man, devoted to his pleasures only: conditions in Hungary went from bad to worse. It is just possible that had he lived and allowed Mary his Queen sufficient influence—for, as she later proved, when Governor of the Netherlands for several decades, she was a most forceful woman and competent administrator—matters might have improved again; but it was not to be.

By 1526, ten years into the reign of Louis II, Sultan Suleiman II, subsequently dubbed *the Magnificent*, had eroded Hungary's southern defences (Belgrade, the cornerstone, fell to him in 1521). Now he launched a major attack to conquer Hungary, and Austria beyond, for Islam, enthusiastically encouraged by the *Most Christian King*, Francis I of France, in favour of anything that might distract his enemies the Habsburgs. Hungary was ill prepared: overall military command had been entrusted to Archbishop Tomori of Kalocsa—a Franciscan of little military training, but a compromise that upset no one—who kept resigning his command in protest against failure to pay what professional troops the country had; other magnates were squabbling and, remembering 1514, reluctant to arm the peasantry.

In late summer the Ottoman army was advancing into Hungary along the western bank of the Danube. A Hungarian army of sorts—some 28 thousand in all—was finally assembled and marched south to halt this advance, Louis II and his entourage joining it near the market town of Mohács. Here Suleiman drew up his vastly superior forces in a carefully chosen defensive position, and waited. On the morning of the 29th of August the Hungarians, brave but forgetful of Nicopolis and Varna, launched a frontal attack on it; most of their number, 24 thousand, fell on the field or were captured and executed. Louis II, who had not joined in the fighting, fled the rout with his immediate attendants. The summer had been exceptionally wet, and a brook they had to cross, usually negligible, was heavily swollen: while trying to ford it the King's horse slipped and threw him. Encased in his heavy armour he was unable to rise, and drowned before any of his attendants managed to come to his rescue.

Suleiman advanced to Buda unopposed, looted the *Corvina* library and the town's churches, set fire to Pest on the opposite bank of the Danube, then retired his army to winter quarters in the Balkans. Yet, in the east of the country John Zápolya (also known as Szapolyai), Governor of Transylvania, still had an intact army: an ambitious man, he had failed to lead it to Mohács in time for the battle, conceivably on purpose.

Ambition was a family trait, the family 'new' in the extreme: John's uncle Imre had been John Hunyadi's principal accounts clerk, to whom Matthias later entrusted the management of the royal salt monopoly (which produced a good quarter of the Crown's revenues), followed by further appointments. Exploiting these to acquire great wealth and power, Imre saw to it that his brother Stephen advanced too (ultimately, by Ulászló's reign, to Palatine, the most senior dignity). A good marriage, with a Princess of Teschen, had consolidated the parvenue Stephen's social position, and also produced John. Now, the country in disarray and the throne vacant, he used the standing his intact army, and control of Transylvania, gave him to convoke an, admittedly incomplete, Parliament at Tokaj. This duly elected him King **John**.

The House of Habsburg

Six weeks later another, and equally incomplete, Parliament—convened by the widowed Queen Mary—met at Pozsony (Pressburg), and elected her brother **Ferdinand I**, mainly in the hope that he might mobilise the resources of the Empire, ruled by his brother Charles V, against the Turk (which he promised to do), rather than by virtue of the dynastic treaty between Ulászló II and Maximillian. But by then John, who was in possession of the Holy Crown, had been crowned, and soon took up residence in the despoilt palace at Buda. For the next fifteen years the country was to be fatally divided in its loyalties (unlike the Fuggers of Augsburg who, while they continued to finance Charles V and Ferdinand, also hastened to negotiate a new commercial treaty—copper exports from the northern Highlands—with John).

Suleiman saw his opportunity, assured John of peaceful intentions and friendship, then marched an army across Hungary—which took little trouble to spare the regions through which it passed—to attack Vienna, but was there repulsed. Next Ferdinand made several efforts to take Buda and evict John from the throne, but failed in both.

Evenually a secret treaty was made between the two Kings: during John's lifetime each would continue as King in the portions of Hungary under his control—broadly: John east of the Danube and much of the north-east, Ferdinand in the west and north-west—but after his death all of the country would be reunited under Ferdinand. However, it did not work out quite as intended. Somewhat late in life John married Isabella Jagello (a first cousin of Ferdinand's Queen Anne: *see* Table 2), who bore him a healthy son, less than a year before he died. On his death, taken by the idea of ruling on her son's behalf, she promptly repudiated the treaty and had the baby **John Sigismund** crowned. At this Ferdinand sent an army to Buda to en-

Table 3: the House of Habsburg

force his claims, but dissension among its commanders rendered it ineffective.

Suleiman, who had been watching developments with interest, now offered to 'protect the infant', and brought *his* army to camp under Buda. Once there it occupied the castle by a ruse, in a bloodless coup. In possession of Buda, the Sultan then sent John Sigismund and his mother to Transylvania, which (with some adjacent regions: the *Partium*) he permitted the boy to keep as its Prince under Ottoman suzerainty; next he methodically occupied most of Hungary's centre, to be governed by a Pasha established at Buda for well above a century thereafter.

Ferdinand I was now sole undisputed King, but his rule limited to the northern Highlands and western Transdanubia (roughly: west of Lake Balaton). About the only benefit he gained from the Crown of Hungary was that he could style himself *Apostolic King* (granted to St Stephen and his successors by the Pope, five centuries earlier; the nearest equivalent had been the style *Equal of the Apostles* used by the Emperors of Byzantium). In all other respects Hungary was a source of vexation: what of it remained in his hands had to be defended against the Turks, while the Hungarians demanded a say in their country's government and, moreover, ever more of them were opting for the teachings of Luther and Calvin.

With many other concerns in Austria, Bohemia and the Empire—first as King of the Romans, acting for his Brother Charles V, and, after the latter's abdication, as Emperor—matters Hungarian were an unwelcome distraction for Ferdinand. Imperial troops were needed elsewhere, so war against the Turks was largely limited to what defence the Hungarians themselves could put up, but subordinated to the *Hofkriegsrat* at Vienna, which kept seeking truces on almost any terms. Those holding long established Hungarian dignities and offices of state were treated with disdain and suspicion (and often not replaced for lengthy periods), their views and advice disregarded, while effective executive authority was transferred to new bureaucratic bodies set up in Vienna, the *Hungarian Chancellery* and *Hungarian*

Treasury. However, Parliaments still had to be called every so often, to vote taxes.

In matters of religion, despite repeated expression of displeasure at the behaviour and attitudes of his Hungarian subjects, Ferdinand had little effect. Whatever their denomination, they continued to preach, argue and publish pamphlets to gain, and re-gain, converts, but were at one in rejecting any interference by the Crown in matters of conscience (a pre-Mohács Act condemning Lutherans, and providing for measures against them, had never been enforced.)

Ferdinand also attempted to re-join Transylvania to what was becoming known as 'Royal Hungary', largely by negotiations, often backed by Spanish troops. Repeatedly John Sigismund was on the verge of accepting Ferdinand's sovereignty, but each time the Sublime Porte made threatening noises and he drew back. Nor did the cold-blooded assassination, on Ferdinand's instructions, of Cardinal Martinuzzi Bishop of Nagyvárad, better known as Friar George, in *de facto* control of Transylvania's government for Isabella and then John Sigismund (and who had been the architect of the earlier secret treaty), promote such an understanding.

Not much changed during the reign of Ferdinand's son **Maximillian I**, nor during the early years of his son **Rudolph** (both II as Emperors). Both had called Parliaments—at Pozsony (Pressburg), by now the recognised capital, and conveniently close to Vienna—to approve their coronation, had sworn Coronation Oaths to abide by the laws of Hungary and defend the realm, had promised to remedy grievances, were crowned, and had then returned to Vienna. However, the latter part of Rudolph's reign at last saw—if not at his initiative, since he was by then firmly ensconced with his alchemists and artists at Prague—an offensive war against the Turks. Known as the Fifteen Years War, it achieved not a few brilliant successes, but failed to dislodge Ottoman power from central Hungary: when the Turks offered to negotiate, Imperial (note: not Hungarian) envoys hastily concluded a peace that abandoned all gains that had been made, although from a military position better than any since Mohács.

Rudolph, meanwhile, was rapidly sinking into near-madness; in 1608 his brother, **Matthias II**, forced him to abdicate, with the backing of Hungary's Parliament, which had refused to be dissolved by Rudolph, as well as all Habsburg Archdukes (a title invented, and conferred on all members of his family, by Frederic III). Long involved with Hungarian affairs, latterly as Rudolph's governor there, he had already established an excellent *rapport* with his new subjects, and his first Parliament, which passed a clutch of Acts that remedied long held grievances concerning the country's governance—their gist that Hungarians, holding Hungarian offices, were to govern the country again at every level—promised to set relations between Hungary and her Habsburg rulers on a new path.

However—considering, in particular, the historical period when it was passed—Act I of 1608 (Hungarian Acts of Parliament were, and still are, numbered in Roman numerals within year) is of greatest significance: it conferred on every subject, without any distinction as to status (in contrast to the Empire's and, indeed, all of Europe's *cuius regio eius religio* policy), the legal right to adhere to the religion of his choice, be it Catholic, Lutheran or Calvinist, and to practice it openly and publicly. Moreover, to underline the equal standing in law of all three denominations, other Acts laid down that whenever the office of Palatine (the most senior dignity) fell vacant, the Crown was to propose two Catholic and two Protestant candidates for Parliament to choose from, as also that of the two officials charged with responsibility for the safety of the Holy Crown, henceforth to be guarded at Pozsony, one was always to be a Catholic and the other a Protestant. In a side swipe, a further Act forbade the Jesuits to own property within the Kingdom.

At the same time Parliament also reorganised itself. Hitherto notionally a unitary body, it was now formally divided into two Houses. The Lower consisted of members elected in the counties (by those of 'noble' status, the erstwhile freemen, irrespective of wealth; these accounted for about one in twenty of the population), and members representing the royal free cities; the Upper contained the bishops (still only Catholic ones), current holders of certain senior offices and judicial positions, and—a novel category—

magnates possessed of hereditary titles (*barons* and *counts* whose titles passed on to all of their descendants were an innovation—first introduced to Hungary by Ferdinand I.)

The promising reign of Matthias lasted barely a decade before the Crown passed to his middle-aged and narrow-minded cousin Ferdinand II, of the family's Styrian branch (*see* Table 3 before.) A bigoted hater of Protestants, he promptly set about eradicating heresy from his realms (with some success in Austria). Soon Bohemia revolted, and invited Frederic of the Palatine—the Winter King—to its throne; but the Bohemians were crushed at the *Battle of the White Mountain*, and what came to be known as the *Thirty Years War* began. Although this war kept him busy for the rest of his reign, he attempted to extend his policies—oppressive in matters religious and political in equal measure—to Hungary too, but here he was checked to a certain extent by the repeated, often armed, interventions of the Prince of (by now firmly independent) Transylvania, Gabriel Bethlen. Amidst and despite all of this the Archbishop of Esztergom, Cardinal Peter Pázmány—convert from Calvinism, Jesuit and stout patriot, the rich earthy Hungarian prose of whose religious tracts and sermons, constructed with subtle dialectical elegance, it is a joy to read to this day—founded a university which, unlike its precursors, has survived into the present (it is now the Eötvös University of Science of Budapest).

Ferdinand III was cast in much the same mould as his father had been. However, still embroiled in the Thirty Years War in Germany, and under threat from Transylvania's Prince George I Rákóczi (the Princes of Transylvania were elected for life, by a Parliament very similar to the Hungarian), he found himself compelled to concede, teeth gritted, Hungarian constitutional rights, including freedom of religion, in a formal treaty (which did not, however, result in abolition of the Hungarian Chancellery and Treasury at Vienna). A decade later, harking back to mediæval precedent, he prevailed on Parliament to approve the coronation as 'Junior King', during his own lifetime, of his eldest son **Ferdinand IV**; but he predeceased his father, and a couple of years later the Crown passed to his younger brother **Leopold I**.

Educated, until his brother's death, for the priesthood, Leopold never doubted his divine right to rule as he pleased nor his duty to eradicate heresy, both views repugnant to Hungary. Within the first few years of his long reign—the darkest half-century of Habsburg rule—he 'forbade' Parliament to raise and discuss grievances, those relating to his religious policy in particular, whereupon Protestant members withdrew, emasculating it. Moreover, his reluctance to approve measures against the Turk drove the exasperated Palatine Wesselényi, and a small group of other senior dignitaries, to start considering plans for his removal.

At this juncture the Turks occupied a large swathe of Transylvania including some key towns (in response to the overly adventurous foreign policy of its Prince), and then made considerable inroads into Royal Hungary. But only when they started to raid deep into Styria too did Leopold finally sent sizeable Imperial forces, up to then idling near Vienna, against them. These beat the Turks comprehensively in the vicinity of the Styrian border (by Szentgothárd in Hungary), with hardly any losses to themselves. Instead of following up this victory, Leopold immediately sent a personal envoy to offer the Turks peace terms that were wholly against Hungary s interests: a twenty-year truce, the Turks to retain all gains made in recent years, Imperial troops facing the Turk to be withdrawn from Hungary, and an undertaking that neither party—one of whom was, also, King of Hungary—would assist the Hungarians against the other.

Hungary was in uproar, and horrified dignitaries pressed Leopold to reconsider; he refused, and earlier plans to remove him were revived. This time more people were involved, there were leaks, and three of the principals (Counts Zrinyi, Frangepán and Nádasdy) were arrested while in Vienna to see Leopold on official business. Tried by an 'extraordinary Imperial court', in Austria, they were executed; somewhat later a dozen more were arrested, similarly tried, and executed, on Hungarian soil. All these trials and executions were, in Hungarian law, illegal.

Leopold then 'suspended the Hungarian constitution, appointing a council (consisting of Germans) to govern the country by decree. To give its decrees muscle Imperial troops (generally commanded by Italians) were stationed in towns and strongholds, while Hungarian soldiery in border forts facing the Turks was dismissed. To boost revenues, and to pay for these Imperial troops, arbitrary taxes were imposed, on a scale that would have increased the tax burden twentyfold had it proved possible to collect them (collection was frustrated by the locally elected county administrations refusal to co-operate). And, to break the Protestants, their ministers of religion and school-masters were ordered to abjure their heresy, on pain of being sentenced to death, imprisonment or sale as galley-slaves to the King of Naples by 'special courts' set up for the purpose (Dutch and English merchants eventually bought the release of most sent to the galleys). It had taken Leopold less than twenty years to achieve this much.

Fleeing Protestant ministers joined dismissed soldiery, and not a few implicated in the failed attempt to remove Leopold, in Transylvania. Eventually a leader emerged to give them cohesion, in Count Thököly (whose grandfather had made a fortune, and earned his title, exporting cattle from Turkish-occupied Hungary to Vienna). Invoking the *Ius Resistendi* clause of the Golden Bull of 1222—which authorised the bishops, barons and freemen of the realm to use force if the King failed to respect the country's laws—he swept across and held, for a while, the northern Highlands, was elected 'Prince of Hungary', and eventually extended his attacks into Moravia. Finally Leopold was forced to back down, called a Parliament (after nineteen years), allowed it to fill vacant offices and dignities, rescinded his unconstitutional decrees, and confirmed religious liberty.

But by now Leopold's twenty-year truce with the Turks was coming to an end; the Grand Vizier (Sultans were by now mere figureheads), encouraged by Thököly, attacked again, investing Vienna in 1683. Sobiesky of Poland arrived to the rescue in the nick of time, and the Turkish army withdrew in disarray. This time, owing to the forcible interventions of Pope Innocent XI—for Leopold was again bent on making peace on any terms—the war against the Turk was carried on. A grand Imperial army, including contingents from many countries beyond the Empire too (besides, of course, Hungarians), started pushing back the Turks. Buda was retaken, after a siege of several months, in September 1686, and by 1690 the Turks had been expelled from most of Hungary, merely clinging to some isolated strongholds. Finally, by the peace of 1699, the Ottoman Empire formally relinquished all its conquests in Hungary.

These events should have been a cause for universal rejoicing in Hungary, had it not been for Leopold's policies. From the first he treated areas retaken from the Turk not as regions restored to Hungary but as 'new conquests', subject to his personal rule only. The surprising speed with which elected county administrations re-formed themselves in most reconquered regions thwarted full implementation of this policy; however, Transylvania was not re-joined to the rest of Hungary but turned into an hereditary Habsburg Duchy (with, it must be added, the connivance of some of its leading families), and a 'military frontier administration', directly subordinated to Vienna, was established across Hungary's south, its much depopulated territory settled with Serbs wishing to escape Turkish rule in the Balkans.

Leopold also considered all landed property in reconquered areas to be 'ownerless' (*terra nullius*), handing out considerable estates to favourites, senior officers of the Imperial forces, and army suppliers (most of whom then imported peasants from Germany and elsewhere, adding to the ethnic mosaic of those parts). However, numerous Hungarians persisted in claiming inherited ancient property rights in these areas, and to deal with them a new body, the *Neoacquistica Commissio*, was set up in Vienna. This demanded detailed documentary proof of the rights claimed but, after some 150 years of war and occupation during which virtually all local archives had perished, few claimants were able to provide documents to the exacting standards set by the bureaucrats; claimants who, nevertheless, did manage to satisfy the Commission were then charged a war-indemnity tax, equal to 10 per cent of the estate's assessed value, payable in cash before they were granted title to their property.

And, even while reconquest was still in progress, in the very year Buda was retaken, an Imperial General (Caraffa) swept through the north and east of Hungary arresting, torturing, executing, and confiscating the property of wealthy burghers and landowners, predominantly Protestant ones, on trumped up charges of a pro-Thököly conspiracy. Parliament eventually managed to have his activities stopped, and voted compensations for the victims' families, but the General was not even reprimanded.

Due to such policies revolts were breaking out across the country by the last decade of Leopold's reign. Fragmented and localised to begin with, they congealed into a major organised war when Francis II Rákóczi assumed leadership in 1703. Several of his forebears had been Princes of Transylvania; his mother, a daughter of the Zrinyi executed by Leopold, had, as a widow, married Thököly. Then, when Imperial forces invested the Castle of Munkács she took charge of its defence, the boy Rákóczi at her side, and held it against them for three years; by the surrender terms she was permitted to join her husband in exile, but he was taken to Vienna, to be moulded into a loyal courtier playboy.

Permitted to keep the vast family estates, created a Prince of the Empire, invested with the Golden Fleece, sent on a Grand Tour of Italy, he was in due course married to a reliably safe Princess of Hessen. Considered 'tamed', he was then allowed to take her for an extended stay on his estates in eastern Hungary. Here he met Hungarians again, absorbed their grievances, and back in Vienna began to dabble in, rather amateurish, conspiracy. Betrayed by a planted intermediary, he was placed under arrest; his 'safe' Princess then obtained permission to visit, exchanged clothes with him, and Rákóczi had departed for Poland before the prison authorities noticed.

Personal 'charisma', besides family background, attracted the disaffected to his *Pro Patria et Libertate* flag. By the time Leopold lay dying in the Hofburg the armies of Rákóczi, elected Prince of Transylvania, were on the way to overrunning all of Hungary. The struggle, which received clandestine support from Louis XIV of France, continued throughout the brief reign of Joseph I. Far less intransigent than his father had been, and still involved in the War of the Spanish Succession, he was inclined to terminate the conflict on reasonable terms, but talks broke down over his refusal to recognise Rákóczi as Prince of Transylvania.

In the end Hungary was no match for the Empire. After seven years of fighting the situation of Rákóczi (by now elected *'Prince-Commandant of Hungary'*: he refused the Crown) was becoming hopeless: his war-weary troops were falling back, his treasury had run out of money, Louis XIV was reducing his support. Even before this stage was reached Joseph had had the good sense to entrust negotiations to a Hungarian (Field Marshall Pálffy); now, while Rákóczi was abroad to seek the assistance of Peter the Great of Russia, his deputy (General Károlyi) and the royal plenipotentiary concluded an honourable peace at Szatmár.

However, Joseph died even as they were signing, before he had seen and approved the final settlement, rendering its future uncertain: Court circles at Vienna were doing their utmost to have it repudiated while Joseph's brother and successor **Charles III** (VI as Emperor) was still in Spain (he had been the Habsburg candidate for its throne). But Charles sent a message approving the peace terms, and formally confirmed them when he got back; Rákóczi, however, refused to accept them—the Principality of Transylvania remained a sticking point—and spent the rest of his life in exile (at Versailles, and then Rodosto in Turkey).

Charles next set about restoring normal relations between King and country, courting Parliament and cultivating its leading members assiduously. His motives were not altruistic: the last and only male Habsburg, he was determined to ensure the succession of his daughter and her descendants. Details of this succession were spelt out in the *Pragmatica Sanctio*, but this was a private document, only binding on members of the House of Habsburg: to give it any standing in Hungarian public law it had to be approved by Parliament. Charles' efforts were successful, and by Acts I, II and III of 1723 Parliament incorporated the *Pragmatica Sanctio*, and its implications (in effect: perpetual personal union with Austria), into Hungarian law.

Thus **Maria Theresia**, by then married to Francis of Lorraine (who followed his father-in-law as Emperor), was in due course duly acclaimed and crowned ruler—designated *rex*, not *regina*, in Latin documents of the time—of Hungary. Hard pressed by Frederick the Great of Prussia, who was attacking her heritage (despite his father's solemn recognition of the *Pragmatica Sanctio*, which Charles had obtained by using his Imperial prerogative to elevate the Prince-Elector, Churfürst, of Brandenburg to King of Prussia), Parliament even voted her money and troops to defend her rights.

She was, however, endowed with a strong streak of 'mother-knows-best'. As she grew older she no longer called Parliaments, failed to fill Hungarian dignities that fell vacant, and applied considerable pressures, but not crude physical coercion, to turn her Hungarian subjects into loyal Austrians and Catholics (such as setting up the Hungarian Noble Guard to attend her person at all times, refusing to receive Protestants at Court, encouraging intermarriage between Hungarians and Austrians). Nevertheless, with Turkish and civil wars in the past and prosperity on the increase, a mutually acceptable, almost cosy, *modus vivendi* was established despite her disregard for Hungarian constitutional practices. The *Neoacquistica Commissio* was finally abolished and, although the Hungarian Chancellery in Vienna remained the ultimate organ of Hungary's government, a Viceregal Council was appointed to deal with day by day matters from Buda.

Her son **Joseph II** seriously upset Hungarian sensibilities by refusing to be crowned, albeit from the most honourable of motives: wishing to align the way Hungary was governed and administered with the rest of his realms, and to recast the lot in the spirit of the Enlightenment as he understood it, he would not swear a Coronation Oath that he could not keep. Neither his scruples nor the intentions of the measures he initiated (most of which he rescinded on his death-bed) were appreciated, and he is still much reviled in Hungary, although at the time some of the most enlightened, and unquestionably patriotic, Hungarians willingly worked for the implementation of many of his policies.

His brother **Leopold II** came to the throne as the French Revolution—which was to guillotine their sister Marie-Antoinette—was unfolding. With predictable inevitability he over-reacted, imported Italian police methods of covert surveillance and paid informers from Lombardy (their father's inheritance, which he had ruled until Joseph's death), instituted strict censorship, and clamped down on anything that carried the faintest whiff of 'liberty'. However, since there were obvious advantages in controlling any possible unrest in Hungary through constitutional channels, he called Parliament again, conceded such demands as were not tainted with 'Jacobinism', and let it fill vacant dignities again, hitting on the idea of proposing his son Alexander Leopold for election to the office of Palatine and at the same time entrusting Presidency of the Viceregal Council to the holder of that office (a shrewd move: by tradition the Palatine had always stood in for the King in his absence abroad).

Two years later his son **Francis I** came to the throne. The last Habsburg to be styled Holy Roman Emperor and the first to assume the title Emperor of Austria (he used his standing as the former, before abandoning it, to create the latter), his reign was dominated by the events of the Napoleonic Wars and their aftermath. In Hungary its early years saw the suppression, with numerous executions and many prison sentences 'at the King's pleasure', of an alleged Jacobine conspiracy, in fact more a ferment of abstract ideals among upper-class intellectuals than a nationalist or political rising. In its wake police methods were reinforced, and the Archduke-Palatine blew himself up with fireworks. He was replaced by his brother Joseph who, to the annoyance of his brother the King and Emperor, soon 'went native', becoming a strong supporter of Hungarian aspirations; he also played a leading role in the development and embellishment of Pest and Buda (not to be united until 1873), where—unlike any Habsburg King, ever—he resided.

The Napoleonic Wars only touched Hungary indirectly. Soldiers were much in demand, so Parliaments had to be called to vote the raising of troops; agricultural produce fetched high prices, so money came into the country. By their end Austria went bankrupt, money lost its value, and many in Hungary were ruined; soldiers, moreover, were no longer needed. Metternich now supreme in Vienna, Francis tried to rule Hungary without Parliaments for a decade and more, but in the end he was forced to give in to mounting Hungarian pressures and called Parliaments again: the period known as the Age of Reform began.

The Parliaments of this period were distinguished from previous ones by ever increasing polarisation along party lines (if not yet organised and disciplined ones in the modern sense), between conservatives and reformers. The latter, some of them inspired by England's Whigs, advanced steadily in the Lower House, despite government attempts to interfere with elections in support of the former; a vociferous opposition, they even made inroads amongst younger members of the Upper House. As a result not a few progressive measures were passed. By the 1840s the balance, and most offices, came to be held by members of a breakaway group of younger conservatives, known as the party of progress with caution (analogous, perhaps, to the Peelites at Westminster).

Ferdinand V (I of Austria, where they started numbering from the beginning again) was considered somewhat simple-minded. His father had him crowned 'Junior King' in his own lifetime, and when he became the ruler he was 'guided' by a council over which Metternich presided. This arrangement broke down early in 1848 when, on news of the revolution in Paris, the Viennese staged a revolution too and forced Metternich to flee. Hungary's Parliament, come under the sway of the reformers, was meanwhile moving in ever more radical directions, finally passing a clutch of Acts that wrought fundamental changes. These included abolition of all 'noble' privileges and the last vestiges of tied peasantry, extension of the franchise and, in particular, the introduction of government by ministers answerable to Parliament, not the Crown, which was henceforth to act on their advice and with their approval only. In April, Metternich no longer there to 'guide', Ferdinand, although dubious at first, gave these Acts his royal assent (whence they became known as the April Laws).

Unfortunately they did not spell out how the relationship between Hungary and Austria was to be managed (beyond including a Minister next the King's person in the cabinet). The two countries shared a monarch, but one of them was now a modern constitutional monarchy, the other still an ancien régime state where the ruler s will was untrammelled. With mutual goodwill this difficult issue might have been resolved, but goodwill was singularly lacking at Vienna, where a deeply conservative clique—which saw in the new Hungarian constitutional arrangements a Jacobin take-over—was re-establishing its hold.

Ferdinand had been persuaded, before he had assented to the laws that tied his hands, to appoint one Baron Jellachich, an adherent of that clique, Viceroy of Croatia (an office under the Hungarian Crown). By the time elections had been held in Hungary under the new franchise, and a Ministry constituted, Jellachich had assembled an army in Croatia, and with this he marched on Buda, against the country's lawful government. A Hungarian army was hastily brought together and, well led, it deflected the Croatian forces, which retired towards Vienna; but the Hungarian government, believing in constitutional propriety, refused to sanction pursuit on Austrian territory.

Tensions, however, mounted. To pay for, in particular, its new army the Hungarian government started to issue money; Austria objected; the Prime Minister went to Vienna to resolve matters, and was there detained. By then Austrian military units were forcing their way into Hungary, and by mid-autumn Ferdinand's realms of Hungary and Austria were, in effect, at war.

At this point a Habsburg family council made Ferdinand abdicate in favour of his 18 year old nephew **Francis Joseph** who, advised by his mother and other arch-conservatives, refused to recognise the validity of the April Laws. The fighting became more bitter, and early the following year Francis Joseph 'abolished' Hungary as a separate state; Parliament responded by deposing the House of Habsburg from the throne, and appointed Louis Kossuth acting head of state. Finding it difficult to finish off the 'rebellious' Hungarians, Francis Joseph asked the Tsar for military assistance, and a Russian army of some 100 thousand entered the country from the east. Hungary could hold not her own against the combined forces of Austria and Russia: in late summer the Hungarian army surrendered, but to the Russians, considered (rightly, as it proved) less vengeful than the Austrians.

Within months the Austrian C-in-C in Hungary, Field Marshall Haynau, had thirteen Hungarian generals executed, on the charge that they had previously been officers in the Austrian army, as well as the first constitutional Prime Minister (Count Batthyány). A period of harsh repression followed: more executions, numerous death sentences in absentia for those who had managed to flee abroad, and thousands of prison sentences, while common soldiers were pressed into the Austrian army and sent to serve in Lombardy. Officials appointed by Vienna governed Hungary for the best part of the next two decades.

However, by the mid-1860s external events were beginning to force the hand of Francis Joseph. Napoleon III trounced his armies in Lombardy, then the Prussians beat them decisively at Königgrätz (Ferdinand, in peaceful retirement since his abdication, is reputed to have commented that, on the evidence, he too could have achieved what the nephew chosen to replace him had). Under the pressure of these events Francis Joseph attempted to reach an accommodation with Hungary based upon the *status quo ante* 1848; to this end a Parliament, elected on the old franchise, was called, but it only met long enough to reject the proposals of the Royal Message (equivalent to Westminster's Speech from the Throne), and then dissolved itself.

In the end Francis Joseph had to accept a scheme evolved by Francis Deák, Minister of Justice in 1848 (curiously, they appear to have taken to each other when they met in person). The *Compromise*, as agreement of 1867 based on that scheme is known, created the Austro-Hungarian Dual Monarchy, in which the Kingdom of Hungary and the Austrian Empire were equal partners, each with its own constitutional arrangements and government but linked by the person of their common monarch. Only in foreign policy and defence were they to act as one, with a 'common' Minister for each of these two areas, and the final say reserved for the monarch. The two states also agreed to share a currency, and to a customs union. Beyond that regular joint meetings of delegations from the two country's Parliaments—Austria had not had one until then, but Hungary insisted—were also included.

Francis Joseph, now finally crowned, thereafter meticulously observed the constitutional proprieties imposed by this agreement, inviting whomever could command most support in Parliament to form Hungary's government, although later on there were frequent tensions between him and Parliament over, in particular, military issues (such as conscript numbers, and the language of command in 'joint Austro-Hungarian regiments Hungary had her own defence force too - manned by Hungarian conscripts). As the years went by Hungary thrived, ever fewer of his subjects could remember a time when Francis Joseph was not on the throne, and gradually he even became popular (especially in the wake of the personal tragedies that afflicted him: the mysterious death of his only son Rudolph and the assassination of Queen Elizabeth, both pronounced friends of Hungary).

In 1914, against the advice of Hungary's Prime Minister, the Dual Monarchy sent Serbia the fateful ultimatum that resulted in the outbreak of the First World War. Its cause, the assassination of the heir to the throne, Archduke Francis-Ferdinand, aroused mixed feelings in Hungary: the fact of the assassination was viewed with abhorrence, but the elimination of an heir who made no secret of his dislike for Hungary was a relief.

The new heir was a young man of immense good will, but not endowed with decisiveness or force of personality. Had **Charles IV** come to the throne in peace-time he might have made an excellent constitutional monarch, but he had the misfortune to succeed his great-uncle in the middle of the War. His attempts to terminate it and make peace resisted abroad and sabotaged at home, he had to see the Dual Monarchy disintegrate in defeat within two years of his coronation. The last Prime Minister he invited to form a government in Hungary, in November 1918, declared a Republic, whose President he soon became, within days of Charles leaving Budapest for Vienna (where the 'traditionally loyal' Austrians forced him abdicate and go into exile, depriving him and his descendants of Austrian citizenship and forbidding them ever to set foot in their country again).

Regency and Republic

Within months the Republic was supplanted by a short-lived Bolshevik Soviet Republic, before what was left of Hungary (she lost over 71 percent of her area, and more than half her population, in the so-called peace settlement dictated at Trianon) could be consolidated again. When Parliament met again it voted that the country remain a Kingdom without, however, agreeing on a king.

There were, broadly, two views on this issue: the nationalists were against Habsburgs, argued for the election of a new King, but had no credible candidate; the legitimists held that Hungary already had a properly crowned king, but the more thoughtful among them conceded that his immediate return might cause international complications (the governments of the so-called Little Entente states, especially Czechoslovakia and the Kingdom of Serbs, Croats and Slovenes—which only took to calling itself Yugoslavia from 1929—were violently opposed to any Habsburg restoration anywhere in what had been the Dual Monarchy, fearing the effect it might have on their new statehood).

Pending resolution of this issue Admiral Horthy—last C-in-C of the Austro-Hungarian Navy, which had been bottled up in the Adriatic, and previously also ADC to Francis Joseph for a while—was voted Regent. He owed his new prominence largely to the circumstance that he had been the most senior officer present when the first anti-Bolshevik government was formed in 1919, and by virtue of this had been appointed C-in-C of the military forces at that government's disposal.

A year later some of the more adventurous legitimists prevailed on Charles, then living in Switzerland, to return to Hungary and take over as King. Landing in western Hungary in a private aeroplane, and thence motoring to Buda, his arrival there was a complete surprise for Horthy (who reputedly asked, when told the King wanted to see him, who this 'Mr King' was to disturb him at lunch-time). They had a long private interview, but Charles, insufficiently determined and forceful, failed to prevail: Horthy assured him of his loyalty, in the abstract, but refused to step down and made him return to Switzerland.

Somewhat later Charles, once again encouraged by some adventurous romantics, made a second attempt, this time accompanied by Queen Zita. He advanced towards Budapest by train, with a few troops from West-Hungarian garrisons that had joined him; Horthy mobilised and armed fervently nationalist university students, and threatened to fight Charles' troops on the outskirts of Budapest. Charles, rather than cause bloodshed, gave up, to be interned in the Abbey of Tihany whence the Allies sent him into exile on Madeira (in a British man-o'-war), too distant to launch any further 'disturbances' from it. Here he soon died of pneumonia.

The legitimists now no longer had a King, indubitably crowned as such, to champion, and became embroiled in debates over whether or not the heir-apparent—Charles' eldest son Otto—could now be considered the legitimate King even though not yet crowned. A few years later these debates became academic, when Parliament voted to formally depose the House of Habsburg, but still failed to resolve the issue of who might be King. Thus Horthy, the 'admiral without a sea', continued as Regent of the 'Kingdom without a King' until 1944, when the Germans, under whose military occupation the country by then was, finally bundled him off to captivity in Germany.

In 1945 a Republic was declared, to be changed into a Soviet-style Socialist Peoples' Republic in 1949. Then, in 1989, following the collapse of Communist rule, Hungary became a plain Republic again. And even though Parliament also decided to restore the image of the Holy Crown—symbol of Hungary's nationhood—above the country's traditional coat-of-arms, nobody any longer seriously proposes restoration of the monarchy. (But in 1990 it was, apparently, suggested to Otto—whom Hungary had never deprived of the citizenship to which he is entitled as heir-apparent at the time of his father's coronation—that he might stand for the Presidency; Dr Otto Habsburg, Euro-MP, declined politely.)

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Andrew L. Simon was born in Hungary of Transylvanian Sekler parentage. After graduating with a degree of Hydraulic Engineering from the Technical University of Budapest in 1954, he worked in various engineering positions. In 1956 he took part in the Hungarian Revolution then left the country for the United States. In 1961 he obtained a Ph.D. in Fluid Mechanics from Purdue University and entered a teaching career.

For 24 years Dr. Simon was professor and head of the Civil Engineering Department at The University of Akron in Ohio. During this time he wrote a number of engineering textbooks (*Energy Resources*, Pergamon, 1976; *Practical Hydraulics*, Wiley, 1976; *Principles of Statics and Strength of Materials*, West, 1983; etc.) His *Hydraulics* (Fourth Edition, Prentice Hall, 1997) was translated into Spanish and Chinese, and used as a hydraulic engineering textbook throughout the world. Now in retirement, he lives in Florida with his wife Marika.