

JOHN von NEUMANN
AS SEEN BY HIS BROTHER

by

Nicholas A. Vonneuman

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Nicholas A. Vonneuman
P. O. Box 3097
Meadowbrook, PA 19046 USA

NICHOLAS A. VONNEUMAN

ATTORNEY AT LAW

P.O.Box 3097
1396 LINDSAY LANE
MEADOWBROOK PA 19046
USA

Telex 283894 NIKVN UR

Phone 215-886-6244
~~215-886-6244~~
PHILADELPHIA PA

03-28-88

RE: "JOHN von NEUMANN -- AS SEEN BY HIS BROTHER"

E R R A T A

Please make the following corrections in your copy. They have already been incorporated in subsequent printings.

- p.17 3rd para. delete last sentence (from "Differentiating"
through "brothers")
- p.18 1st full para. delete last two sentences (from "Hebrew"
through "Testament")
- p.28 1st full para. line 8 delete "Francais"
substitute "Français"

Thank you.

N. A. V.

eq

DEDICATED TO THE MEMORY OF OUR PARENTS *

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1. INTRODUCTION

This is the preliminary version of my manuscript dealing with the formative years of my brother, John von Neumann. It covers or will cover relevant aspects of our childhood and young adulthood environment, and within it, the background of the evolution of John's philosophical, ethical, scientific and other related concepts -- to the extent that these concepts reappeared later in the work of the mature scientist, and to the extent of my observations as a witness, and by now one of the very few surviving witnesses of that early environment.

My reason for making available at this time this preliminary, not yet fully implemented, and somewhat unpolished and disorganized version, is the pressure of my other activities which do not allow me to spend on this project as much time as it would deserve. For the same reason, I have not yet included in this version the reproductions of available illustrations listed in Appendix F, nor all required translations of non-English citations. However, in due time I intend to publish also the revised, fully implemented and final version. At this time I have to be satisfied that at least the substance of my exclusive material is placed on record or at least is identified, for the benefit of interested historians of science.

Much of my material, including many of the photos and illustrations listed in Appendix F, is exclusive and cannot be obtained from any other source. This is so because it is I who have preserved, discovered or rediscovered it, or initiated its reproduction or reproduced, copyrighted or disclosed it for the first time under appropriate reservations. Thus it

may represent a potentially significant contribution to an overall comprehensive and intellectual biography of John von Neumann which may be written some day by a fully competent scientist-mathematician-biographer. Historians of science interested in this aspect are invited to contact me for the purpose of clarifying conditions for utilizing this material.

It is also my intention to secure that ultimately all of my relevant illustrations, reproductions or originals as listed, should be deposited for preservation or display in a library, reading room or other appropriate location of an academic institution. I am inviting parties interested also in this aspect to contact me for discussing further details.

My manuscript is not intended to be my autobiography or merely a collection of family souvenirs. I will try to avoid writing too much about myself, but if I fail in that respect, I would still have the satisfaction of having contributed also in this manner to the description of our early environment, and to the presentation of my perspective of JvN.

2. WHO WAS JOHN von NEUMANN

John von Neumann is generally known as a mathematician who had something to do with quantum mechanics, Los Alamos, computers, and theories of poker and economics. But he is not so well known (except to competent scholars) as a mathematician and mathematical physicist or as "the last representative of a once flourishing and numerous group, the great mathematicians who were equally at home in pure and applied mathematics and who throughout their careers maintained a steady production in both directions."²⁻¹ His incredible diversity and multiplicity of topics in many branches of mathematics, physics, economics, and other disciplines, covered sufficient contributions and subjects in each class alone to fill a lifetime career for any great scientist. "Furthermore, his contributions are not disjointed and separate remarks in these fields, but arise from a common point of view."²⁻² Generally speaking, his contributions are characterized by "an uncommon ability to organize and axiomatize complex situations that a priori do not seem amenable to mathematical treatment,"²⁻³ and by his conviction that empirical push to practical applications is required to save a scientist, particularly a mathematician, from becoming lost in pure or abstract fields,²⁻⁴ and that in some fields scientists can no longer carry on their research in isolated "ivory towers" without the need for "accounting for the possible uses of their discoveries."²⁻⁵

The foregoing is stated merely as a general introduction or reminder. It is not within the scope of my work to fully cover this angle. For a listing of other scientists' commentaries or analyses evaluating JvN's work, see Appendix A. For a bibliography of his works, see Appendix B.

3. WHO IS JvN

But JvN not only was, but also is. The longterm effects of his work and his lasting influence in science and education were foreseen by President Eisenhower in the course of the dialogue between him and John upon bestowing the Freedom Medal in a White House ceremony in 1956, on the occasion of one of John's last official appearances, at a time when there was no longer any doubt about the outcome of his illness:

JvN: I wish I could be around long enough to deserve this honor.

E: Oh yes, you will be with us for a long time.
We need you.

Of course, President Eisenhower was correct. JvN is and will remain with us for a long time.

This "non omnis moriar" approach of Horace was always also our fundamental philosophy of life, adopted in earliest family environment and reinforced as a guiding principle whenever an appropriate opportunity arose, such as, for instance, when reading Baron Joseph Eötvös's "Last Will and Testament": ". . . if my name survives, then the victory of my ideas, rather than a marble statue, should become my memorial..."³⁻¹

Of course, John succeeded in reducing to practice this principle to a much larger extent than others. One of his surviving ideas was incorporated in his message conveyed to new generations in the course of his appearances on the "Youth Wants To Know" TV series and on other occasions, to the effect that the study of science and technology subjects in high school, if not earlier, is a practical necessity, also because the evolution in these disciplines is so extensive that by the

time the student graduates, entirely new fields of applications, which could not have been foreseen, will be available and open to exploitation.

Generally speaking, the underlying structural features of John's works which survived and what made him great was not necessarily the genetic gift of his brain reflecting an incredible rapidity of his reasoning process and the incredible scope of his memory and power to recall, reorganize and associate. After all, "these features are ephemeral. Rather was the axiomatic method -- he got to the root of the matter by concentrating on the basic properties (axioms) from which all else follows. This method, at the same time, revealed to him the steps to follow to get from the foundations to the application."³⁻²

To some extent at least, some of the prerequisites or foundations for this feature can be traced to his early environment.

4. WHO AM I

Since I claim relevance of my childhood and young adulthood observations in the family environment, which are significant for the purposes of the history of science as they relate to John's biography, I may have to state also at least some of my credentials. I am JvN's youngest brother, grown up in the same family and historical environment of Hungary, also graduating (in 1928) from the same "famous" Lutheran Gimnasium in Budapest.⁴⁻¹ Brother Michael also graduated there in 1925. I visited the USA first in 1934 and immigrated in 1936, residing first in John's household in Princeton and commuting from there to my first job in New York, and subsequently moving to New York, various U.S. Army locations, Washington DC and ultimately to the Philadelphia area. I frequently visited Princeton also after my move from there, and met there in John's company some of his friends with such names as Einstein, Alexander, Lefschetz, Marshall Stone, ~~Sam~~ Bochner, Morgenstern, and others.

Under father's guidance I was educated in his profession as a lawyer, graduating with a Doctor of Juridical and Political Sciences from the University of Budapest and subsequently also with a Master of Comparative Law (American Practice) degree from George Washington University in Washington DC. Father's motive undoubtedly was to have his third son brought up in the same profession as his own, as one of his sons was already on the way to becoming a mathematician scientist, and the other (Michael) a mechanical (subsequently switching to electronic) engineer. However, I was subject to and influenced by the same multilingual, multidisciplinary and technological environment as the others.

For the benefit of those readers who might really be interested in details of my personal background which, after all, to some extent also reflects JvN's environment which is the principal subject of this book, my curriculum vitae is reproduced in Appendix G.

5. CENTRAL EUROPEAN HISTORY BACKGROUND

There are many publications available covering the cultural atmosphere and history background of Central Europe in the 19th and 20th century,⁵⁻¹ and the character of the wave of intellectual immigrants arriving in the U.S.A. from that environment. I will refer to these only in very general terms. However, I intend to cover in detail only those aspects which are most relevant for our purposes, about which not much is known or about which some inaccurate or misleading descriptions are in circulation. In any event, for our purposes, three principal periods are discernible:

- 5.1 - The post-"Ausgleich" era
- 5.2 - The First World War period
- 5.3 - The post-"Trianon" era

5.1 - THE POST-"AUSGLEICH" ERA

The 1867 Austro-Hungarian "Compromise" ("Ausgleich" or "Kiegyezés") established the foundations and a new approach for the "dual monarchy" in which Hungary became an "equal" partner. The Habsburg government in Vienna assumed more conciliatory attitudes, with more Hungarian statesmen assuming higher positions in Vienna. One side effect of this new and relatively "progressive" system was the attenuation of the until then official anti-semitism, and more emphatic recognition of the Jewish intelligentsia and business community in Hungary. To some extent, this environment resulted also in the "margittai" title of nobility conferred upon my father in 1913 by Francis Joseph, for merits earned in the field of Hungary's economy.

5.2 - THE FIRST WORLD WAR PERIOD

At home, as far as I could observe, the First World War atmosphere was relatively unemotional, hardly taking sides. Apparently this was in line with some then generally prevailing attitudes according to which Hungary can only lose: if the Central Powers lose, quite obviously dismemberment of the Habsburg system into its ethnic components will terminate Hungary's leading position (as it did happen); and if the Central Powers win, Hungary may become a satellite in a new German "empire." In this not very enthusiastic atmosphere, John followed on specially prepared and available war maps of all fronts, the daily reports of advances and retreats. He followed it objectively as a war correspondent or historian, hardly taking sides, but merely as a matter of historical events. Father's attitude was about the same and they jointly composed a ditty to the melody of one of the popular Schubert "Moments Musicaux": "Unsere Truppen stehen schon vor, Tarnopol, Tarnopol. Unsere Truppen sind keine Puppen, essen Suppen und nicht Kohl . . ." However, this was not a derogatory or sophisticated joke, but rather a sad commentary on a situation with no possible happy outcome.⁵⁻²

This relatively "neutral" attitude, incidentally, was also reflected in one of our games played by the children, this one under John's leadership, consisting of "battles" drawn symbolically or abstractly on graph paper, with castles, highways, fortifications, etc., represented by filling in or connecting the squares of the graph paper. The aim was to demonstrate and practice ancient strategies. There was no emotional content in assigning the role of participants in confrontation, or of the victors and the vanquished.

Of course, it should be noted at this point that Austro-Hungarian army units fought mostly on the eastern, and later also on the southern fronts. They were never in any contact with the armies of the three principal western allies, and

thus there was never any particularly emotional confrontation towards the west. On the contrary, our first English language teachers (Thompson, Blythe) were British subjects, interned in Vienna as "enemy aliens," who had no difficulties in having their place of "internment" officially moved to Budapest where life was considered more cheerful.

Somewhat in the same spirit, we had in our household and to some extent shared within grandfather's larger household as part of our language studies, one German-speaking "governess" from Germany, and one German and French-speaking from Alsace. The latter was emotionally and nationalistically French, refused to speak German and refused to associate with the German governess from Germany. We tried to bring them together onto talking terms as "quasi-neutrals" in a "quasi-neutral" atmosphere, but did not succeed. We could not quite understand why; they probably could not understand it either.

There was, nevertheless, at least one direct confrontation with the British Navy when an Austro-Hungarian naval unit under the command of Captain (not yet Admiral) Nicholas Horthy attempted to break out of the Adriatic into the Mediterranean. In the ensuing "battle" in the strait of Otranto with a British naval unit, Horthy got wounded but refused treatment, had himself tied to his command chair on the bridge, and withdrew only when -- according to the legend -- his British counterpart became incapacitated. Of course, we never really believed that the Austro-Hungarian navy would have had a chance in the Mediterranean controlled by the British Navy assisted by allied Japanese naval units. Perhaps this was a sideshow in coordination with a major German naval action elsewhere. After the war, Horthy and the commander of the British unit met and shook hands, complimenting each other on their respective gallantry.

5.3 - THE POST-"TRIANON" ERA

In the treaty of Trianon (1920) Hungary lost a substantial part of its territory with substantial ethnic Hungarian populations, which was a rather disturbing point in Hungarian-Western relations, never forgotten. According to Boroviceni's "Der König und sein Reichsverweser" and other sources, the allies "selected" Admiral Nicholas Horthy as the best candidate to fill the Regency, ~~and combat the Bolshevik revolution,~~ ^{and combat the Bolshevik revolution} because he was the only high ranking Hungarian officer speaking ~~French~~ ^{fluent} French and thus capable to participate in negotiations. Horthy ~~lived up to his obligation by putting down the Bolshevik revolution.~~ ^{lived up to his obligation by putting down the Bolshevik revolution.} He also ~~prevented the return of~~ prevented the return of Charles of Habsburg. Some "loyalist" or "monarchist" sentiment nevertheless remained in favor of Charles in his capacity as King of Hungary. After Charles' second attempt to return, he was delivered at the Allies' request to a British Navy vessel in the southern Danube, the escorting Hungarian Army officers still saluting him with a respectable farewell "Viszontlátásra." Charles died in exile in Lequieto on the island of Madeira.

However, in the economic and industrial revival of the 1920's, the western allies, having recognized the risks of leaving a vacuum in a defeated land, participated indirectly in reconstruction. From western allied surplus army equipment, Packard trucks with the well-known Packard front radiator curves, appeared as sanitation (watering) trucks on the streets of Budapest, and also former allied ambulances converted into units of the first post-war taxi fleet of Budapest. More significantly, western, mostly British, loans to finance industrial revival contributed to this process in the 1920's.

At the same time, however, too much criticism of the Trianon treaty was discouraged by the Allies, and Ferencz Herczeg's "Baba-Hu" had to be taken off the theatre repertory

at the request of the Allied embassies in Budapest. Later, however, Rothermere, in confrontation with Beaverbrook, sponsored the "Justice for Hungary" transatlantic flight . . . although no treaty revision ensued.

Father's association with the banking house of Adolf Kohner's Sons occurred in this period, after leaving his position as counsel and director of Magyar Jelzálog Hitelbank, which by then was past its golden age of its banking business. The transition was recorded in the following poem composed for this occasion by father:

"Leer gebrannt ist die Städte and gemein
the Forderung,
Als er der sie auferwäckte zu die
Kohnersöhne gung [sic]."

["The shop is burnt out and the liabilities are unbearable, as he who once revitalized it, transferred to Kohner's Sons." Play of words: "Gung" non-existing past tense in lieu of "ging," for sake of rhyme, and international telegram address "Kohnersöhne," lost in translation.]

The principal banking business of the bank was to finance the Hungarian industrial reconstruction with the aid of Western loans and German know-how.

The relationship with the forces of the "Little Entente" towards and at the end of the war was by no means so friendly. When Rumanian forces occupied Budapest and lined up trucks to carry away the art treasures of the museum in the Városliget, the curator of the museum called the American ^{member of the International} ~~Embassy, whose~~ ^{litary Commission,} ~~Embassy,~~ General Bandholz, ^{who} promptly appeared on the scene and ordered the Rumanian trucks removed. By strange coincidence, at the end of the second world war, American intervention again saved the art objects of the museum under somewhat similar circumstances -- and it also salvaged St. Stephen's "Holy Crown" and other crown jewels, which a special Hungarian army unit was protecting and moving west with the

retreating Nazi forces, but ultimately making them available to the U.S.A., where they were kept at Fort Knox until their ultimate return to Hungary.

In the context of a new but still relatively mild anti-semitism, it should be noted that in the 1920's, after John graduated from high school and assumed university studies, the atmosphere was not yet "prohibitive" (as it became later in 1930's and 1940's). Indeed, John got his Ph.D. in Mathematics at the University of Budapest (in addition to his chemical engineering degree from Zürich), notwithstanding "numerus clausus," and subsequently explained that if he had decided to remain in chemical engineering, then he would have returned to Budapest, but since he elected mathematics, the openings in Hungary were close to nil and so he remained in Germany. Of course, subsequently, he accepted the first USA invitation, explaining that the ratio of Privatdozents to available professorships in Germany was hopeless. Only by the later 1930's did he say and feel that the atmosphere in Europe is no longer appropriate for scholastic endeavors.

6. CHILDHOOD AND YOUNG ADULTHOOD MILIEU

This is a rather complex and extensive "milieu" in which age differentials and overlapping generations make it rather difficult for handling as a homogenous environment. Accordingly, for the sake of convenience, it will be handled in the following segments:

- 6.1 - The larger family milieu
- 6.2 - The immediate family milieu
- 6.3 - The religious milieu
- 6.4 - The Lutheran Gimnasium milieu
- 6.5 - The König Library

6.1 - THE LARGER FAMILY MILIEU

This consisted on mother's side of maternal grandfather (Jakab Kann)'s apartment house in Budapest at Váczikörút 62, renamed during World War I Vilmos császár-út 62 (after German Emperor William) and now Bajcsi-Zsilinszky-út 62, in honor of former member of parliament, leader of the anti-Nazi coalition and movement opposed to the alliance with Hitler's Germany, martyr of the Hungarian nationalist front, who was executed by the Hungarian Nazi (arrow cross) regime after a mock trial and illegal revocation of his parliamentary immunity. Without regard to these historical reflections of the changing street name, the apartment house was generally known and referred to as "62" as a symbol and original headquarters of grandfather's larger family. The five principal apartments were occupied by grandfather's and his four daughters' respective families. Grandfather's four daughters' families maintained at least one German and one French-speaking governess, occasionally sharing

them. This was considered a necessity for learning French and German from early childhood on, resulting from the recognition that it is a requirement for success in later life, since even a relatively short trip out of Budapest brought us in contact with other nations speaking other languages. Thus "62" symbolized also all cousins and second cousins in close friendship relationships, with informal contacts across the three floors of the building and beyond.

The apartment house around the corner at Báthory u. 16 also belonged to grandfather, some of its apartments also occupied by relatives. By strange coincidence, this house is now headquarters of the Hungarian John von Neumann Society for Computer Sciences. Summer months spent in Zugliget (suburban Budapest) in two summer cottages of grandfather, shared by all families.

On father's side our paternal grandfather Neumann Mihály born 1839, Ond near Szerencs, Zemplén m. in northern Hungary. Father had two sisters and the three sons -- and one half-brother, a K.u.K. lieutenant, who died in the 1919 influenza epidemic without family. Consequently, only the lines of three sons bear this Neumann name, which otherwise is extremely common in Central Europe.

Close friendly contacts and association between all, senior and junior generations, whether residing in "62" or elsewhere.

For family trees with more details see Appendix E.

6.2 - THE IMMEDIATE FAMILY MILIEU

This consisted of father, mother, John (b. 1903), Michael (b. 1907) and myself (b. 1911). Notwithstanding the age differentials, the relationships between the brothers was close. Of course, we considered John "merely" as a brother. He had at that time and also later the same typical attitude of human

warmth and friendliness, adapting to any situation, discussing any subject with interest; if it was his specialty, then reducing it to understandable levels for "laity," not necessarily with unlimited patience, but most certainly for 5-10 minutes in each case, and then quickly shifting to other subjects. Science subjects also discussed in this manner, whether taken from high school studies or otherwise. If at first I didn't understand all of it, I got an idea what it's all about, and when running into it later, it was already against some background and I was prepared for it.

Frequent guests for dinner or otherwise, including family friends such as Lipót Fejér, Rudolf Ortway, or B. Enyedi, and father's local business visitors, and also from England and Germany. From the business visitors, at relatively formal dinners, and from father's approach to them in the context of the activities of his banking house, we got introduced to the "secrets" of making business contacts and of management with executive powers in father's banking house. This was always discussed, just as all school subjects, and analyzed in terms of father's management of his activities through the means of delegating powers to his associates and staff. This ability was observed by all of us and so discussed, particularly by John. Indeed, John's ability to manage with executive and delegated powers, as reflected in his management of his "IAS 1952" computer project with all of its implications, can be traced to this early family environment.

Family unit also present when father took all of us along on some of his European business trips which were then combined with family vacation. In the early 1920's father acquired and rebuilt the summer home at Eötvös-út 15 (on "Svábhegy," now "Szabadsághegy," in suburban Budapest).

6.3 - THE RELIGIOUS MILIEU

Only maternal grandfather, Jakob Kann, observed meticulously the Jewish religion, ceremonials and services. But he didn't care about others' attitude in the family and their mixed marriages. Some of the great Jewish holidays were rather non-denominational family reunions.

When brother Michael raised question to father: "why don't we sincerely observe religion, and since we don't, why do we consider ourselves Jewish," father replied: "tradition."

In high school phase of religious education, we couldn't quite master the Hebrew script and thus had difficulties, although from Hungarian text and lectures, we retained the moral teachings of the Old Testament. [Differentiating habits (Friday evening service with hat on) irritated me -- and also my brothers.]

In Lutheran Gimnasium atmosphere we learned about the New Testament, "Our Father" prayer, etc. The Christmas tree and gifts were observed at home, and also the Christmas carols, and on such occasions the servants and the German governess, the true Christians, participated with us.

After father's death in 1929 we all converted to Catholicism for sake of convenience, not conviction. In this context, it is significant to observe that in last illness JvN was attended by Father Anselm (Benedictine monk), and various legends arose (and some later published) of John's conversion and second baptism. This was not quite as simple or correct. With our background it would have been inconceivable to turn overnight into a devout Catholic. The significance of said monk was that he had classical education and was therefore capable to converse with John on equal terms. This was extremely important at phase of illness when he became gradually detached from his governmental, scientific and academic environment to the intensity and pressure of which he was

accustomed. For Father Anselm's allocution pronounced at the obsequies of JvN on February 11, 1957, see Appendix D.

6.4 - THE LUTHERAN GIMNASIUM MILIEU

We all attended the Lutheran Gimnasium (Fasori Ág. Hitv. Ev. főgimnázium), a denominational high school of eight years, of highest reputation. All religions were admitted, although tuition fees were graduated along distance from reformation: Lutheran, other Protestants, Catholic, Jewish. The atmosphere was characterized by mutual tolerance. Religious education was separate for each: (1) Protestants under minister Berecki (his two sons were classmates of John and Michael, respectively, and the scholastic, social and friendship relationships were transdenominational). Morascher, the organist and music teacher, in first part of music instruction hour, practiced hymns for Protestant Sunday service. The others (Catholics and Jews) were supposed to sit back and write scales or harmony chords. However, I preferred to listen to and learn the hymns. I also learned "Our Father," with which every morning started, by merely listening to it. (2) Catholics, taught by visiting priest. Since there were very few, more than one class was combined and held at another time. Thus, Catholics had nothing to do during religion hour. (3) Jewish, taught by visiting rabbi in the same hour in another classroom. [Hebrew script, liturgy, other "differentiating" habits, irritated me. But from Hungarian translation I probably learned many moral teachings and ideas of Old Testament.]

Subjects highly scholastic: 8 years Latin, 4 years Greek, 1 year Hungarian history, and 2 years advanced at end, in between world history, geography, Hungarian and world literature, geography, very intensive, appeared to me dry but when exposed to real world later, I was prepared for it. Also

physics, math including calculus, analytical geometry, etc.

The famous students: Eugene Wigner (one class above John). Antal Doráti, in Michael's class. Outstanding teachers: Rácz (who "discovered" John's math talent). Galli (physical education; in winter season permitted us to go to nearby ice skating rink). Szolár (cited Gyóni "Cézár én nem megyek"). Kliment (Je prends le bien où je le trouve). Klaniczai (Ritka vendég rácz országban . . . Jankó Sibiniani). Serédi (ex-priest, "izraelita hittestvéreink"), etc.

6.5 - THE KÖNIG LIBRARY

Father read and acquired for the benefit of all, many books, and on one occasion bought from an estate (König) an entire library. He then had it installed in one of our rooms, by removing furnishings around its walls and ordering book-cases all around and up to the ceiling, which were then custom made by a cabinetmaker. This room then became known as the "König Library," although it was not limited to books from that acquisition. It then became and remained a significant center of family life and studies, not just a reading room.

Perhaps the most important (from John's point of view) item in this library was the 44 volume general history (Allgemeine Geschichte in Einzeldarstellungen) of the then and presumably now famous historian Wilhelm Oncken (1838-1905). John carefully and fully read one volume after the other, all forty-four, completely covering the set in due time, and reporting to the family circle from time to time some of his related comments and conclusions. It undoubtedly remained in his memory as a database and foundation of his future long term interest in history. Some of the most important world events of history he would discuss in more detail within the family circle, after having consumed and digested them from Oncken. Thus I recall that I learned from him (among many

other subjects) on the occasion of one of these "lectures," and long before I learned it in school or from my later travels, the reasons for Brazil being a Portuguese-speaking country, as distinguished from Spanish South America.

My own browsing through this library was of course less organized, not aimed at specific goals, but rather based on random searches (in my case mostly for poems), relying on the principle of serendipity, and I then also contributed at least some initiative for presenting a subject now and then for the family discussions and for placing on record the underlying philosophy of the respective poet. And so I "discovered" Sully Prudhomme (*Le meilleur moment des amours n'est pas quand on a dit "Je t'aime."* Il est dans le silence même à demi rompu tous les jours. Il est dans les intelligences promptes et furtives des coeurs, dans les feintes rigeurs et secrètes indulgences. Il est dans le frisson du bras où se pose la main qui tremble, dans la page qu'on tourne ensemble et que pourtant on ne lit pas. Heure unique, où la bouche close par sa pudeur s'en dit tant, où le coeur s'ouvre en éclatant tout bas comme un bouton de rose. Où le parfum seul des cheveux parait une faveur conquise, heure de la tendresse exquise où les respects sont des aveux.) Such texts of poems were also repeated and discussed in the family circle and analyzed. In this instance, we compared it with the less sophisticated ditty of the day representing the opposite idea: "Parlez moi d'amour . . . pourvu que toujours vous répétiez ces mots suprêmes: Je vous aime."

I also "discovered" and submitted for joint analysis of its deeper meaning, János Vajda (*Mint a Mont Blanc csucsán a jég minek nem árt se nap, se szél, csöndes szivem többé nem ég. Nem bántja újabb szenvedély. Körültem csillagmiriád versenyt kacérkodik, ragyog, fejemre szórja sugarát. Azért még föl nem olvadok. De néha csöndes éjszakán elálmodozva*

egyedül, mult ifjuság tündér taván hattyúi képed fölmerül. És akkor még szivem kigyúl mint hosszú téli éjjelen Mont Blanc örök hava ha túl a fölkelő nap megjelen). This was of course Vajda's "Gina Emléke -- Húsz év múlva" (Memory of Gina -- after twenty years). Time marches on. By now a multiple of twenty years has passed. If at this point I am venting too many of my personal emotions, my excuse is that all of this poetry was at that time also the subject matter of family discussions. Thus it describes or characterizes indirectly the general environment in which John also participated. Of course, I can now quote only those poems which I happened to memorize, I hope correctly. But there were many more.

And let me now continue in this spirit and state that I also "discovered" and submitted to family discussion Heinrich Heine (In den abendlichen Mondschein wandelt de Alkaden Tochter. Pauken and Trompeten Jubel klingt herunter von dem Schlosse. "Überlästig werden mir die Tänze and die süßen Schmeichelworte, und die Ritter die so zierlich mich vergleichen mit der Sonne. Überlästig wird mir alles seit ich sah im Strahl des Mondes jenen Ritter dessen Laute nächtlich mich ans Fenster lockte. Als er stand so stark und mutig und die Augen blitzend schossen aus dem edelblassen Ansicht, glich er wahrlich Sankt Georgen." . . . "Horch, da ruft es mich, Geliebter. Doch bevor wir trennen sollst Du nennen deinen süßen Namen den so lang Du mir verborgen." Und der Ritter zärtlich kosend küsst die Hände seiner Donna, und die Lippen und die Stirne und er spricht sodann die Worte: "Ich, Señora, eu'r Geliebter binn der Sohn des vielgelobten grossen schriftgelehrten Rabbi Israel von Saragossa.") Needless to say, the family discussion and analysis of Heine's "Donna Klara" centered around Heine's criticism of anti-semitism. And apropos of Heine's famous criticisms, we also were reminded at this time of his views of the 1849 events (Austrian suppression of

the Hungarian revolt): "Wenn ich den Namen Ungarn hör', da wird mein deutscher Wams mir eng."

I also discovered and we then discussed the *Lusíadas* of Camões, at that time only in translation and also as part of our high school studies, but much later I verified and memorized some of it in the original when I acquired a good knowledge of the Portuguese language (*As filhas do Mondego a morte escura longo tempo chorando memoraram, e por memória eterna em fonte pura as lágrimas choradas transformaram. O nome lhe puseram que inda dura: Os amôres de Inês que ali passaram. Vede que fresca fonte rega as flores, que lágrimas sao a água e o nome "Amôres"*). Much later on a trip to Portugal I could not resist the temptation to visit also Coimbra and verify all this. Of course, the tragic story of Inês de Castro and her Pedro was already in our early environment well known to John.

There were many more, and always subject to family discussion. Of course, father was an amateur poet and so the observation that poetry conveys not only emotions but also philosophical ideas, and very efficiently indeed, was often placed on record. And that poetry is a language within a language . . . again an idea traceable to John's future speculations on computer and brain languages. As to father's amateur poetry, some of them were mentioned in this manuscript, but more are available, in both Hungarian and German. They are mostly on the humorous side, but always with a message.

7. FATHER'S INFLUENCE

Father believed in the life of the mind. At the dinner table he would often talk about what was happening in the world. This resulted in the joke introduced by John upon someone's arrival: "What's new in the universe?" (Mi ujság a világegyetemben?) -- "I don't know. I'm not coming from there." Generally, father's ideas and subjects were presented and discussed "around the dinner table." This included also the "lunch table," since it was still customary at that time for the entire family to gather for a relatively full and lengthy lunch, after which we returned to our respective job, work or studies until dinner time in the late evening hours.

"Around-the-dinner table" we listened frequently also to father's comments on his own profession and business activities (as a lawyer and banker engaged in industrial financing and credit extensions) and the theoretical foundations of his profession in that field, i.e., financial statement analysis and basic credit qualifications, and also their practical applications, i.e., how to select investment possibilities, how to evaluate borrowers, etc. The social responsibility of professionals involved in this context was also discussed, in the sense that it called for selection of industrial projects worthy of sponsoring.

Although these discussions were of a general nature, John introduced the suggestion to apply all this by analogy also to other professions. Thus we have here some background for John's later ideas expressed on his field of pure v. applied mathematics, to introduce "empirical rejuvenation"⁷⁻¹ to abstract practices, yet taking advantage at the same time also

of "laissez faire" and serendipity leading to new and strange results.⁷⁻²

Father also deemed it necessary to demonstrate at home some practical examples of where the industrial applications of financing can lead, e.g., if these activities involved financing of a newspaper enterprise, the discussion was about the printing press and he brought home and demonstrated samples of typesetting types. Or if it was a textile enterprise, e.g., the "Hungaria Jacquard Textile Weaving Factory," the discussion centered around the Jacquard automatic loom. It probably does not take much imagination to trace this experience to John's later interest in punched cards!

Another example: father's banking house financed (among others) a theater chain (Unió Színházak), which led to discussions of potential conflict between the artistic desires of the stage, on the one hand, and the needs of the ticket office and the financiers on the other. But it also brought all of us closer to the theater performances, including premières, and more specifically the plays of Ferencz Molnár, the role of Max Reinhart in Vienna, etc.

Entertaining father's business associates and their foreign contacts and visitors at dinner at home resulted in a better understanding for all of us of international trade and financing practices.

Preservation of the Hungarian cultural heritage, as reflected in literature, sciences and history, was also a theme frequently discussed by father, with the participation of all, but particularly John, whose interests were open in all directions of world history, but particularly in the direction of historical questions of Hungary, in the context of Central Europe and the rest of Europe and the world.

Indeed, in subsequent discussions within the Princeton social milieu of the 1930/1940's, John observed and frequently

commented on the general lack of knowledge about Hungary, and he criticized the oversimplification or stereotyping of western-central-eastern-balkan Europe classifications. He then would emphasize that you cannot judge nations out of context, without recognizing relationships of interdependence. He also delivered "lectures" on history of Hungary from House of Árpád on through Finno-ugrian linguistics. Also in Princeton social and science milieu, he frequently "preached" on historical Hungarian scientists, e.g., in context of non-Euclidian geometry he always added Bolyai to Riemann and Lobachevsky, or else he mentioned Bolyai first. In social conversations, when others appeared to be surprised at the great number of famous Hungarians, he would very seriously explain: "Oh yes, indeed, not only great Hollywood names, such as Lukács Pál or Bánky Vilma, but (smiling) also Liszt or Semmelweiss, and even (more emphatically smiling towards his colleagues) two Bolyais or two Eötvöses."

Also within the scope of father's philosophy on preserving the Hungarian heritage was his title of nobility: margittai (of/von/de Margitta) received from Francis Joseph in 1913 in recognition of his merits and successes in the field of economy (see Appendix F for reproductions of granting document and coat of arms). Father consistently refused to change his name "Neumann" to a "better" sounding Hungarian name, as it was done sometimes by some persons, but retained his original as a matter of pride and tradition. On the other hand, he always added the nobility title as "margittai Neumann." This was confirmed by John and had its effect also on his subsequent usage of that name, as e.g., in his early Zürich University correspondence and registration documents which refer to "Johann Neumann von Margitta." Subsequently, German language publishers introduced the German linguistic habit of "von Neumann," omitting the title as such.

Perhaps most significant in the context of JvN's career was father's attitude in taking very seriously and recognizing the significance of the recommendations of John's first high school (Lutheran Gimnasium) math teacher. Prof. Rácz, who "discovered" or recognized John's math talent, called father and warned him against the potential abuse of the child prodigy's talents. On the practical side, Rácz then advised him of the merits of providing John with a special math study program and initiated for this purpose a meeting and discussion with Prof. Kúrschák of the Budapest University.

8. MOTHER'S INFLUENCE

Mother believed in the life of music, art and related elegance. Elegance not in the sense of fashionable dressing, but rather the then contemporary artistic taste as displayed or practiced (among others) by portrait photographers. This can be noticed at the posture or position of hands in the family portraits (Appendix F). Undoubtedly, this concept of elegance reappeared later -- by analogy -- in John's references to elegance in mathematical proofs or proceedings.

From mother we also learned the significance of "doing the impossible," in the context of her telling us about her father, our maternal grandfather, Jacob Kann, who came from an unknown environment in Óbuda (a northwestern district of Budapest), starting out with nothing as a poor boy, and creating ultimately a very successful business enterprise (KH). Thus, "doing the impossible" became a subject matter of discussion, in this context, and also in the context of our discussions of and reading the books on the great explorers, including Shackleton who was referred to by his contemporaries with the adage ". . . and if it is impossible, then leave it up to Shackleton." By analogy, we may find a trace of this in John's later works characterized by Dieudonné with the comment that one of John's specialties was to find mathematical solutions to problems which "a priori did not seem amenable to mathematical treatment."8-1

From mother we also learned many events of history, some of which she recalled from newspaper headlines. Examples:

In the context of the Dreyfus Affair, mother recalled,

and frequently mentioned that when Dreyfus received a new trial at the proceedings at Rennes (1898-1899), the general expectation was not just a reduced sentence and a pardon but complete exoneration. In this expectation, an editorial headline: "A hirt Rennesbol én lesem" (I can hardly wait for the news from Rennes). But the disappointment was then expressed by a last minute addition before going to the press: "Lesheted már édesem" (You might as well wait for it). Only 1906 brought the complete exoneration. However, the subject matter, in the context of antisemitism and the then prevailing political situation in France, was discussed around the dinner table for many many years (reaching the years of my observational capacity), always introduced by mother quoting the above editorial headlines.

Mother also quoted frequently, long before we learned it in school or from the König Library, Heinrich Heine's lines in criticism of the Austrian suppression of the Hungarian revolt of 1848/1849: "Wenn ich den Namen Ungarn höre, da wird mein deutscher Wams mir eng." Other quotations: Inscription of Napoleon's tomb in the Hôtel des Invalides in Paris: "Je desire que mes cendres reposent au bord de la Seine, au milieu de ce peuple Français que j'ai tant aimé." -- From an obituary published upon the assassination of Francis Ferdinand at Sarajevo in 1914, referring to him as the "agg uralkodó" (the old sovereign) -- quite obviously utilizing a pre-prepared obituary of Francis Joseph, without making in it the required correction.

Thus many discussions on history within the family circle leading to the most active participation of John were initiated or introduced by mother's citations. But she also contributed to our education in the musical arts, by frequently singing such melody fragments as for instance, "Mert ez a

szerelemnek örök ígéje" from Offenbach's Hofmann or "emlékeinket felujitni, uram ne is kísértse meg, mert amit egyszer elfeledtünk, mintha nem is történt volna meg" from Hervé's Lily. The respective implications of these and other lines were of course also subject to analysis and discussion, quite apart from the melodies.

9. SCIENCE AND OTHER SUBJECTS DISCUSSED IN FAMILY CIRCLE

Current political events, all science or pre-science subjects, high school and higher educational topics, music, literature, theater, etc. -- were continuously discussed in family environment, around the dinner table with parents, and also in the broader family environment. John loved to participate in these. If the subject was his specialty (science), and above the heads of or too advanced for the others, he adapted himself to their level and explained, as required, the problem in appropriately simplified terms on lower levels. Maybe his patience in that respect was not unlimited, but he always started or initiated that phase and stuck to it for at least a few minutes before switching to other subjects. His memory and unlimited scope of universal interests was amazing. At that time we probably did not attach any further significance to this, nor did we evaluate or even could have evaluated the incredible multiplicity and diversification of the innumerable subjects so discussed. But later, perhaps decades later, many of these subjects reappeared in his scientific work (directly, or in the background), and he had no difficulty in recovering these or related ideas from his memory as they became relevant in specific instances.

His almost unlimited memory and scope of interest was reflected also in frequent complaints of his high school ("Gimnasium") teachers to the effect that when he was asked what the assignment was for today, he did not know; but he then participated in discussions with full competence and knowledge of the subject. In other words, he did not bother to follow up assigned tasks as such. Indeed, my recollection

of his later years of high school ("Gimnasium") is that he came home after school (2 p.m.), stood at his desk for a few minutes, reviewing his books, and that finished his homework!

Examples of subjects so discussed follow with an indication, where appropriate, of the ultimate context.

From high school we recalled, perhaps erroneously, that the light-sensitive receptors on the retina perform exactly the same function as the silver grains on photo-negative film, so that a complete and fully detailed picture is projected onto the retina which is then visualized as such (although upside down, but then we get used to that and imaginatively reverse it). John explained with excited interest that this is not quite so, because the retina merely takes samples which are then processed along nerve paths exiting through the eye as the optic nerve, etc. And then he further explained the amazing fact that whereas on man-made panels the wire bundles exit toward the rear, on the retina they exit forward before bending back in a completely transparent medium, etc. Ultimate context: CNS circuitry compared with that of artificial automata.

Other example of subjects discussed, ultimately leading to some central nervous system context of his later work: We learn to ride and balance on the bicycle, a most complicated procedure, through a subconscious and involuntary process. When planning a literary work or equivalent project, we perceive several independent and as yet not connected ideas emerging like isolated islands from a sea of subconscious information, long before they can be connected. Single channel or linear input to ear contrasted with multi-channel or area input to eye; but this may be misleading, since cochlea is not necessarily recording merely a sequence of changing frequencies, but may record also overall wave form, or other incidentals of the sound waves and sound world around us. The big reptiles must have had sub-brain-centers near

their giant leg joints in order to operate them. Hungarian babies learn the Hungarian language with same ease with which Japanese babies learn Japanese; what is then the brain's primary language?

Discussion of Pirandello's plays, "Six Characters" and "Henry IV" etc. in the 1920s. Pirandello's clash of several reality levels, or overlapping fields of illusion and reality, incomprehensible (to me, at least) at that time. But from these John preached the basic concepts of a then new and primitive cognitive and perception psychology. This also leads to CNS context and involved his related joke: proscenium is interface between illusion and reality, but not any more by some modern playwrights or directors.

Example for logic context: at dinner table we apologize for some minor infraction of family discipline, by confessing: "I admit that I am a liar." This then followed by discussion of paradox and rigorous logic. In the same spirit, his joke: if God is all-powerful, can He create such a big stone which He Himself could not move?

Prize contest in a magazine: Who wrote this: "They know this well my baron and my men / Gascony, England, Normandy, Poitou, / That I had never follower so low / Whom I would leave in prison for my gain. / I say this not as a reproach to them, / But prisoner I am." Since I did not know the answer, I asked John:

N: Who wrote this?

J: (without hesitation) Richard Coeur de Lion.

N: Do you know this poem?

J: No.

N: Did you ever hear it?

J: No.

N: Then how did you know the poet?

J: "Very simple. Gascony, England, Normandy and Poitou were in one feudal hand only during the early Plantagenets,

and from there it was quite easy to associate with Richard's crusades and European captivity. But of course, this is a translation. Quite obviously, the early Plantagenets spoke Norman (Medieval) French." --- Context: axiomatic deduction. I found out later that the translation is that of Henry Adams, and that the "Prison Song" is only one of Richard's many and most perfect poems, usually referred to as gems of English literature!

The "Titanic" catastrophe remained in the headlines for many years, particularly after details of the USA Senate and British Board of Trade investigations became better known. I got quite excited about the argument that if only one of the many contributing factors had not occurred, then the tragedy could have been averted. John assured me that my if only approach is unreasonable and that I should relax. What I should say is: if another random set of circumstances had existed; and then some of them would have been worse (trade First Officer Murdoch's in-the-retrospect-erroneous order "hard astarboard, full speed astern" for a high wind or storm), and none of the lifeboats could have been lowered!

The "Titanic" also involved discussion of a broader moral issue: responsibility for training persons in command positions in how to behave in situations of stress or panic. Indirectly, this also has CNS context. However, at that time our discussion was limited to such questions as who would have been responsible for training First Officer Murdoch in high speed maneuvering; who would have been responsible for equipping the ship with the additional lifeboats for which the davits were designed; responsibility for "Californian"'s Captain Lord's failure to order his radio operator on the air at first sighting of distress signals (accompanied by detailed analysis of the question whether the "Californian" could have arrived on the spot in time to be of help); was J. P. Morgan in any way responsible in his capacity as sponsor, organizer,

and financier of International Mercantile Marine, owners of both the "Titanic"'s White Star Line and the "Californian"'s Leyland Line; etc., etc.

Context: music. John was generally but not justifiably referred to as completely non-musical (botfülu) and not a lover of music, if not antagonistic to music. But this was not quite correct. Undoubtedly, he lacked the interest or patience to attend concerts or to listen to phonograph or, later, to radio music. When forced to play piano and practice for the next lesson, it was noted that he played continuously the simple scales -- reading a book on the music stand. But he did "sing" melodies or ditties and he did recall major themes from popular operas.

I was a more active concert-goer and in this context maintained and kept at home -- among others -- a handbook edition of Beethoven symphony scores. He looked at it, presumably seeing orchestral score for the first time, and then asked why some instruments are written with different key signatures; in other words, he promptly noticed that the key designations are different for some transposing instruments. We then also discussed that Bach's "Kunst der Fuge" (Art of the Fugue) was written in a score for several voices without designating the individual instruments. This was then followed by a general discussion of establishing ideas in abstract without immediate practical application -- in other words, visualizing the non-existent, or not yet existent. Decades later I was reminded of this in a somewhat analogous context when he described the "IAS 1952" as not a production tool, but rather a research tool or prototype for electronic components not yet existing.⁹⁻¹

Occasionally, "mini lectures" for the family circle were initiated by outside events. As an example, although from a much later period, in the early 1930's during a brief visit to Budapest, John delivered one of the famous "Ortvay Colloquium"

lectures⁹⁻² at the University of Budapest, on Dirac's then new theory of light. I attended but did not understand. Shortly thereafter, John delivered his customary "mini lecture" to the family circle, explaining in down-to-earth style at least what it was all about, and on that level we did comprehend what it was all about.

It should be noted here that even during the earlier periods, Rudolf Ortway, Director of the Theoretical Physics Institute of the University of Budapest was and remained a good friend of John, although his senior, who appeared also frequently in the family circle as a friend of the family. The friendship continued, later also by transatlantic correspondence, until the tragic events of the 1930/1940's.⁹⁻³

But back to the early environment. Science subjects were not only discussed, but also demonstrated in laboratory experiments at home, without a laboratory. I recall very well when John and Michael dropped a piece of sodium into a glass of water, happily observing the resulting vehement reaction, and then drinking or at least tasting the end product -- followed by an emergency consultation with our family physician.

Unauthorized "laboratory" experiments were performed as a matter of family routine also by brother Michael when he replaced our obsolete 6 circuit electrical fuse panel with a single united fuse parallel with an incandescent lamp to indicate a short circuit. The next day this was replaced by a licensed electrician with a then modern fuse board. I was not much behind him, and installed an additional 110 V outlet in our bedroom, using an old, damaged and frayed bell wire of considerable length. This was also replaced quickly by the licensed electrician. At that time all of this was merely one manifestation of the family's R & D fever. In due time, Michael learned the electrician's trade at the University of Technology in Budapest during his engineering curriculum. And I learned about various national and local electric codes in

my several Law School curricula.

In addition to Rudolf Ortway, Lipót Fejér, professor of mathematics at University of Budapest under whom John wrote his dissertation and obtained his Ph.D. in mathematics, was also a frequent visitor and family friend. And so was Sándor Ferenczi, one of the "big 5" associates of Freud, who introduced psychoanalysis in Hungary.

Ferenczi was a close relative (see Family Tree in Appendix E) and member of the family circle also in that capacity. As a result, discussions about Freud and psychoanalysis were among the subjects frequently encountered "around the dinner table." Undoubtedly this also led to John's interest and subsequent work on the central nervous system, decades later. This conclusion was expressed quite recently and quite constructively and positively by Prof. Lynn Nadel of the Department of Cognitive Science of the University of Arizona in a presentation (in response to my remark on Ferenczi in the von Neumann household), somewhat as follows: "A sketchy evolution of John's ideas on this subject may be traced along these lines: ^{Freudian inhibitions →} JvN's speculations about analog processing in the brain → current thinking about role of hippocampal function as a 'parallel distributed processor' much like the analog processor noted by JvN → facts about the development of the hippocampal formation which raise the possibility that its unusual postnatal maturation might account for the kinds of phenomena first described by Freud."⁹⁻⁴

And now my last recollection of JvN's early comments in context of cognitive or perception psychology at the introduction of the first talking movies: the spoken words appear to come from the mouth of the actor, even though quite obviously the loudspeakers are placed behind the screen or elsewhere in the theatre in quite different locations. This was not a major discovery, but most certainly an important example of JvN's general interests and analytical faculty.

Somewhat later, initiative to discuss science subjects was offered through Michael's reports on his engineering studies. For example, on one occasion Michael reported the following humorous comment from his university's annual fun magazine: "From a lecture by the famous professor⁹⁻⁵ in structural engineering: And the safety factors should be selected so that, if only possible, the bridge should not collapse even once during its first five years of use." Naturally this was amidst discussion of the industrial and financial problem of side effects resulting from multiplying basic safety specifications by a factor of 5, or by 10, or 100, etc., involving also John's comments on statistics and probability, to the effect that, why, of course, one can always secure 100% probability from statistical formulae, but then the spread of ranges and expenses become prohibitive.

Some examples for science subjects presented by John in the early environment in a humorous manner, although with a very serious intent were based on a play of words in Hungarian, which would be lost in an English translation:

"Mindazon halmazok halmazára melyek önmagukat nem tartalmazzák" (Context: set theory)

"Mint szállnak a légtérben a zól karikák (Context: organic chemistry).

10. JOKES NARRATED AND ANALYZED IN FAMILY CIRCLE

John loved to tell jokes in his pleasant raconteur-ian narrative fashion. These were not jokes which he made up, but rather jokes which he heard elsewhere and memorized for presentation in due time in the family circle, which was then followed by a discussion and analysis of the issues involved. The aim was not necessarily entertainment or showing off or enjoying being in the spotlight. On the contrary, at least one principal aim was to analyze or discuss after the presentation the deeper, hidden meanings of the joke, its message, or the subconsciously recorded and then exposed hidden implications. And of course, some sense of humor and an atmosphere of comedy always helped to convey serious messages or critiques which otherwise would not be appreciated. In this spirit I am now going to repeat some of his favorite jokes -- not for the entertainment of my readers, but for the benefit of better describing the atmosphere of our early environment. In some instances I will indicate the context or future relevance of the joke, its message, and of the public discussion which followed, although in most instances this would be obvious in any event.

Francis Joseph walking in Prater, Vienna's famous big public park, with an aide on a warm early spring afternoon. Couples sitting on, under and behind benches, in and behind shrubbery, in each others' arms and tender embraces. His majesty looks around with astonishment and finally asks his aide what these young people are doing. The aide turns to his majesty's ear and in a low voice gives the answer -- such low voice that others could not hear it and history could not

record it. His majesty, in turn, looks around once more with astonishment, and says with an expression of bewilderment: "Also machen das die Leute noch!" ("So it's still being done!") (Context: FJ's alleged senility at the time of the outbreak of World War I.)

Berlin street scene, World War I: man at corner yelling repeatedly: "The Kaiser is an idiot." Out of nowhere two police agents appear and arrest him for high treason. "But I was referring to the Austrian Kaiser, not to our Kaiser." "You can't fool us! We know who the idiot is." (Context: Political science and semantic ambiguities.)

At a German trade fair, introduction: "Sigmund Platz aus Lübeck." "Vielleicht der Bruder vom berühmten Markus Platz aus Venedig?" (Context: Semantic ambiguities.)

Sears Roebuck mail order department, in response to a toilet paper order, requests reference to catalogue order number. Customer replies: "Gentlemen, if I had your catalogue I wouldn't have placed my order." (Context: modern marketing techniques.)

Young woman at a store's cashier who rejects her \$5 note for being a counterfeit: "My goodness. I've been raped!" (Context: criticism of defense strategies in rape cases relying on victims' alleged promiscuity, but ignoring assault and injury aspects.)

Telephone rings early morning in big law office: "Shapiro, Shapiro, Shapiro, Shapiro & Shapiro." "May I speak to Mr. Shapiro." "I'm sorry, Mr. Shapiro is in conference and cannot be disturbed." "Then may I speak to Mr. Shapiro." "I'm sorry, but Mr. Shapiro is out of town and will not be back for another week." "Then may I speak to Mr. Shapiro." "I'm sorry but it is Mr. Shapiro with whom Mr. Shapiro is in conference and cannot be disturbed either." "Then may I speak to Mr. Shapiro." "I'm sorry, but Mr. Shapiro is in court today and will not return until late afternoon." "Ah well,

then let me speak to Mr. Shapiro." "This is Mr. Shapiro speaking. What can I do for you?" (Context: criticism of law office pomposity.)

Senior law partner leaves on Florida vacation, instructing junior partner to attend to an important trial coming up and to promptly notify him of result. A week or so later Senior receives telegram: "Justice has prevailed." Thereupon he nervously rushes to hotel desk and sends reply: "Appeal immediately." (Context: criticism of law practice morality.)

Board of Directors meeting in the jungle: Lion (loud and boasting): "I am Leo, King of the jungle -- why are you so meek and weak?" Little Mouse (squeaking): "Because I have a bad cold." (Context: subjective or relative points of view.)

In the jungles of a recently discovered continent, an explorer (E) assisted by an Interpreter (I) interviews the local native chief (C):

E: Ask him how he feels about visitors from other continents.

I: (To C in the local language) ---

C: Krp.

I: He says that although they had no preceding experience with such visitors, they would consider it a distinct advantage to get acquainted with some of them. Not necessarily for the sake of friendship, but rather for the purpose of exploiting mutually beneficial barter trade agreements. For this purpose their principal potential export products could be

E: Now ask him if he would accept from us this gift which we brought along, as a token of our friendship and good intentions.

I: (To C in local language) ---

C: Klp dlvo wktli bba frtl nokvrt Dlkmok prstilqu krtkvk clfnxi tinv crx pdmkl

I: He says, yes.

(Context: primary and secondary languages.)

Come to us for dinner next Saturday.

Awful sorry, but we already have another engagement.

Well then, one week from next Saturday.

Awful sorry, but we will be out of town to attend a big wedding.

Well, then, two weeks from next Saturday.

Awful sorry, but will have to attend one of our nephew's graduation

Well then, N-1 weeks from next Saturday.

Awful sorry, but will have to attend a business convention out of town.

Well then, N weeks from next Saturday.

Awful sorry, but we will have to attend a funeral.

(Context: critique of social etiquette.)

In the USA: Anything is permitted which is not explicitly prohibited.

In Germany of the Prussian tradition: Anything is prohibited which is not explicitly permitted.

In France: Anything is permitted which is explicitly prohibited.

(Context: national moralities.)

Divorce lawyer (L) interviews client, a wife (W) who desires to prevent husband from obtaining divorce.

L: You say that you wish to continue and maintain your happy marriage, but your husband claims that that is impossible and that he intends to obtain divorce. Now let me see. For how long have you been married?

W: Five years.

L: Any children?

W: Yes. Two.

L: Hm. (He gets up, walks to bookcase, pulls out a few big volumes, turns pages and then returns.) Well I guess I have another appointment in about ten minutes, so why don't you come back tomorrow morning.

Next morning:

L: Ah yes, the wife who seeks protection against husband's attempts to obtain divorce. Now you said you had two children. What then is your husband's attitude? Why does he want to disturb the family unit?

W: He says that we cannot agree on the religious education of our children, since he is a Protestant and I am Catholic.

L: Hm. (He gets up, walks to bookcase, pulls out a few big volumes, turns pages and then returns.) Well I guess I have soon another appointment. Why don't you come back tomorrow morning?

Next morning:

L: Ah yes, the wife who seeks protection against husband's attempts to obtain divorce.

...
...

L: Hm. (He gets up, walks to bookcase, pulls out a few big volumes, turns pages, and then discovers among bulging pages his eyeglasses which were obviously forgotten there some time ago. He picks up and puts on his eyeglasses, returns, looks over his client carefully observing her face and features and says:) Well, I guess he is quite right. I'm afraid I can't help you.

(Context: critique of law office pomposity.)

After a formal wedding ceremony in September, the newly wed couple's first baby is born in January. In the hospital nursery, baby looks out through window and observes heavy snow

falling, and pedestrians walking in fur coats and shivering.
Baby speaks: "Rather cold for June." (Context: critique of
social etiquette.)

Many more available. Some not fit to print, but always
presented in good taste.

11. SUMMARY OF CONCEPTS IDENTIFIED IN EARLY ENVIRONMENT AND TRACED TO MATURE SCIENTIST

In the final fully implemented version of my manuscript the specific traits identified in preceding chapters as evolved, motivated, introduced or recognized in the childhood and early adulthood, family and school environment will be listed and traced at the other end of their evolution as they appeared in the background of or as expressed explicitly in the work of the mature scientist. This tracing will be in two directions.

First, to the underlying overall, common and joint characteristics of JvN's achievements and subjects in his scientific work, such as e.g.: logic, axiomatization, formalization; widely diversified and multidisciplinary interests, powerful memory, power to analyze his way to essence of any situation, inspiration from empirics; abstract/pure v. applied/empirical subjects; elegance and grace in style; search for new ideas and heuristic insights.

Second, to JvN's relevant ideas as explicitly expressed in his speeches, articles or public statements or letters addressed primarily to non-mathematician audiences, in non-technical terms. A partial listing of these is in Appendix C.

As in all other instances where my present manuscript is incomplete or unimplemented and where I promised full details to be published in the final version, I will remain at the disposal of researchers and historians of science to supply, under appropriate circumstances, the missing links also prior to the final publication.

12. MISLEADING LEGENDS AND ANECDOTES

There are many erroneous data in circulation about JvN, and also many legends and anecdotes which are not necessarily based on facts. From the point of view of the history of science, this is probably irrelevant. However, from the point of view of objectivity to be employed by future biographers, some of these may be misleading. For this reason, the problem is probably compounded by the fact that JvN, having passed away at a relatively young age, did not have the opportunity to write his own autobiography as many other scientists did, and thus there is not much reliable firsthand information available concerning early environment and personal philosophies and real human character.

To be sure, much biographical material has already been published about John, and his contemporaries and associates published several objective and purely scientific evaluations of his work. Although not all of these are easily available and many are already out of print, interested scholars and competent researchers could most certainly locate these (see Appendix A) and also several bibliographies of his works (see Appendix B). However, the early environment and human character of John may not have been adequately covered because the respective writer may have had to rely frequently on irrelevant or misleading legends or anecdotes, or would have had to cover events at which he was not present and with respect to which he had no access to direct sources of reliable information.

Of course, some of John's articles, speeches or public statements addressed to non-mathematical audiences (see Appen-

dix C) survive, although most of them are out-of-print and not generally known. And yet these too could throw more light on these aspects and discredit some of the erroneous legends.

To correct the erroneous data published may involve the risk of merely calling undeserved attention to those which otherwise would have passed unnoticed. To discredit the erroneous or unfounded legends or anecdotes involves the risk of losing an appeal to a layer of audience whose attention could not be aroused otherwise, although professional historians of science would know how to discount these. Nevertheless, in the interest of objectivity and for the benefit of future biographers I will now try to straighten out at least some of the most relevant errors published or in circulation.

First of all, several erroneous personal or family data, and also erroneous or misleading historical facts concerning the events of 1919 in Hungary have been published or circulated by John's post-1930 associates without any citation of their sources or merely citing other such associates who in turn did not cite any reliable sources for events or data related to events of which they were not direct witnesses and at which they could not possibly have been present. I will not include these in my present text, but I am planning to cover these in the next revised and fully implemented version, and in any event I am prepared under appropriate circumstances to discuss these with interested biographers or potential biographers. However, I will refer at this point to a few of the most significantly and conspicuously erroneous items involved.

The so-called "Mauchly-Eckert Affair" and related accusations are, of course, among these. This matter is so well and objectively treated and disposed of by Herman H. Goldstine in his "The Computer from Pascal to von Neumann" that I could not possibly add anything to it. However, I would like to mention one of my own personal involvements in this "affair." In 1982 I happened to listen to a five-minute spot commercial on WFLN

Philadelphia radio sponsored by the Women's Board or Auxiliary of the University of Pennsylvania, honoring the anniversary of the foundation of the University of Pennsylvania by Ben Franklin, and listing among other achievements: "and 40 years ago [the University of Pennsylvania] gave birth to a new age by inventing the computer." I could not resist the temptation to write a letter to then President-Elect Hackney, pointing out that the computer resulted not from a single invention but rather from a continuous process of evolution in which each phase depended on the preceding one, that the question of who was "first" in any specific feature is not relevant in any event, and that the University of Pennsylvania should not limit its pride to the ENIAC, but should generally pride itself for having contributed the milieu of the Moore School which ultimately resulted in two distinct directions of the computer evolution, namely, the ENIAC and JvN's IAS 1952. President Hackney responded very graciously, that of course one cannot put everything into a five-minute spot, and assured me that it will be discontinued or modified.

Steve Heims: "JvN and Norbert Wiener. From Mathematics to the Technologies of Life and Death" (MIT Press, 1980), is of course a good example for a mixed collection of correct, erroneous, objective and malicious features. This is so well treated and disposed of by Robin E. Rider's review in SCIENCE, Vol. 121, June 1981, p. 1496, that nothing could or should be added. However, it may be appropriate at this point to repeat Rider's conclusions to the effect that this work is not a biography of either scientist but rather a presentation of Heims' biased views and criticism to which he is entitled, but neither scientist is a good example or model for the two extremes which Heims is describing, and that Heims could not familiarize himself with JvN's human character since JvN -- unlike Wiener -- hardly wrote anything about himself. Indeed, it seems to me that if Heims would have read some of JvN's

speeches, (e.g., "Can we survive technology," etc., see Appendix C), he might have reached a different conclusion concerning JvN's attitudes. As to the family background as presented by Heims, i.e., tracing JvN's philosophies to the theme of ancestral vengeance of past centuries (p. 242), it is fantastic and imaginative, but without any substance or evidence. Of course, maybe I should not comment on this, because I cannot claim that I was sitting around the dinner table of our ancestors centuries ago; I merely claim that I was sitting around the dinner table of our parents in the 1910/1920's. One more personal aspect: on p. 427 (Note 30) Heims states: "I am grateful for the recollections of JvN's childhood recounted to me by his brothers Nicolas Vonneuman and . . ." I do not recall ever having met Heims, although such meeting may have occurred many many years ago, and I forgot about it. But in any event, I never recounted anything to anyone for publication purposes, except under the most formal arrangements and subject to explicit conditions, and upon reading Heims' book, I could not find in it any relevant data which may have originated from me.

One more event which is sometimes incorrectly published: in the 1970's Vietnam atmosphere, Princeton University students attacked and damaged "JvN Hall" on campus, behind the Engineering Department. Of course, the attack was not directed against JvN, but against IDA (Institute for Defense Analyses) which occupied those premises and had originally sponsored its erection in cooperation with and for ultimate use by the University. Pictures of condition of building after attack exist and have occasionally circulated. Thereafter, IDA moved out, into a demonstration-proof new building somewhat out-of-campus range, and JvN Hall was carefully restored to its original condition (but this time with unbreakable elastic acrylic window panes) and integrated into the Engineering Quadrangle. Original JvN memorial tablet is still

(1982) in its lobby.

Quite a few incorrect details have been published in connection with John's last illness. From the point of view of the history of science, these are probably irrelevant. However, in view of some of the unfounded and misleading anecdotes in circulation, it may be appropriate to place on record, also for the benefit of future biographers, that I was in Washington, DC throughout that period since my job kept me there. Medical records and history in Walter Reed were available to John's wife, Klara, brother Michael and myself. Others had no access to it, but could not resist the temptation to talk about it and to analyze it. Among the relevant aspects is probably what Klara wrote in her foreword to "The Computer & the Brain" on how the incomplete manuscript of the Silliman lectures remained with him and how he worked on it and carried it along, as long as he was capable of doing so.

13. RECOGNITION OF JvN IN HUNGARY TODAY

In 1983 I was contacted by MAFILM, the Hungarian movie producer, through the Hungarian Embassy in Washington, inquiring whether I would be prepared to cooperate with MAFILM's crew, expected to arrive soon in the USA, in supplying information in the form of interview or otherwise for their cultural and educational film to be produced on JvN. I agreed, but by coincidence the MAFILM crew, upon their arrival in the USA or thereafter, called me at home exactly on the morning of the day on which we were scheduled to depart from New York on a European business trip including Budapest. I told my callers that regrettably it is too late for me to participate in their shooting session in the USA, but if they return to Budapest when we are still there, I will be at their disposal. It so happened that they called me indeed in Budapest a few days before our departure, and arrangements were made for a shooting and interview session which took place on October 17, 1983. Actually, this turned out to be more useful and practical than it would have been in the USA, where they were rushing from one place to another, whereas in Budapest there was more time and better opportunities available. Their Director, Gábor Dénes appeared with two operators and equipment in two taxis and we made the rounds for interviewing or dialoguing with Mr. Dénes or monologuing by myself, at all "historical" locations which I proposed to them, particularly father's former summer home at Eötvös-út 15 and grandfather's former apartment house, our birthplace at Bajcsi-Zsilinszky-út 62. At Eötvös-út 15 I rediscovered and called to the attention of the moviemakers the stained glass window and the three

animal heads and the three daisies abstracted from father's coat of arms (see Appendix F).

The documentary film was accordingly completed, and presented for official preview in October, 1984 at MAFILM executive projection room and a few days later in the Néprajzi Múzeum (the former Supreme Court and Appellate Court) in the presence of the Minister of Education, and a slightly modified educational version at a university. Subsequently the production reached the movie theater and TV.

There is in Budapest a Neumann János Számítógéptudományi Társaság -- John von Neumann Society for Computer Sciences, by strange coincidence with headquarters at Báthory u. 16, one of maternal grand-father's former apartment houses. All of this is in line with the Hungarian tradition of centuries to be proud of their successful emigrants and their success achieved abroad.

On this occasion I would like to express my appreciation to the Hungarian scientists involved, and more specifically to those who participated in this production with a sincere interest in and understanding of JvN's role in the history of science, i.e., Gábor Dénes, director of the educational film produced by MAFILM; Győző Kovács, vice-president of the JvN Society for Computer Sciences in Budapest; Dean Ervin Szűcs and Prof. Dénes Nagy of the Loránd Eötvös University of Sciences in Budapest where the modified MAFILM production was presented which provided me with the opportunity to answer questions from the students and discuss some related aspects of the history of science; and last but not least Dr. Ferencz Nagy, science consultant to MAFILM and OMIKK, and expert on the JvN-Rudolf Ortvy connection.

14. CONCLUSION

I've been asked frequently: which philosopher did John follow? I don't know; we never discussed it, and he never mentioned it. Maybe he never followed any philosopher as such. Of course, he was a pragmatist, and that in itself may be some indication of an underlying philosophy. But at second thought, it would appear to me that there may have been one philosopher whom he followed or at least considered, i.e., Goethe. After all, Goethe was -- among many other things -- a philosopher. We studied Faust in school very thoroughly, both parts, in original and also in Hungarian translation. And beyond our high school studies, we discussed it thoroughly at home, at that time, and also thereafter and indeed throughout the years, rereading sections of it. There were particularly two passages which caught his and our imaginations: First, the concluding eight lines of Part II (l. 12104-12111):

Alles vergänglichliche ist nur ein Gleichnis . . .

All things transitory but as symbols are sent . . .

(Bayard Taylor's translation).

There are many interpretations for these eight lines which, however, are not the subject matter of this book. What is relevant for our subject matter is our speculations, right or wrong, of the meaning of these lines within the greater context of Goethe's philosophy, i.e.: there is a unifying force behind all manifestations of nature, which we cannot fully comprehend, but we can try to explain it with means at our disposal. It was in this spirit that John tried to comprehend or tackle the mysteries of atomic and subatomic particles through quantum mechanics, the mysteries of weather

conditions and forecasting through hydrodynamics and statistics, the mysteries of the central nervous system through logic and architecture of artificial computers, the mysteries of genetics and inheritance through his theory of self-reproducing automata, etc.

Second, in Part I, before departing on their journey the first station of which is Auerbach's Keller, to Faust's question "Where are we going?" Mephistopheles replies (l. 2052):

Wir sehen die kleine dann die grosse Welt.

The little world and then the great we'll see.

(Bayard Taylor).

We realized that this is not the micro v. macro cosmos and we knew or recalled that "grosse Welt" was Goethe's link to Part II, not yet known to others, but we explained it to ourselves that yes, "kleine" of Part I v. "grosse" of Part II is analogous to basic human emotions and passions by man alone, v. more sophisticated intellectual ambitions, executive and administrative powers, plans for improving the lot of humanity by man, no longer alone but together with others, in society. This was then discussed also frequently in the context of father's and of John's concept of the professionals' responsibilities to society.

15. EPILOGUE

As long as we mentioned analogies or similarities between some features of John and father, it may be appropriate also to mention the last similarity, namely, that father died (June 4, 1929), also relatively young (at 59), and also from an illness which at that time was considered incurable. Borsszem Jankó¹⁵⁻¹ then published the following obituary:

margittai Neumann Miksa dr.

Egy munkás élet, sok szép akarat,
Tegnapról máma ím ketté szakadt.
Alighogy heged támad újra friss seb,
S a régi gárda kisebb, egyre kisebb.

[A lifetime of hard work and many praiseworthy plans have now suddenly come to an end. Old wounds are hardly healed as new ones are appearing; and the old guard gradually disappears.]

In the case of father in 1929, the "old guard" consisted of the progressive leaders and executives of the Hungarian industrial and commercial revival after World War I. But a new guard always follows the old. At this point I will not treat the new guard of the 1930s. But for the sake of analogy and to the extent that John's passing away in 1957 also reflected the gradual disappearance of an old guard, I should mention whom John considered the new guard in the 1950's, although he did not anticipate at that time his own premature departure. In his communications and speeches and in private discussions he made this quite clear: the new guard will have to come from a new generation of young people of an impres-

sionable age, who will have to learn how to live together, irrespective of their nationality, religion, or ideology. And it was for the same reason that he emphasized that education of future scientists must be broad and multidisciplinary. In that context he also recommended that the new generations should select fields of science and technology in any event, because evolution is so fast that by the time they graduate or enter professions, entirely new fields will be open to them which could not have been anticipated at the beginning of their studies.

And as long as the Epilogue opened with a poem, let me conclude now with another, although I do not claim that John was familiar with it or that I discussed it with him. Indeed, even I discovered it only relatively recently by coincidence. However, it does express many of our fundamental philosophical ideas and Weltanschauung. It is George Santayana's "Epitaph": "Oh youth, oh beauty! Ye who fed the flame which here was quenched, breathe not your lover's name, he lies not here. Wherever you dwell, anew he lives again and loves again in you. Pluck the wild rose and weave the laurel crown, to deck your glory, not his false renown."

THE END

FOOTNOTES

* This dedication should be considered as an extension, rather than a paraphrase, of John's dedication of his first published book to the memory of his father: "DEM ANDENKEN MEINES VATERS GEWIDMET." Johann von Neumann, Mathematische Grundlagen der Quantenmechanik (Berlin: Julius Springer, 1932), p. [3].

2-1. J. Dieudonné in Dictionary of Scientific Biography, Charles Goulston Gillespie (Princeton University), Editor-in-Chief, Charles Scribner, NY, Vol. XIV, p. 89.

2-2. Herman H. Goldstine and Eugene P. Wigner, Scientific Work of J. von Neumann, SCIENCE, Vol. 125, 12 April 1957, p. 683.

2-3. Dieudonné, op. cit., p. 89.

2-4. JvN, "The Mathematician" in Taub/Pergamon Collected Works, Vol. VI, p. 9.

2-5. JvN, "Impact of Atomic Energy on the Physical and Chemical Sciences," in Taub/Pergamon Collected Works, Vol. VI, p. 522.

3-1. br. Eötvös József, "Végrendelet": ". . . Márványszobor helyébe, ha fönmarad nevem, eszméim diadalma legyen emlékjelem . . ."

3-2. Paul Halmos: The Legend of JvN. American Monthly, Vol. 80, No. 4, April 1973, p. 394.

4-1. Official Hungarian Name: "Ágostai Hitvallású Evangélikus Főgimnázium."

5-1. Among others: Leslie C. Tihany, A History of Middle Europe from the Earliest Times to the Age of the World Wars, Rutgers University Press, New Brunswick, NJ, 1976, and Leslie C. Tihany, The Baranya Dispute, 1918-1921, Diplomacy in the Vortex of Ideologies, Eastern European Quarterly, Boulder, 1978.

5-2. Tarnopol, in the Western Ukraine, was in Austria since 1772, reverted to Poland in 1919, and ceded to the USSR in 1945. The Austrian offensive at Tarnopol in 1915 was one of the important events on the eastern front.

7-1. JvN, "The Mathematician," loc. cit.

7-2. JvN, "The Role of Mathematics in the Sciences and in Society (Taub/Pergamon, VI:490).

8-1. Dieudonné, loc. cit.

9-1. JvN's letter on IAS letterhead addressed to U.S. Navy, in Library of Congress, Manuscript Division, "JvN Collection," Container #25.

9-2. Laszlo Füstöss: Rudolf Ortway, Akadémia Kiadó, Budapest, 1984, published by the Hungarian Academy of Sciences in its "Hungarian Scientists of the Past" series.

9-3. Correspondence between JvN and Rudolf Ortway is preserved in the Manuscript Division of the Library of Congress in Washington, DC and in the Archives of the Hungarian Academy of Sciences in Budapest. Dr. Ferencz Nagy, Science Consultant to OMIKK and MAFILM in Budapest published several papers and one book on the JvN-Ortway connection.

9-4. "Computation in the Mammalian Hippocampal Formation" presentation of Prof. Nadel at "The Computer and the Brain" International Symposium in commemoration to JvN, held at Arizona State University, Tempe, Arizona, on April 12-15, 1987.

9-5. Otto Hermann.

15-1. Hungarian weekly published in Budapest (then and now) combining humor with serious critiques.

APPENDIX A

Scholarly Publications Evaluating JvN's Work

J. Dieudonné: op cit. in footnote No. 2-1.

Paul Halmos: The Legend of JvN - American Monthly, Vol. 80,
No. 4, April, 1973.

Herman H. Goldstine: "The Computer from Pascal to vN."
Princeton University Press, 1972.

Goldstine & Wigner: "Scientific Work of JvN," SCIENCE 1957,
125:683/4.

S. Bochner: "JvN," National Academy of Sciences, Biographical
Memoirs, Vol. 32, 1958, pp. 438-457.

Bulletin of the American Mathematical Society: "JvN 1903-1957."
(Memorial Volume) May, 1958, 64:654.

Stan Ulam, Freeman Dyson, and others, as part of their resp.
autobiographies.

Also: Arthur Burks, Tarján, Taub, etc. (will be supplied).

APPENDIX B

Bibliography of JvN's Works

"Mathematische Grundlagen der Quantenmechanik." Berlin, Julius Springer, 1932, and its USA reprints and translation.

"The Computer and the Brain," (Silliman Lectures) Yale, 1957.

"Theory of Games and Economic Behaviour," with O. Morgenstern. Princeton University Press, 1953.

See also Bibliography in JvN Collected Works, A. H. Taub, Ed., Pergamon Press Ltd., Oxford, England, 1961, VI: pp. 529-536.

"Theory of Self-reproducing Automata." Arthur W. Burks, Ed., University of Illinois Press, 1966.

"Essays on Cellular Automata." Arthur W. Burks, Ed., University of Illinois Press, 1970 (Not restricted to JvN's work).

"Continuous geometries with a transition probability." Israel Halperin, Ed., American Mathematical Society Memoirs #252, Nov. 1981.

After final proofreading and just before going to the press, my attention was called to "Papers of JvN on Computing and Computer Theory," edited by William Aspray and Arthur Burks, The MIT Press: 1987, which contains an up-to-date comprehensive bibliography with no restriction on subject.

APPENDIX C

Articles, Speeches or Public Statements
Addressed to Non-Mathematicians or
Not Necessarily Mathematicians

"The Mathematician" in "The Works of the Mind." Ed. R. B. Heywood. University of Chicago Press, 1947, pp. 180-196.

"Can We Survive Technology" in FORTUNE, June 1955, pp. 3, 106/152.

"The NORC and Problems in High Speed Computing." Address on the occasion of the first public showing of the IBM Naval Ordnance Research Calculator on December 2, 1954 (IBM: 1954).

"Entwicklung and Ausnutzung Neuerer Mathematischer Maschinen", 1954. (Taub/Pergamon V: 248-287)

"The Future of High Speed Computing" at IBM Seminar, 1949. (Taub/Pergamon V: 236)

"The General and Logical Theory of Automata" (Hixon Symposium 1948. (Taub/Pergamon V: 288-328)

The Impact of Recent Developments in Science on the Economy and on Economics" at National Planning Association, 1955. (Taub/Pergamon VI: 100-101)

"The Role of Mathematics in the Sciences and in Society," 1954. (Taub/Pergamon VI: 477-490)

"Method in the Physical Sciences," 1955. (Taub/Pergamon VI: 491-498)

"Impact of Atomic Energy on the Physical and Chemical Sciences," 1955. (Taub/Pergamon VI: 520-522)

"Defense in Atomic War," 1955. (Taub/Pergamon VI: 523-525).

"In the Matter of J. Robert Oppenheimer: Transcript of Hearing before Personnel Security Board and Texts of Principal Documents and Letters, United States Atomic Energy Commission." Testimony of John von Neumann on April 27, 1954 (The MIT Press: 1954, pp. 631, 643-656).

Hearings before the Special Committee on Atomic Energy, United States Senate, on S.1717 "Atomic Energy Act of 1946." Statement and Testimony of Dr. John von Neumann on January 31, 1946 (United States Government Printing Office, Washington: 1946, pp. 205-219).

Hearings before the Senate Section of the Joint Committee on Atomic Energy, Congress of the United States "on the nomination of John von Neumann to be a member of the United States Atomic Energy Commission," on March 8, 1955 (United States Government Printing Office, Washington: 1955, pp. 45-61).

Two Audiotapes from Library of Congress, Manuscript Division, JvN collection:

- 1) "The NORC - IBM" Address on December 2, 1954 (see above).
- 2) "The Hungarian Free Radio" Interview on April 13, 1955.

(Copies of these are in my files. Listing is not necessarily complete. N.A.V.)

APPENDIX D

Allocution

Pronounced at the Obsequies

of

Professor John von Neumann

by

the Rev^d Dom Anselm Strittmatter, O.S.B.

in the Chapel of Walter Reed Hospital,
Washington, D.C.

February 11, 1957

The fear of the Lord is the beginning of wisdom.---- The fear of the Lord lends wisdom her own piety, such piety as shall keep the heart safe and make it acceptable.

Well it shall be, indeed, for the man who fears the Lord; at his last end he shall win blessing.

Eccl^{us} I 16-19.

Dearly beloved in Christ!

When we see human greatness brought low in death, how forcibly is the truth brought home to us that God alone is great! And how fully do we realize this at this moment, assembled as we are to pay our final tribute of love and respect, of admiration and veneration to the great man whose mortal remains lie here before us.

Holy Mother Church has offered for him the Eucharistic Sacrifice which she asks God to accept even as He deigned to accept the offerings of His righteous servant Abel, the sacrifice of our patriarch Abraham, and that offered by the priest-king Melchisedek — a prayer à propos of which the late Sovereign Pontiff Pope Pius XI under dramatic circumstances and at an historic moment declared that spiritually we are Semites, being through Christ and in Christ the spiritual offspring of Abraham. The Mass is indeed a sacrifice of thanksgiving offered through Christ and by Christ, in Whom the hope of a blessed resurrection has shone forth, for to us who believe death is a transition from one life to another, the second richer, deeper and fuller than the first. For whatever death may mean on the physical plane, in the realm of the spirit it does not spell dissolution, it is not cessation.

This is not the place nor the occasion to recite the tale of John von Neumann's achievements. Now that he is dead, his story will be told to the world at large in greater detail than ever before and his eminent place in the history of science clearly defined. We here present have come to pay our respects to a man we admired not least for the distinguished services he rendered to his adopted country, services which merited and received the highest recognition his country could bestow. All here present who were at one time or another his professional associates in the course of his brilliant career, all of us who were called upon, not to say privileged, in one way or another to give him special care, to serve him during his last illness, we all feel that we may claim, as indeed we do, an intimate share in these obsequies. We have come to pay our respects to a man we loved;

we are gathered to express our condolence to his immediate family. To the loyal helpmate of many years, whose self-sacrificing devotion during the long months of illness it has been an inspiration to witness, to his brothers and his daughter — to all these and to all the other relatives we express our deepest sympathy.

Proximity to John von Neumann was no ordinary experience. One sensed his distinction, his greatness, the fine edge of his spirit. Without conceit or arrogance, he was fully conscious, as every great man must needs be, of his high endowments and achievements. But as he came more and more to realize that the control over the physical forces of nature which he and his co-workers had placed in the hands of their fellow men could be used for evil as well as for good, that as the world is moving today this control might quite possibly be used for destruction rather than up-building, he felt with steadily increasing intensity the moral problems bound up with the greatest of modern scientific triumphs. This realization that man was proceeding along a track which might well lead to power above and beyond control, was the beginning of an insight into another realm, into a world of values which cannot be ignored, for it is as real and vast, yea more vast than the immense world of the atom he had helped to explore. Here were responsibilities clamoring for attention. He could not avoid the manifold implications of the problem. Fully cognizant of the legitimate, of the sovereign demands of national security, he realized none the less the imperious insistence of claims of a totally different order. As for his own role in this complex situation, in spite of the dismal possibilities he envisioned, he knew no hesitation, he had no regrets. And yet the verses of a famous Latin hymn which he would seem more than once to have read and pondered kept coming back to mind, shall we say, re-echoed in his soul. He recited them in the original one day during his last illness to an astonished visitor:

Judex ergo cum sedebit,
Quidquid latet apparebit,
Nil inultum remanebit.

When the Judge His seat hath taken,
All things hid shall be made plain,
Nothing unavenged remain.

Quid sum miser tunc dicturus?
Quem patronum rogaturus,
Cum vix justus sit securus?

What shall wretched I then plead?
Who for me shall intercede,
When the righteous scarce is freed?

The fear of the Lord lends to wisdom, in the present case, to learning and science, her own piety. It was not easy for one who had never known frustration, still less failure, to submit to the designs of an inscrutable Providence, to say 'Thy Will be done', once he had come to realize that science could not check the progress of his disease. But this grace, too, was finally given him. It was given him to understand something of the purifying and atoning value of suffering, as he learned that according to his Catholic faith all suffering is a share in the Passion and Death of Christ, in Whose redemptive mission we, Christ's brethren, members of His Mystic Body, actively participate. It was given him to repeat not only the psalmist's cry: "My God, my God, why hast Thou forsaken me?" words so mysteriously pronounced by Christ on the Cross, but also in a spirit of submission and trust those final words of our dying Saviour: "Father, into Thy hands I commend my spirit."

Now that his course is run, may the Angels lead him into Paradise, into the holy city Jerusalem, whose light is the brightness of God, to Whom — Father, Son, and Holy Ghost — are the glory and the power forever. Amen.

Eternal rest grant unto him, O Lord, and may perpetual light shine upon him.

May his soul and the souls of all the faithful departed through the mercy of God rest in peace. Amen.

APPENDIX E

Family Trees

- 1) Father's Line
- 2) Mother's Line

(Will be supplied upon request, and will be included in any event in final version.)

APPENDIX F

List of Available Originals or Reproductions of
Photos and Illustrations

1. Color reproduction of father's nobility (margittai) grant document (1913).
2. Same, coat of arms, alone.
3. Father's parents' marriage certificate.
4. Father's father's photo.
5. Mother's grandparents' photos.
6. John and Lili 1913.
- 7-11. Abt. 1925 portrait photos: parents and three sons.
12. Father's portrait, watercolor painting by Kunwald C  zar, original and color reproduction (abt. 1925).
13. Color reproduction of stained glass window E tv s- t 15 -- 3 daisies and three animals, (transparency incl.)
- 14-16. Animal heads above windows at Eotvos-ut 15.
17. E tv s  t 15: Three daisies on top.
18. E tv s  t 15: Stairs and pool view
(All E tv s  t 15 photos from former summer home in Budapest, photographed in 1984, now used as city's special residential kindergarten.)
19. Father's tombstone in Budapest.
20. "62" grandfather's apt. house.
21. B csi-u 8. Headquarters of Kohner Adolf Fiai. Photo 1983 of restored front view, displaying 2nd floor, former executive and boardroom, and recessed top floor, former International Department.
22. 1956 Eisenhower Freedom Medal ceremony in White House.

23. JvN in corner of IAS 1952. This photo published before, but always with several people standing in front of machine. In this, JvN stands alone in corner and photo displays almost full length (14 out of 20 Williams tubes) of machine, broadside.

24. 1942 Nicholas - U.S. Army photo.

25. Same in OSS badge (original).

26. 1984 Nicholas and students after University of Budapest viewing of JvN modified documentary film.

27. Same in faculty surrounding.

28. NAV portraits in context of '20s style.

29. Portrait photo of paternal grandfather on porcelain plate. On the rear side of this the following imprint appears: "A. Hofman's, Porzellan Photographie, Karlsbad." The date is probably early 1900's. We recall from stories that father and his father or other family members used to spend some vacations at Karlsbad (now Karlovy Vary) resort (original).

30. Father's binoculars from service as volunteer in Austro-Hungarian army, probably in 1890's. Binoculars have inscription "C.P. Goertz, Wien-Pozsony, No. 12134, H-5 Feldstecher mit Skala 6-Fach." Leather case displays "K.u.K." coat of arms, symbol of army equipment (original).

31. Father's sister's (Aranka) portrait photo, probably around 1900. On reverse side, "Strelisky L. Fenyképész Pesten."

32+. Many more available.

APPENDIX G

Curriculum Vitae of Nicholas A. Vonneuman

Name and address: Nicholas A. Vonneuman, 1396 Lindsay Lane,
Meadowbrook PA 19046 Phone: 215-886-6244

Personal data: Birth date: May 14, 1911 Budapest, Hungary
naturalized USA citizen

Education: Doctor of Juridical and Political Sciences
University of Budapest, Hungary
Bachelor of Arts (major: accounting), George Washington
University - School of Government, Washington DC
Master of Comparative Law (American Practice), George
Washington University - Law School, Washington DC
Member DC Bar
Registered Patent Attorney - U. S. Patent Office

Languages: Hungarian, Portuguese, German, French, Italian, Spanish

Employment:

1937-1942 National City Bank of New York, New York NY, Comptrollers
Department, Auditor
1942-1943 U. S. Army - Infantry Replacement Training Center, Macon GA;
Army Specialized Training Program (Languages),
Clemson SC & Urbana IL
1943-1945 U. S. Army - Detached Service O.S.S., incl. civil service
status _____ from 11-7-45
to 12-31-45 to conclude assignment after
discharge from U. S. Army
1946-1957 Italian Technical Delegation (Italian Embassy), Washington DC,
Chief Accountant
1957-1976 Air Products & Chemicals, Inc. (incl. predecessor Houdry Corp.),
Allentown PA. Licensing Attorney, in charge of technology transfer
contract negotiations and governmental registration or approval
proceedings in other countries under conditions where knowledge of
local language is required in order to avoid the need for reliance
on interpreters. Retired 1976 pursuant to employer's mandatory
policy at age 65, but retained as parttime consultant.
1976- Active private practice of law and consultant in same field
1981- US State Dept. consultant on external research projects (Brazil)
Professional associations: American Bar Association, Licensing Executives
Society, Inc. (USA & Canada), Philadelphia Bar Association,
The District of Columbia Bar. Committee Chairs.

Publications by Nicholas A. Vonneuman

Conditionally Exclusive Patent Rights and the Patent Clause of the Constitution.
The American Journal of Comparative Law
Volume 5, Number 3, Summer 1956 pp.391-409

But How Do We Apply Modern Logic to Law?
M.U.L.L. (Modern Uses of Logic in Law) (American Bar Association)
December 1960 pp. 138-140

REVIEWS (Partial Listing)

Ilmar Tammelo: Modern Logic in the Service of Law
Springer-Verlag, Vienna & New York 1978

The Journal of Symbolic Logic
Volume 45 - Number 3 - September 1980 pp.633-634

reprinted in:
Jurimetrics Journal of Law, Science and Technology
(American Bar Association - Section of Science & Technology)
Volume 21, Number 2, Winter 1980 pp.226-227

W. Ross Ashby: Design for a Brain - The Origin of Adaptive Behavior
John Wiley & Sons NY 1960

M.U.L.L.
September 1962 pp.154-155

H. M. Semarne: Language Engineering
Industrial Research 44 Apr/May 1961

M.U.L.L.
September 1962 pp.153

Roscoe Pound: Law Finding through Experience and Reason
U of Ga Press Athens 1960

M.U.L.L.
September 1962 p.154

Ulrich Klug: Juristische Logik
Springer-Verlag Berlin 1958

M.U.L.L.
September 1960 pp.112-113

L.E.Allen & M.E. Caldwell, Ed.: Communications Sciences and the Law
The Bobbs-Merril Company 1965

Jurimetrics Journal
September 1966 pp.28-31

: : : :
: : : :

The American Journal of Comparative Law

TRANSLATIONS (Partial Listing)

from Portuguese into English:

Chronicles of Modern Life - Short Stories by Luís Fernando Veríssimo.
Américas (Organization of American States - Washington DC)
Volume 34, N: 6, Nov/Dec 1982 pp.18-21