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Charles Sanders Peirce (1839-1914) photographed in Berlin
 Courtesy of the Department of Philosophy, Harvard University



The Early History of Computer Design

Charles Sanders Peirce and Marquand's Logical Machines

BY KENNETH LAINE KETNER
 WITH THE ASSISTANCE OF ARTHUR F. STEWART

The Marquand Papers in the Department of Rare Books and Special Collections of Princeton University Library contain some significant items for the early history of computer design. This essay is a summary of those materials, as well as an attempt to answer some outstanding questions about them. The principal dramatis personae in this tale are Charles Sanders Peirce (1839-1914) and Allan Marquand (1853-1924). In order to substantiate our conclusions, let us begin with some background information on how these men entered the drama.¹

From 1879 through 1884, Peirce was a part-time lecturer on logic at the new Johns Hopkins University while continuing his full-time job as assistant in the U.S. Coast and Geodetic Survey in nearby Washington. Contrary to the initial impression it conveys today, the rank of assistant at the Survey was a high-level appointment. Although his appointment at Hopkins was in logic, he was also busy there with research in psychology and philos-

¹ I wish to thank the staff of the Princeton University Library for their assistance in making available materials from the Allan Marquand Papers and for their patient helpfulness. Dr. and Mrs. Preston H. Tuttle of Princeton, New Jersey, and Professor Arthur Burks of the University of Michigan also provided invaluable aid. Professor Max Fisch, of the Peirce Edition Project in Indianapolis, generously offered his encyclopedic knowledge of Peirce. Carolyn Eisele helped arrange the occasion to present parts of this paper before the History of Science Society at its October 1983 meeting, and also offered valuable advice. The Department of Philosophy at Harvard University has graciously given permission for use of materials from the Peirce Papers.

ophy. Moreover, he was acknowledged by the distinguished J. J. Sylvester, the head of mathematics in the University, as one of the active faculty researchers in that department.² Peirce had a number of talented students in logic whose work may be sampled in *Studies in Logic. By Members of the Johns Hopkins University*, recently reprinted by Benjamins in The Netherlands, exactly 100 years after its first issue in 1883. Among these bright pupils was Allan Marquand, at that time Fellow in Philosophy and Ethics at Hopkins until he graduated in 1880. Son of Henry G. Marquand, the prominent philanthropist and art collector, Allan worked within the history of logic (writing under Peirce's supervision a dissertation on the logic of Philodemus) and upon trying to improve the design and function of what were then called "logical machines"—at least they were so called within Peirce's circle. Marquand began with improvements upon W. S. Jevons's logical machine, whimsically known as the "Logical Piano," which had been constructed in 1869.³

In late 1886, Marquand published, in the *Proceedings of the American Academy of Arts and Sciences, for 1885-1886*, an essay (reproduced in Appendix A) on "A New Logical Machine," a device that was constructed in Princeton during the winter of 1881-1882. A good account of the method of operation for the device is given in Marquand's essay. Its internal works employed mechanical principles, it could handle four terms, and it functioned somewhat better than the Jevons "Piano."

Marquand's article received fairly wide notice. As we shall see, both Peirce and James Mark Baldwin (an actor in our drama to be formally introduced soon) were aware of it, and praised its ideas. Furthermore John Venn, the famous British logician, in a letter to Marquand dated March 1886,⁴ acknowledged receipt of the paper, and went on to talk shop in an appreciative spirit. Perhaps the most prophetic response, however, was from the president of Cornell University, Charles Kendall Adams:

² See Carolyn Eisele, *Studies in the Scientific and Mathematical Philosophy of Charles S. Peirce*, ed. R. M. Martin (The Hague: Mouton, 1979) and Max H. Fisch and Jackson I. Cope, "Peirce at the Johns Hopkins University," *Studies in the Philosophy of Charles Sanders Peirce*, ed. Philip P. Wiener and Frederic H. Young (Cambridge: Harvard University Press, 1952), pp. 277-311.

³ William Stanley Jevons, "On the Mechanical Performance of Logical Inference," *Philosophical Transactions of the Royal Society of London*, 160 (1870), 497.

⁴ The Allan Marquand Papers, Princeton University Library.

President's Rooms
Cornell University

March 4, 1886

Dear Sir: Please accept of my thanks for your "New Logical Machine." Could you invent a machine that will do the work of a College President? I give you my order in advance.

C. K. Adams⁵

Photographs surviving in the Marquand Papers show early and later stages of construction of Marquand's machine (see figures 1-4). Figures 1 and 2 show what must have been an earlier stage of construction. Notice that the face in figure 1 shows only uppercase letters, contrary to the mixture of uppercase and lowercase letters shown on the face in figure 3. Figures 3 and 4 were printed with Marquand's article for the *AAAS Proceedings*. The surviving machine (fig. 5) appears identical with the machine in figures 3 and 4. Moreover, on the extant unit's face, a close examination reveals small pin holes near all the lowercase letters, surely indicating that Marquand, in preparing his device for exhibit before the AAAS meeting, obtained and installed appropriate lowercase lettering. Both upper and lowercase letters are needed for the proper operation of the machine. Perhaps Marquand used only uppercase letters in the early stages of construction because he lacked a ready source of correct lowercase brass letters. If one compares the views of the works of the early and later models as exhibited in these photographs, one can see small improvements in the later version. For instance, viewed from the back, two pulleys at lower center and right center have no brass housing in the early unit, but have housing in the later version. There are also a few rods, perhaps torsion springs, at the left side in the later unit, which are missing in the earlier photographs. The facts that the photographs for the AAAS article appear identical to the surviving machine, and the surviving machine shows pin holes near the letter modifications on its face, strongly imply that these four photographs are of but one physical entity which underwent a few changes in construction during what must have been a period of fine tuning of the design.

By the time the AAAS article appeared, Marquand had become

⁵ Ibid.

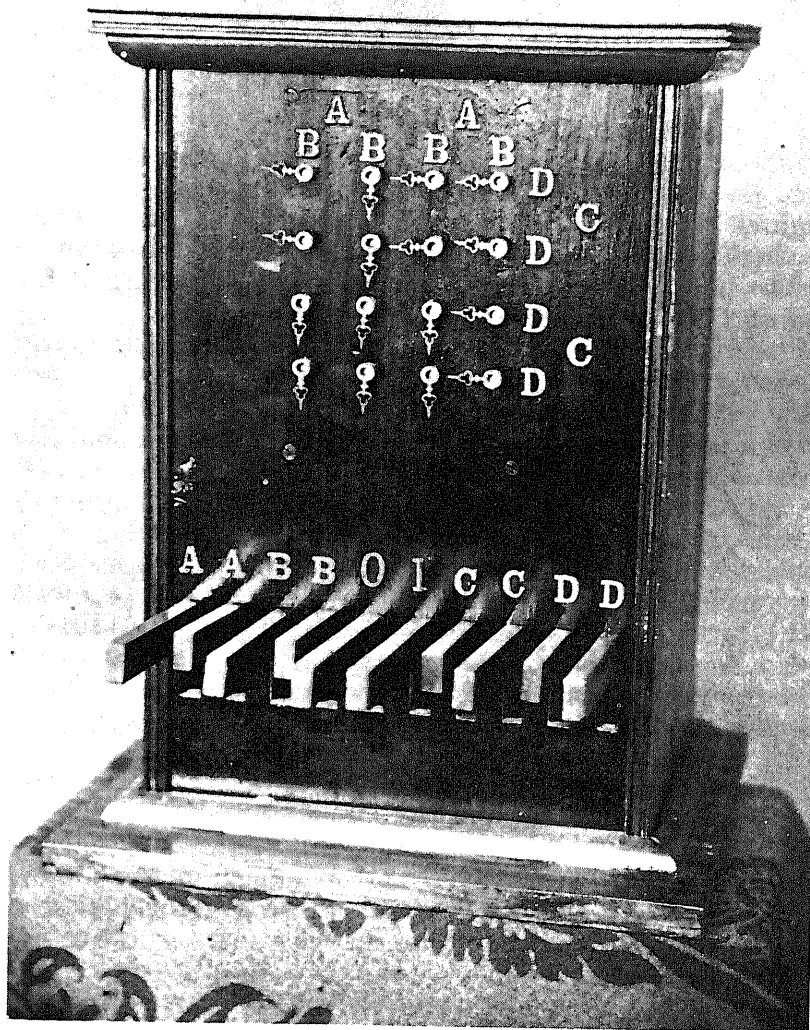


Fig. 1. Front view of an early model
of Marquand's logical machine
The Allan Marquand Papers
Princeton University Library

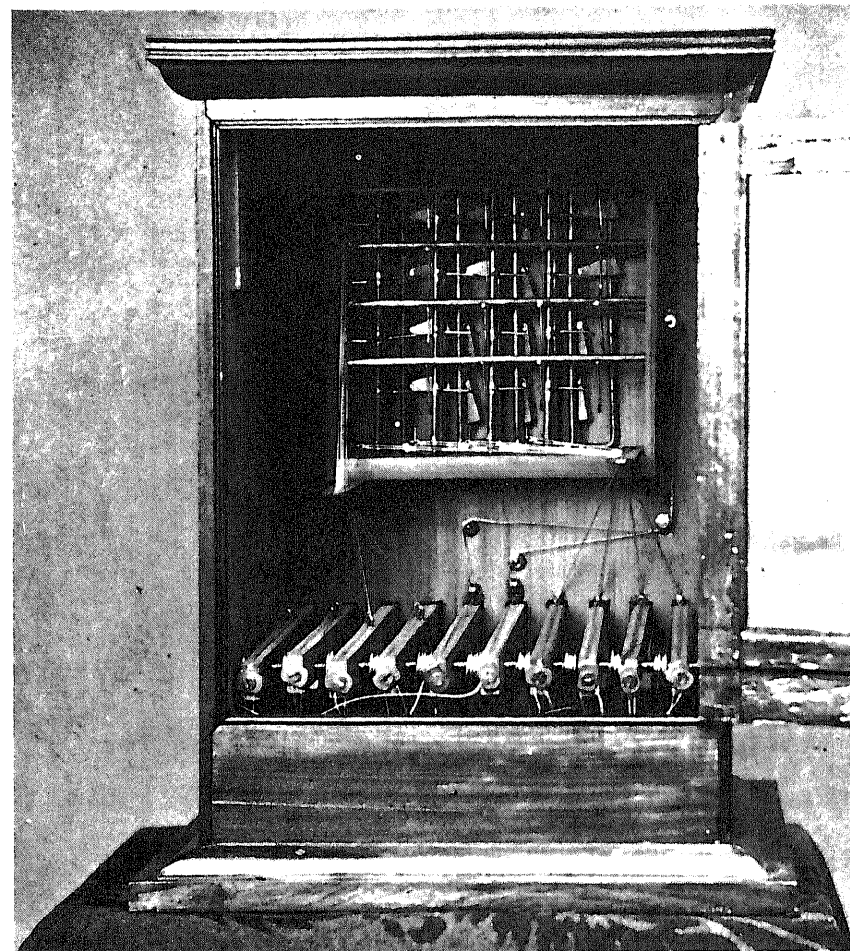


Fig. 2. Back view of an early model
of Marquand's logical machine
The Allan Marquand Papers
Princeton University Library

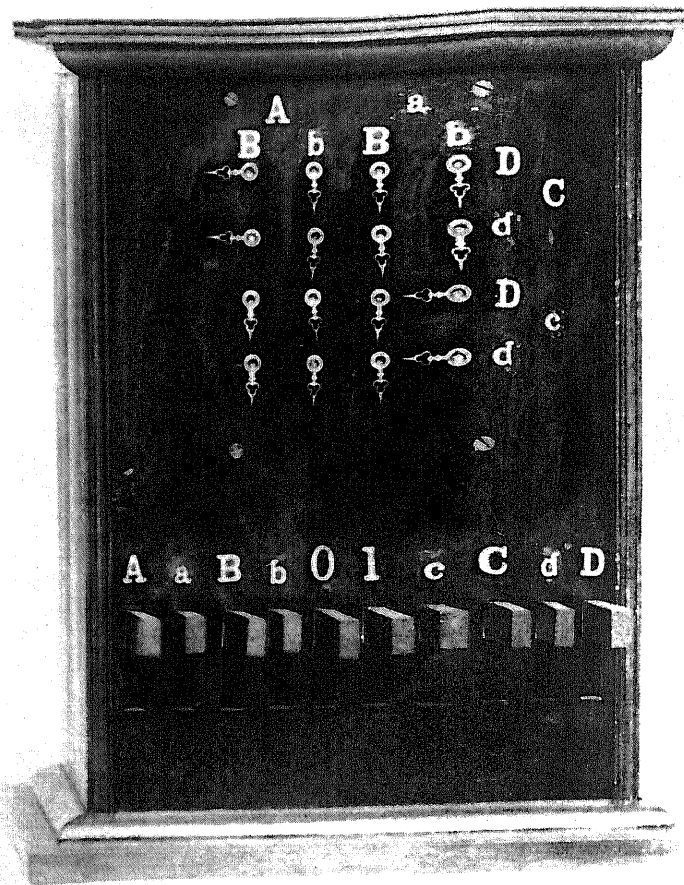


Fig. 3. Front view of the later model
of Marquand's logical machine
The Allan Marquand Papers
Princeton University Library



Fig. 4. Back view of the later model
of Marquand's logical machine
The Allan Marquand Papers
Princeton University Library

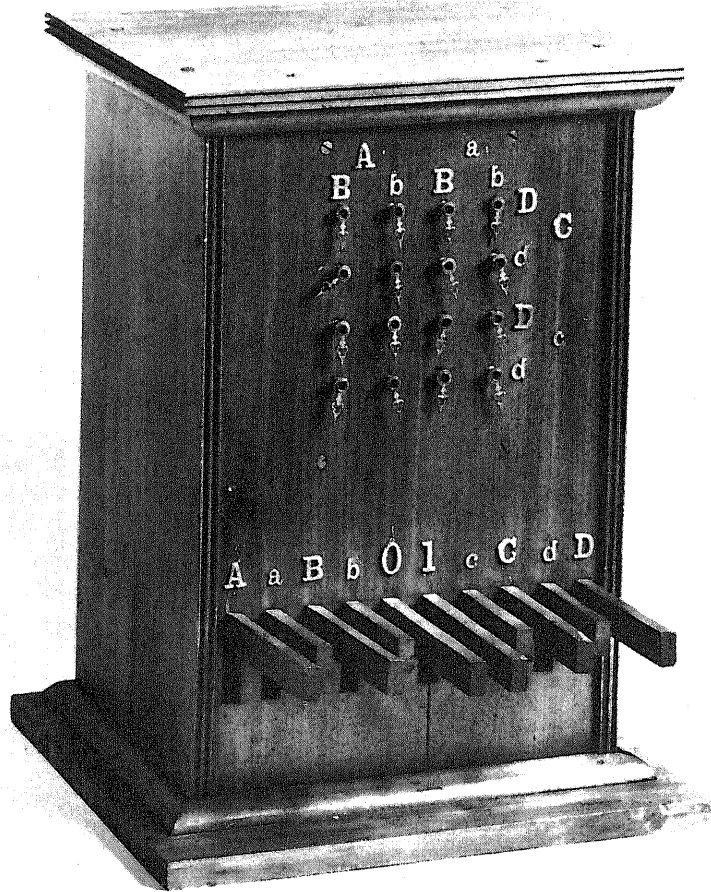


Fig. 5. The only known surviving Marquand machine
Fine Hall Library, Princeton University
Photograph by Robert P. Matthews

a member of the faculty at Princeton, his alma mater, in 1881 as a tutor in Latin and lecturer in logic, and in 1883 as professor of art and archaeology, a position he held until his death in 1924. Why did Marquand make such a radical career change? A likely hypothesis may be found in *The Eye of the Tiger*, a publication celebrating the recent 100th anniversary of the founding of the Princeton Department of Art and Archaeology. There the same question was raised, and probably correctly answered.

It would seem that from the beginning [of his career at Princeton] Marquand and his teaching were highly visible. His career always followed a course of the strictest intellectual discipline, but his early endeavors resulted in a series of comments made by the president to the Trustees that we shall take the occasion to report. The first of these came in November 1881 when McCosh said, "It is proper to state that Allan Marquand, Ph.D., who is a Tutor in Latin, gives instruction in Modern Logic. . . . I have not yet called together the committee appointed on this subject, but mean to do so now." The specific subjects Marquand lectured on to seniors and some postgraduates were "the theory of induction, probability, algebras of logic, and the logic of relatives."⁶ What the president seems to have meant was that these subjects had not been cleared with the curriculum committee, and therefore Marquand had made his own decisions about giving them. Further, Marquand had submitted a letter directly to the curriculum committee in this regard, which seems not to have been much appreciated. In fact, we are told he was given permission to withdraw his letter, which he did. Therefore, unfortunately, no record remains of his proposals. But according to what we might call "an oral tradition" we hear that President McCosh found Marquand's teaching "unorthodox and un-Calvinistic," i.e., not so proper for instruction in philosophy at the College of New Jersey. As a result, it was probably with a certain amount of relief that McCosh was authorized by the Trustees to invite Marquand to take up the new and, as it seemed, less controversial field of the history of art.⁷

⁶ These were precisely the subjects Marquand studied with Peirce at the Johns Hopkins University.

⁷ Marilyn Aronberg Lavin, *The Eye of the Tiger: The Founding and Development of the Department of Art and Archaeology, 1883-1923* (Princeton: The Department of Art and Archaeology and the Art Museum, 1983), pp. 8-9.



Allan Marquand (1853-1924), ca. 1881
Princeton University Archives

Not only did Marquand “take it up,” he had a brilliant career in the field.

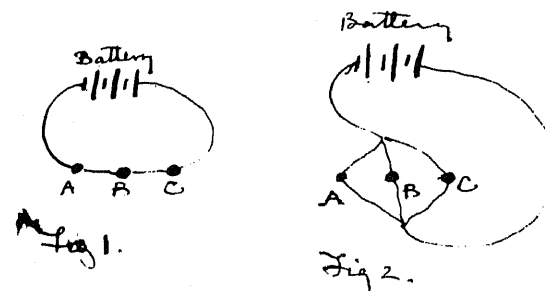
Just before, or perhaps shortly after Marquand’s AAAS paper was published late in 1886, it seems that Peirce had fallen upon hard financial times, an experience it was his misfortune often to repeat. He had recently been summarily dismissed by Hopkins in a way that would make the present AAUP Executive Committee swear like cowboys.⁸ He was eventually to establish his new residence in Milford, Pike County, Pennsylvania. But for the moment, being short of funds, he seems to have asked Marquand for support. Although we do not have a record of the request, we do possess a copy of a remarkable letter from Peirce to Marquand.⁹ It is dated 30 Dec. 1886, 36 W. 15th St.,

New York. Peirce first thanked Marquand for his largesse, and promised to repay soon.

I am as deeply touched by your generosity, as if you had made me a present; and doubtless you think it somewhat problematical when you see your money again. Nevertheless, I have no intention of remaining so poor as I am, and if there is no other way, if the world does not care to pay for my philosophy, I will abandon that and apply my logic to private ends. I mean at once to advertise that I will give lessons by correspondence in the art of reasoning. If this idea is as successful as I hope, I shall not keep you long waiting. If not, I have others.

The next paragraph discussed a previous conversation between them: “You spoke, when I saw you, as if disappointed with the reception your machine had met with.” This is no doubt a reference to the paper Marquand read at the AAAS meeting on 11 November 1885, later published as mentioned above. Peirce went on to discuss some possible ways to improve the machine in terms of the kinds of logical operations one ought to expect from it. Then came some important words:

I think you ought to return to the problem, especially as it is by no means hopeless to expect to make a machine for really very difficult mathematical problems. But you would have to proceed step by step. I think electricity would be the best thing to rely on.



Let A, B, C be three keys or other points where the circuit may be open or closed. As in Fig. 1, there is a circuit only if *all* are closed; in Fig. 2 there is a circuit if *any one* is closed. This is like multiplication & addition in logic.

⁸ Fisch and Cope, “Peirce at the Johns Hopkins University.”

⁹ The Allan Marquand Papers, Princeton University Library.

"Multiplication and addition in logic" are the same as conjunction and disjunction of propositions. These circuits, of course are Shannon's analogues, about 50 years before Shannon discerned them.¹⁰

This letter was discovered at Princeton about 1970 by Dr Preston H. Tuttle. Apparently no one before then, except Marquand, was influenced by it since it was not published until 1973¹¹ after efforts by Max Fisch and Arthur Burks. But what, we may ask, did Marquand do with the idea about using electricity?

One of the best of the very few pieces of evidence we have on this subject is an article by James Mark Baldwin entitled "Logical Machines," which appeared in 1902 in Baldwin's *Dictionary of Philosophy and Psychology*. In this dictionary is perhaps the first publication of the idea of using electricity for machine logic. Baldwin, a famous psychologist, was a colleague of Marquand at Princeton, and his dictionary was, and is, a widely used reference work. Peirce, by the way, was one of the principal contributors to it. The article began with the assertion that there were but three types of machines that merited attention: those of Jevons, Venn, and Marquand. Under the last name, he noted the mechanical machine reported to the AAAS in November of 1885, then wrote:

In 1882 Marquand constructed from an ordinary hotel annunciator another machine in which all the combinations are visible at the outset, and the inconsistent combinations are concealed from view as the premises are impressed upon the keys. He also had designs made by means of which the same operations could be accomplished by means of electro-magnets.¹²

Baldwin probably made a small slip here, for if one reads his entire account of Marquand's efforts on this subject, it appears he thought that Marquand developed all of the following: a system of logical diagrams, a first machine based on them, a

second expanded machine built in 1881-1882 and presented in November 1885 to the AAAS, the "hotel annunciator" machine built in 1882, and then the electromagnetical design he had someone make. But in reality, there is reason to believe the "hotel annunciator" machine and the one exhibited to the AAAS are one and the same unit. Hotel annunciators in those days came in versions that operated either hydraulically, pneumatically, electrically, or mechanically.¹³ The machine exhibited to the AAAS most likely was based on principles found in mechanical hotel annunciators of the day. Baldwin's description of how the "hotel annunciator" machine functioned is identical to the way the AAAS machine functioned, as reported in Marquand's paper. Thus, Marquand made four, not five contributions to the development of logical machines: he worked out a diagrammatic method, designed a simple mechanical version of those diagrams,¹⁴ designed the AAAS/Hotel Annunciator machine, and commissioned an electromagnetical design. In his *Dictionary* article, Baldwin went on to compare Marquand's machines with those of Jevons and Venn, hinting that Marquand's AAAS equipment was superior due to its simplicity and ease of expansion to accommodate a larger number of terms. This theme echoes similar remarks by Peirce in his 1887 article "Logical Machines."¹⁵ Baldwin concluded by saying that "Marquand's logical machines are now in the Princeton Psychological Laboratory." The only known surviving Marquand machine is the AAAS unit, which is in Fine Hall Library on the Princeton University campus. It has recently been restored to working order.

This electromagnetic design probably did not precede Peirce's letter of December 1886, so the date of the design could be any time between 1886 and 1901-1902. The foregoing leaves us with these questions: Does the design that Marquand "had made" still survive? Can we discover who Marquand had design it, and when?

There is, also in the Marquand Papers at Princeton, a remarkable circuit diagram, which Professor Alonzo Church no-

¹⁰ Claude E. Shannon, "A Symbolic Analysis of Relay and Switching Circuits," *Transactions of the American Institute of Electrical Engineers*, 57 (1938), 713 ff.

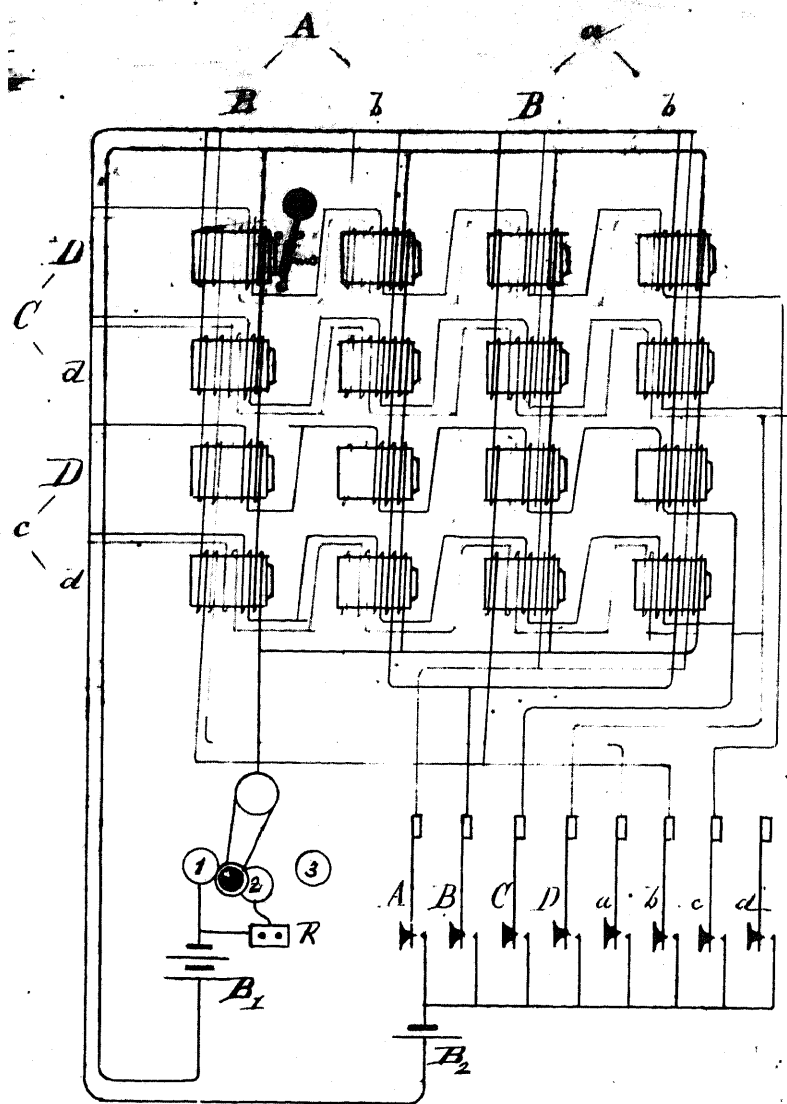
¹¹ Charles and Ray Eames, *A Computer Perspective* (Cambridge: Harvard University Press, 1973), p. 33.

¹² James Mark Baldwin, *Dictionary of Philosophy and Psychology* (New York: The Macmillan Company, 1902), Vol. II, pp. 28-30.

¹³ *The Century Dictionary*, ed. William Dwight Whitney (New York: The Century Company, 1889), p. 226.

¹⁴ *Studies in Logic. By Members of the Johns Hopkins University*, ed. Charles Sanders Peirce (Boston: Little, Brown and Company, 1883), pp. 12-15.

¹⁵ *The American Journal of Psychology*, 1 (1887), 165-170.



Circuit diagram for an electromagnetic logical machine
The Allan Marquand Papers
Princeton University Library

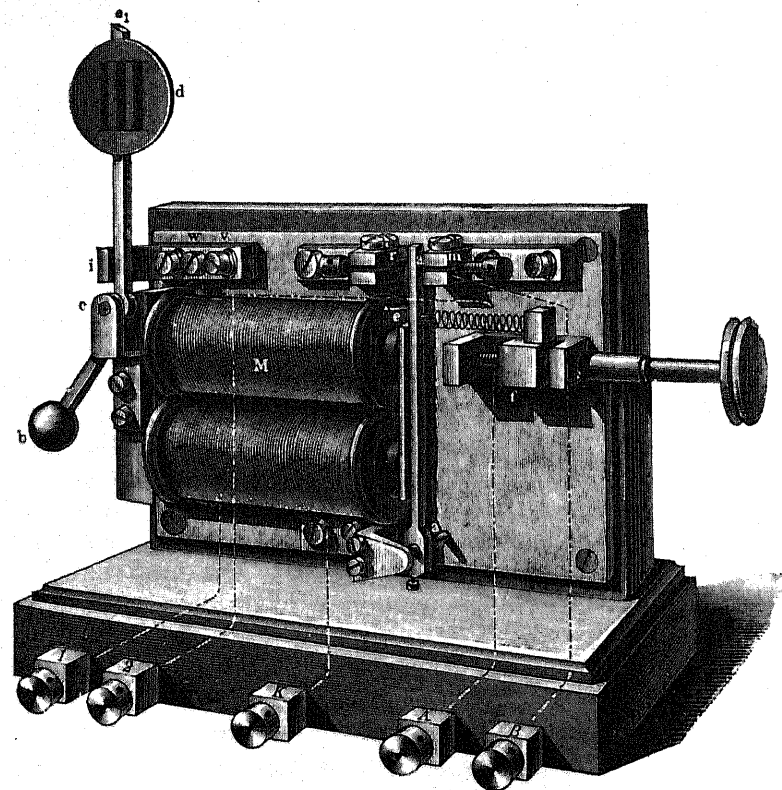


Fig. 625.

Siemens and Halske's fire alarm telegraph
in George B. Prescott, *Electricity and the
Electric Telegraph*, 1884
Courtesy of Texas Tech University Library

ticed, probably about 1950.¹⁶ On the face of the diagram, in the lower left corner, too faint to be seen in most photographs is a note in light pencil: gravity > springs. This presumably means that gravity would be a force more appropriate than that of a spring for countering the magnetic force on each arm. Perhaps the author of that short comment had in mind an arrangement being used in fire alarm telegraphs at that time.¹⁷ The handwriting on the verso of the diagram is as follows:

- (1) raises the fallen.
- (2) Sustains the upright—but does not raise the fallen
- (3) Causes the unsustained to fall
- A Sustains the a's
- a " " A's
- B " " b's
- b " " B's
- etc.

Upside down, in relation to the above directions, and crossed out with a pen stroke, are the following words: "INVENTOR," "WITNESSES," "By," and "Attorney." In the witness position, also crossed out, is a signature: Wm. S. Skinkle [?]. The signature is in a different hand than that for the operating directions. Heretofore all scholars who have looked at the diagram that Church found in the Marquand Papers have assumed that Marquand designed it. But it seems, in view of Baldwin's statement cited above, we now have definitive evidence that this is the design Marquand had made, and that Marquand was not its designer.

Wolfe Mays of the University of Manchester¹⁸ and George W. Patterson of the Moore School of Electrical Engineering, University of Pennsylvania¹⁹ have discussed the circuit under the assumption that it was designed by Marquand. Patterson offered a complete electrical engineering analysis of its capabilities, while proposing some revisions of Mays's earlier ideas about its operation. At the time they wrote, neither author was

¹⁶ Wolfe Mays, "The First Circuit for an Electrical Logic Machine," *Science*, 118 (1953), 281-282.

¹⁷ George B. Prescott, *Electricity and the Electric Telegraph* (New York: D. Appleton and Company, 1884), Vol. II, pp. 1051-1053.

¹⁸ Mays, "The First Circuit for an Electrical Logic Machine."

¹⁹ George W. Patterson, "The First Electric Computer: A Magnetological Analysis," *Journal of the Franklin Institute*, 270 (1960), 130-137.

aware of Peirce's 1886 letter to Marquand suggesting electricity, nor, probably, of Baldwin's statement in the *Dictionary*. It will contribute to our goals to have an outline of Patterson's analysis in non-technical language. Then it will be possible to add a few comments, and finally to offer a conclusion about who Marquand had designed the diagram and when.

To understand the operation of this circuit, one must grasp a few simple things about the 16 electromagnetic elements which constitute its operating core. The word "element" is used here in a special way to refer to one of the units in the design, each unit being composed of an electromagnet having five separate coils, an armature with air gap, and spring to maintain a position for the unenergized armature. An element is not a relay, for the armature of a relay moves switches, something not a part of this design. A typical element with armature is drawn at the upper left position of the circuit diagram. The armatures are omitted from the drawing of the remaining elements as an expediency.

When the armature of an element is to the right, as it would be when no current is on the element coils, a certain amount of current, call it the "pull-in" value, would have to be applied should we wish to pull the armature to the left to touch the element's iron core. This would be a relatively large current, because to attract the armature the magnetic field has to overcome the air gap between the magnet core and the piece of iron on the armature. Magnetic flux travels easily through iron, but relatively poorly through air. However, once the armature is attracted and is in contact with the core, the armature can be retained in its "pulled-in" position with a much smaller current, simply because the air gap is almost non-existent. This phenomenon is used in this machine to create a means for magnetically storing states of information—memory, in other words.

Notice that each element has five coils. One coil on every element is controlled by the three-position operation switch. If the operation switch is placed in position one, a strong current flows, causing all elements to pull-in. The remaining four coils per element represent the possible truth values that could be impressed upon that element. Because the machine can handle a maximum of four terms, there are 16 elements. If we arrange the following matrix, one can see why 16 elements with four coils each are needed.

| | | | |
|------|------|------|------|
| ABCD | AbCD | aBCD | abCD |
| ABCd | AbCd | aBCd | abCd |
| ABcD | AbcD | aBcD | abcD |
| ABcd | Abcd | aBcd | abcd |

Here uppercase letters represent a variable as being true, and lowercase letters represent its falsity. And each grouping of four letters in the 16-fold matrix represents one element's four programming coils. Every possible function is provided, and those functions are controlled by the eight input keys in the lower right of the circuit. For instance, if the D key is depressed, appropriate coils in the matrix will be energized.

The machine is used in this general way. First a programmer puts the operate switch onto position one. This brings all armatures to the vertical (no air gap) position. Then the operator switch is placed onto position 2 which sends a reduced current to the operation coil on every element. This current has been calibrated to be just enough to hold all armatures vertical. With the operate switch in position 2, a premiss is entered by depressing the appropriate programming keys, which are arranged to stay closed until reopened. Now the control switch is placed in position 3, which opens it completely, meaning all the elements not receiving current from the separate programming keys will drop out, de-energize. Next one returns the operate switch to position 2, and opens all programming keys, the result being that the machine will "remember" all the elements previously programmed, that is, those previously programmed key entries will be preserved on the element matrix. We can now enter a new premiss with the program keys, then move the operate switch to its open position, and see the result of two premisses entered. We can "save" that again, and see the result of a third premiss entered, and so on. At the proper point we can stop, inspect the "read-out" facility, which in this case is the pointers of element armatures, and from that determine what conclusion is consistent with the premisses entered.

Patterson concluded his analysis by saying that the machine is theoretically easily expandable to any size (any number of terms). Hence, according to him, this seems to be a design for a general-purpose, truth-functional, logical computer. It is quite phenomenal that it includes most of the functions thought to be essential to computers today. The operate switch is a kind of system control element. The keys represent program input.

The machine of this design includes and uses a magnetic memory! And there is an output in the form of the pattern created by the armatures which can be read off, row and column fashion, to provide results, or solutions, to problems. The only similarity, however, between this circuit and the circuits in Peirce's 1886 letter is that they both use electricity. The 1886 approach would operate quite differently from the electromagnetic circuit, since the former envisioned the state of information being represented by a current flowing or not flowing, and allowed for no memory function. The electromagnetic circuit employs a key and coil for every possible state, including negative states, and does not make use of Shannon's analogues. Instead, it employs what Patterson identified as a "threshold" approach.²⁰ We could say that the information is represented as states of magnetic energy in each of the 16 elements.

Now we must consider evidence which strongly, although circumstantially, implies that Peirce was the designer of this remarkable circuit. The argument begins with Baldwin's statement that Marquand had someone make an electromagnetical design. This implies that the design was not made by Marquand, contrary to what Mays, Patterson, and other scholars thus far have assumed.

Another scholar, by the way, who seems to have made that assumption, is Martin Gardner.²¹ After considering Baldwin's dictionary entry on logical machines, the note by Mays, and Patterson's article, Gardner stated that "The wiring diagram is of no special interest . . ." ! Gardner was also confused by Baldwin's talk of a "hotel annunciator" machine, saying that "nothing whatever is known of the 'hotel annunciator' machine." One might compare Gardner's discussion of the Marquand logic machines with his equally infelicitous discussion of Peirce's existential graph method of logic.²² Gardner's negative assessment of existential graphs is fully countered by recent work on that topic.²³ As we shall see below in Peirce's letter to J. M. Hantz,

²⁰ Patterson, "The First Electric Computer"; Arthur Burks and Irving Copi, "The Logical Design of an Idealized General-Purpose Computer," *Journal of the Franklin Institute*, 261 (1956), 299-314, 421-436.

²¹ Martin Gardner, *Logic Machines and Diagrams* (New York: McGraw-Hill Book Company, 1958), p. 112.

²² *Ibid.*, pp. 54-59.

²³ Don D. Roberts, *The Existential Graphs of Charles S. Peirce* (The Hague: Mouton, 1973); Kenneth Laine Ketner, "The Best Example of Semiosis and Its Use in Teaching Semiotics," *American Journal of Semiotics*, 1 (1981), 47-84; Ketner, "Peirce's Existential

perhaps there is a profound connection between diagrammatic logic and logic machines.

The circuit from the Marquand Papers is an electrification and an improvement of the mechanical machine reported in his 1886 AAAS paper. This we have determined by learning to operate (conceptually) both designs. They do function similarly but the electrical circuit version adds more features. Peirce and Marquand were in close touch, as Peirce's 1886 letter shows. They were so close that Marquand was lending him money. In the letter, Peirce asked for a conference. Also, he ended it with a P.S.: "If you will send me a copy of your last paper on your machine, I will act as Devil's Advocate, by attacking it." This also suggests continuing contact. Princeton and New York are closely situated. Since in the letter Peirce professed a desire to repay the loan, it is even feasible that Marquand might have said, the next time they met, "Well, design an electrical machine for me, and I will consider the loan paid." The handwriting on the verso of the circuit diagram matches some stylistic features in the handwriting of Peirce's 1886 letter as well as other samples of his hand from this period. It also matches some features of Marquand's hand. But an indisputable identification of the handwriting has yet to be made, a task complicated by the fact that Peirce wrote equally well with either hand. The form of lettering on the circuit diagram itself matches similar kinds of lettering found elsewhere in the Peirce manuscripts. The circuit diagram is done in five colors of ink: black, red, blue, yellow, and green. Peirce was an expert on inks: since he was a trained chemist he often made his own inks. He liked, moreover, to show multifunctional concepts such as these with different colored inks. The person who designed the circuit would have had to know Marquand's prior machines intimately, would have had to be an expert in logic at the research level, and an experienced electrical physicist, also at the research level. Peirce fulfilled all these distinctive qualifications perfectly. He was Marquand's teacher during the development of the mechanical units at Hopkins.

Graphs as the Basis for an Introduction to Logic: Semiosis in the Logic Classroom *Semiotics 1980*, comp. Michael Herzfeld and Margot D. Lenhart (New York: Plenum Press, 1982), pp. 231-239; Ketner, "A Brief Intellectual Autobiography by Charles Sanders Peirce," *American Journal of Semiotics*, 2 (1983), 61-83; Ketner, "Who Was Charles Sanders Peirce and Does He Deserve Our Homage?" *Krisis*, 1 (1983), 10-18; and Ketner, "Peirce on Diagrammatic Thought: Some Consequences for Contemporary Semiotic Science," *Proceedings of the Third Colloquium of the Deutsche Gesellschaft für Semiotik*, forthcoming.

kins. He was perhaps the leading logician of the world at that time, and very active in logical research. He was a world-renowned physicist still in the employ of the U.S. Coast and Geodetic Survey. His letter of 1886 alone testifies amply to his knowledge of electrical physics. Other evidence of his solid knowledge of electricity is abundant.²⁴ During this period there was no person other than Peirce who possessed this unique set of capabilities. Consider also that Marquand's 1882 mechanical unit had two control keys. In Peirce's 1886 letter, one of his recommendations was that the control key should have more than two functions. He urged: "it [the design] ought to perform 4 operations, or 3 at least." The electrical design has a three-position control switch, so it performs three functions. Because this electrical design is theoretically expandable to any number of terms,²⁵ it would be capable of solving "really very difficult mathematical problems," as Peirce wrote to Marquand. One class of difficult problems this kind of machine, when expanded, could solve would be truth-functional or Boolean problems with a large number of variables. Such problems are difficult because the matrix for each would be equal in length to 2 raised to the power equal to the number of different variables. Thus, if one has four variables, a complete matrix has 16 combinations. But if one had 20 variables, a complete matrix would require 2 to the 20th power combinations. In this last case, the electrical design could save considerable time. What kinds of practical applications would such a unit have had? One occurs immediately; perhaps there are others. In evaluating contracts, for instance in insurance or legal work, the provisions can be represented as logical relations, truth functions, and one can thereby look for unexpected combinations of provisions, or loopholes. This design could be so used. It is barely possible that Peirce and Marquand might have had some notion of patenting the design, hence its being drawn on paper suitable for a patent application, even including some appropriate typing. Peirce was involved in patent applications in the late 1880s and early 1890s, so this kind of paper might have laid readily at hand. Because of his continuing shortage of funds Peirce often wrote on partially used scraps of paper such as this appears to be.

²⁴ Kenneth Laine Ketner and James Edward Cook, *Charles Sanders Peirce: Contributions to The Nation* (Lubbock: Texas Tech Press, 1975-1979), Vol. II, pp. 218-222, 228-229; Vol. III, pp. 205-206, 254-256.

²⁵ Patterson, "The First Electric Computer," p. 137.

All of the above considerations lead to the strong inductive conclusion that this electromagnetic design was made by Charles Peirce.

It is possible to make an educated guess about the date of its creation, namely 1887, in view of the following evidence. Peirce was thinking about logic machines during that year, for he published an important short essay entitled "Logical Machine" (reproduced in Appendix B) in the new *American Journal of Psychology*, edited by his old Hopkins colleague, G. Stanley Hall. By 1890, in a letter to Peirce dated 25 March, Marquand stated that he was no longer active in philosophy: "I am now too much of an outsider in philosophical matters to engage in a public discussion."²⁶ Indeed, even by the time of Peirce's 1886 letter, Marquand had already been three years into his new career as an art historian.²⁷ In view of that recent change in his career, it would have been quite natural for Marquand to have laid aside the recently designed circuit, leaving it unconstructed and untested. The fact that the circuit was not built is, surely, one of the facts we have to explain. During 1887, it would have been natural for him to have done nothing more with it. This supposition gains in plausibility if one also considers the possibility that Marquand might never have intended collecting the debt in any event. Marquand's letter of 1890, stating that he was an outsider in philosophy, also puts a kind of terminus on the most likely period in which he would have had a design made. In other words, he was not interested by 1890, so it is likely that he commissioned the design in 1887 when he had, as the police say, motive and opportunity for doing so.

A second strong piece of evidence for dating this design is in a letter from Peirce to J. M. Hantz, dated 29 March 1887.²⁸ We know nothing about Hantz, except that he lived in Wisconsin. Peirce made several relevant points there: that formal logic is like a machine; that Peirce's expanded logic, which encompasses more than formal logic, is like observing diagrams; and that this wider logic is a living non-mechanical process.

It is my fate to be supposed an extreme partisan of formal logic, and so I began. But the study of the logic of relations has converted me from that error. Formal logic centers its

²⁶ The Charles Sanders Peirce Papers, Department of Philosophy, Harvard University.

²⁷ Lavin, *The Eye of the Tiger*, pp. 8-9.

²⁸ Peirce Papers, Harvard University.

whole attention on the least important part of reasoning, a part so mechanical that it may be performed by a machine, and fancies that that is all there is in the mental process. For my part, I hold that reasoning is the observation of relations, mainly by means of diagrams and the like. It is a living process. This is the point of view from which I am conducting my instruction in the art of reasoning. I find out and correct all the pupil's bad habits in thinking: I teach him that reasoning is not done by the unaided brain, but needs the cooperation of the eyes and hands. Reasoning, as I make him see, is a kind of experimentation, in which, instead of relying on the intelligible laws of outward nature to bring out the result, we depend on the equally hidden laws of inward association. I initiate him into the art of this experimentation. I familiarize him with the use of all kinds of diagrams and devices for aiding the imagination. I show him just what part abstract thought has in the process—a quite subsidiary one.

The claim that narrow formal logic is like a machine sounds like the result of a piece of research, and the piece of research of which it could be a result is the design of the 16-element electromagnetic machine for Marquand. Peirce would have also readily appreciated its expandability to any number of terms. There is, however, another possibility expressed in this letter, presently just an idea being advanced, awaiting further study. The idea is that Peirce's comments, about logic (in the broadest sense) being non-mechanizable, run awfully close to similar ideas by Alan Turing.²⁹ This is of course a matter which must be resolved later.

Marquand wrote no more on logical machines. But in 1887, Peirce wrote an amazing and insightful article on that topic for the premier issue of the *American Journal of Psychology* (see Appendix B). The article mentioned Marquand's work in a positive way, showing that the problem was still on Peirce's mind. Indeed, he continued to make comments on the problem, the latest known one being in 1906.³⁰ The first issue of the *Journal* was dated November 1887. Probably by then Peirce had already

²⁹ Alan Turing (1912-1954) was a scientific genius: Fellow of King's College, Cambridge, mathematical theoretician, and inventor of the idea of a "universal machine," he was also renowned for his work on the German "Enigma" codes during World War II.

³⁰ Peirce Papers, Harvard University, Manuscript 498.

finished the circuit design. This surmise is strengthened by some of the contents of the *Journal of Psychology* article. For instance, Peirce showed awareness of the distinction between machines Marquand had constructed and those which had been designed but not built, precisely the kind of distinction a circuit designer would have in mind. But the most important item of evidence in this article is the diagram on page 166. The fact that Peirce used circles here strongly suggests that he had the circular armature faces from the circuit design in mind. Furthermore, arranging the "readout" of the electromagnetic machine in this new way is an improvement over the row-column method Marquand used. With Peirce's circles (armature face labeled as above, one can immediately identify the meaning of an energized or non-energized element; whereas, if one uses Marquand's older row-column method for the machine's readout, some non-immediate interpretation by the user is needed

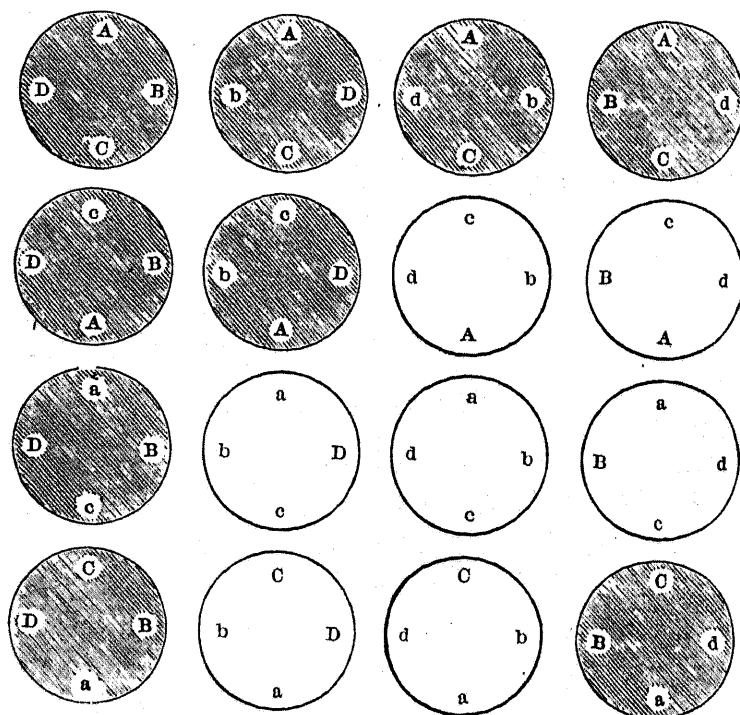


Diagram by Charles Sanders Peirce in "Logical Machines,"
The American Journal of Psychology, Volume 1, 1887

before the meaning of a result is obtained from the display. In contemporary computer jargon, this move to a revised display format would be called "making the machine user-friendly."

These are exciting conclusions. If true, they mean that Charles Peirce, late in 1886 and early 1887, invented electrical computing. Obviously it was not an invention that, as far as one knows, entered the flow of technological development at that time. It lay in cold storage, until it was rescued partly by James Baldwin, who mentioned it very briefly in his *Dictionary*. But we can say that there the idea was published in its general form, although not identified with Peirce. It is not known who in the field of technology might have read Baldwin's remarks and profited from them. Yet the possibility exists. That dictionary was a widely distributed and often used reference work. When Church brought the design fully into the light of day, it did enter the flow of science, through the work of Mays and Patterson. Then it may have influenced the work of Burks (and perhaps others) who knew Patterson's piece. Perhaps it did provide ideas to these researchers and others. In the 1950s, truth-functional logic machines executed with electromagnetic elements had just been developed. Of course these scholars thought the design was by Marquand. But at least we may conclude that in designing this unit, Peirce in 1887 was successfully doing what the mainstream of logic and computing science was just beginning to do around 1950. That Charles Peirce was roughly 63 years ahead of his time can perhaps be described as *the* curse of his career.

APPENDIX A

Allan Marquand, "A New Logical Machine,"
*Proceedings of the American Academy of
 Arts and Sciences*, XXI (1886), 303-307

XVII.

A NEW LOGICAL MACHINE.

BY ALLAN MARQUAND, PH. D.

Presented by Invitation, November 11, 1885.

DURING the year 1881 I constructed a logical machine somewhat similar to the well-known machine of Prof. Jevons, and printed logical diagrams for problems involving as many as ten terms.* This earlier instrument and the logical diagrams formed the basis of the machine illustrated on the accompanying plate. The new machine was constructed in Princeton during the winter of 1881-82, by my friend Prof. C. G. Rockwood, Jr., whose mechanical skill and untiring patience gave me invaluable assistance. The machine was made from the wood of a red-cedar post, which once formed part of the enclosure of Princeton's oldest homestead. It measures 32 cm. high by 21 cm. wide and 15 cm. deep. Like the instrument of Prof. Jevons, and that of Prof. Venn, it is constructed for problems involving only four terms, but more readily than either of those instruments admits of being extended for problems involving a larger number of terms.

The face of the machine (Fig. I.) presents to view sixteen small pointers representing the sixteen logical combinations of the symbols *A*, *B*, *C*, and *D*, with their negatives *a*, *b*, *c*, *d*. These combinations are so arranged that all the *A* combinations are found in the two vertical columns to our left, the *a* combinations in the two vertical columns to the right. The *A* combinations are subdivided vertically into the *B* and *b* combinations, and the *a* series in like manner. Both are also subdivided horizontally into the *C* and *c* combinations, and each of these again into the *D* and *d* combinations. Thus the uppermost pointer to the left represents the combination *A B C D*, the horizontally adjoining one *A b C D*, the next *a B C D*, and so on until we reach the lowermost to the right, which is *a b c d*. Below the pointers may be seen the two operation keys marked *1* and *0*, and the four positive and four negative letter keys under their respective symbols.

* *Philos. Mag.*, October, 1881, pp. 266-270.

The *I* key may be called the *restoration key*. It prepares the machine for a new problem, by raising all the pointers to the horizontal position. The *O* key may be called the *destruction key*, as when pressed down it allows the pointers to fall. The function of a *letter key* is to sustain in the horizontal position the pointers representing the corresponding negative combinations. Thus, if the *A* key is pressed, the *a* pointers are sustained; if the *b* key is pressed, the *B* pointers are sustained; and similarly for all the remaining letter keys.

Turning now to Fig. II., the mechanism by which this is effected will be easily seen. On the inner face of the machine, and corresponding to the pointers, are sixteen drops, some of which are pictured in the horizontal position, and some as fallen. The two operation keys move rectangular frameworks, each consisting of four vertical brass rods fastened together, and carrying pins which reach all of the sixteen drops. The framework of the *O* key moves on the inner, that of the *I* key on the outer side of the drops, both horizontally. If we wish to bring all the pointers to the horizontal position and hold them there, both operation keys are pressed down. The *I* key raises all the drops. Releasing first the *O* key, its framework is drawn back by a fixed spring, and by means of its pins holds the drops in position; on releasing the *I* key, its framework is drawn back so as not to interfere with subsequent operations. Each letter key operates two vertical or two horizontal rods, free to revolve on their axes. In each rod are set four pins, conveniently bent, so that when the rods are partially revolved, by pressure of the letter keys, the pins are made to sustain the drops in the horizontal position without raising those which have fallen. The rods return to their original position, by means of small spiral springs, as soon as the pressure of the letter keys is released. The desired motion is communicated to the rods by means of cat-gut strings, there being two such strings from each letter key. Thus the *A* key operates the two vertical rods which are to hold the *a* drops; the *b* key the rods for holding the *B* drops; and the other letter keys in like manner. By this device it will be seen that, if we should press the *A* key (this holds the *a* combinations), and then the *O* key, only the *A* pointers will fall; or, if both the *A* and *B* keys are depressed (this holds the *a* and *b* combinations), and then the *O* key, only the *A B* pointers will fall; and similarly for the other combinations.

To utilize the instrument for the solution of logical problems, we first raise all the pointers to the horizontal position. This will indicate the state of a logical universe of four terms before the introduction of premises. Now, since the establishment of any combination

means the negation of some other, we may express our premises in negative form. Thus, in general, $A \prec B$ (every *A* is *B*) may be expressed $A b \prec O$ (*A*'s which are *b* do not exist). This we express upon our machine by pressing down the letter keys *A* and *b*, and then the destruction key. The falling of the *A b* pointers indicates exactly the change effected in the logical universe by the introduction of the premise $A \prec B$. We may then continue to impress as many premises as we please, until all the pointers have fallen. The following formulæ* will suffice to illustrate the manner in which premises may be reduced from the positive to the negative form.

| Positive Form. | Negative Form. |
|------------------------------------|--|
| (1.) $A \prec B$ | $A b \prec O$. |
| (2.) $A + B \prec C$ | $\begin{cases} A c \prec O. \\ B c \prec O. \end{cases}$ |
| (3.) $A \prec B + C$ | $A b c \prec O$. |
| (4.) $A \prec b + C D$ | $\begin{cases} A B c \prec O. \\ A B d \prec O. \end{cases}$ |
| (5.) $A B \prec C$ | $A B c \prec O$. |
| (6.) $A \prec B C$ | $\begin{cases} A b \prec O. \\ A c \prec O. \end{cases}$ |
| (7.) $A (B + C) \prec D$ | $\begin{cases} A B d \prec O. \\ A C d \prec O. \end{cases}$ |
| (8.) $A \prec B (C + D)$ | $\begin{cases} A b \prec O. \\ A c d \prec O. \end{cases}$ |

Having expressed our premises upon the machine, and their effect being recorded by the pointers, it only remains for us to read off the conclusion. The entire conclusion is represented by the fallen pointers, and might be expressed as their joint sum; or it may be viewed as the logical sum of the combinations represented by the horizontal pointers. Thus, the premises of Barbara, $A \prec B$ and $B \prec C$, give as the entire conclusion read negatively,

$$\left. \begin{array}{l} A b C \\ A b c \\ A B c \\ a B c \end{array} \right\} \prec O.$$

* The sign \prec is that used by Mr. C. S. Peirce for the general sign of inference. $A \prec B$ means, if *A*, then *B*. Viewed in the light of class extension, it means the class *A* is included in the class *B*. The sign of addition is here used in the non-exclusive sense; thus, $A + B$ means either *A* or *B*, or both. The expression AB means, when designating a class, the individuals which belong to both classes *A* and *B*; when designating a quality, the combination of the qualities *A* and *B*.

Read positively, the conclusion is,

$$A B C + a B C + a b C + a b c = 1;$$

or, more briefly,

$$B C + a b = 1.$$

Ordinarily, the conclusion called for is part only of the total conclusion. Thus, syllogism with the above premises asks for a conclusion involving only A and C . An inspection of the dial-plate will show us the conclusion $A < C$, and also other conclusions involving relations between other terms than A and C ; thus,

$$c(A + B) < 0; b < a + c, \text{ etc.}$$

Nor is it necessary that our conclusions should be limited to relations between terms given in the premises, as may be seen in the solution of the following problems.

PROBLEM I.

Let us suppose that there are four girls at school, Anna, Bertha, Cora, and Dora, and that some one had observed that

(1.) Whenever either Anna or Bertha (or both) remained at home, Cora was at home; and

(2.) When Bertha was out, Anna was out; and

(3.) Whenever Cora was at home, Anna was at home.

What information is here conveyed concerning Dora?

Indicating by the capital letters the fact of *remaining at home*, and by the small letters that of *going out*, our premises are

$$A + B < C = \begin{matrix} A c \\ B c \end{matrix} < 0$$

$$b < a = b A < 0$$

$$C < A = C a < 0$$

and, impressing them upon the machine, there will result the state of things indicated by Fig. 1. From this we may read off the conclusion,

$$D < A B C + a b c.$$

$$d < A B C + a b c.$$

Or, if Dora remain at home, her three sisters will be all at home or all out; and the same will be true if Dora goes out.

PROBLEM II.

If $A = B$ and $B = C$, what may be said of D ?

Impressing upon the machine our premises,

$$(A = B) = \begin{matrix} A < B \\ B < A \end{matrix} = \begin{matrix} A b < 0 \\ B a < 0 \end{matrix}$$

$$(B = C) = \begin{matrix} B < C \\ C < B \end{matrix} = \begin{matrix} B c < 0 \\ C b < 0 \end{matrix}$$

the same state of the logical universe is produced as by the premises of the preceding problem. Hence,

$$D < A B C + a b c.$$

PRINCETON COLLEGE,
Princeton, N. J.

APPENDIX B

Charles Sanders Peirce, "Logical Machines,"
The American Journal of Psychology, 1 (1887), 165-170

Logical Machines.

In the "Voyage to Laputa" there is a description of a machine for evolving science automatically. "By this contrivance, the most ignorant person, at a reasonable charge, and with little bodily labor, might write books in philosophy, poetry, politics, laws, mathematics, and theology, without the least assistance from genius or study." The intention is to ridicule the *Organon* of Aristotle and the *Organon* of Bacon, by showing the absurdity of supposing that any "instrument" can do the work of the mind. Yet the logical machines of Jevons and Marquand are mills into which the premises are fed and which turn out the conclusions by the revolution of a crank. The numerous mathematical engines that have been found practically useful, from Webb's adder up to Babbage's analytical engine (which was designed though never constructed), are also machines that perform reasoning of no simple kind. Precisely how much of the business of thinking a machine could possibly be made to perform, and what part of it must be left for the living mind, is a question not without conceivable practical importance; the study of it can at any rate not fail to throw needed light on the nature of the reasoning process. Though the instruments of Jevons and of Marquand were designed chiefly to illustrate more elementary points, their utility lies mainly, as it seems to me, in the evidence they afford concerning this problem.

The machine of Jevons receives the premises in the form of logical equations, or identities. Only a limited number of different letters can enter into these equations—indeed, any attempt to extend the machine beyond four letters would complicate it intolerably. The machine has a keyboard, with two keys for the affirmative and the negative form of each letter to be used for the first side of the equation, and two others for the second side of the equation, making four times as many keys as letters. There is also a key for the sign of logical addition or aggregation for each side of the equation, a key for the sign of equality, and two full stop keys, the function of which need not here be explained.¹ The keys are touched successively, in the order in which the letters and signs occur in the equation. It is a curious anomaly, by the way, that an equation such as $A=B$, which in the system of the transitive copula would appear as two propositions, as All A is B and All B is A, must not be entered as a single equation. But although the premises outwardly appear to be put into the machine in equations, the conclusion presents no such appearance, but is given in the form adopted by Mr. Mitchell in his remarkable paper on the algebra of logic. That is to say, the conclusion appears as a description of the universe of possible objects. In fact, all that is exhibited at the end is a list of all the possible products of the four letters. For example, if we enter the two premises All D is C, or $D=CD$, and All C is B, or $C=BC$, we get the conclusion in the following shape, where letters in the same vertical column are supposed to be logically multiplied, while the different columns are added or aggregated:

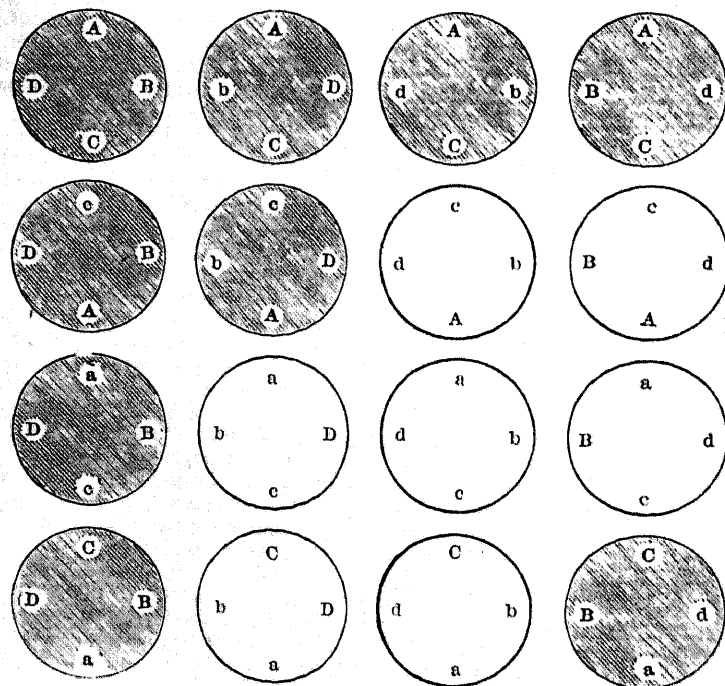
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| A | A | A | A | a | a | a | a | a |
| B | B | B | b | B | B | B | B | b |
| C | C | c | c | C | C | c | c | c |
| D | d | d | d | D | d | d | d | d |

¹Phil. Trans. for 1870.

The capital letters are affirmatives, the small letters negatives. It will be found that every column containing D contains B, so that we have the conclusion that All D is B, but to make this out by the study of the columns exhibited seems to be much more difficult than to draw the syllogistic conclusion without the aid of the machine.

Mr. Marquand's machine is a vastly more clear-headed contrivance than that of Jevons. The nature of the problem has been grasped in a more masterly manner, and the directest possible means are chosen for the solution of it. In the machines actually constructed only four letters have been used, though there would have been no inconvenience in embracing six. Instead of using the cumbrous equations of Jevons, Mr. Marquand uses Professor Mitchell's method throughout.¹ There are virtually no keys ex-

¹It would be equally true to say that the machine is based upon Mrs. Franklin's system. The face of the machine always shows every possible combination; putting down the keys and pulling the cord only alters the appearance of some of them. For example, the following figure represents, diagrammatically, the face of such a machine with certain combinations modified:



This face may be interpreted in several different ways. First, as showing in the shaded portions—

cept the eight for the letters and their negatives, for two keys used in the process of erasing, etc., should not count. Any number of keys may be put down together, in which case the corresponding letters are added, or they may be put down successively, in which case the corresponding combinations are multiplied. There is a sort of diagram face, showing the combinations or logical products as in Jevons's machine, but with the very important difference that the two dimensions of the plane are taken advantage of to arrange the combinations in such a way that the substance of the result is instantly seen. To work a simple syllogism, two pressures of the keys only are necessary, two keys being pressed each time. A cord has also to be pulled each time so as to actualize the statement which the pressure of the keys only formulates. This is good logic: philosophers are too apt to forget this cord to be pulled, this element of brute force in existence, and thus to regard the *solvet ambulando* as illogical. To work the syllogism with Mr. Jevons's machine requires ten successive movements, owing to the relatively clumsy manner in which the problem has been conceived.

One peculiarity of both these machines is that while they perform the inference from $(A+B)C$ to $AC+BC$, they will not perform the converse inference from $AC+BC$ to $(A+BC)$. This is curious, because the inference they refuse to perform seems to be merely syllogistic, while the one they do perform, and in fact continually insist on performing, whether it is wanted or not, is dilemmatic, and therefore essentially more complicated. But in point of fact neither of the machines really gives the conclusion of a pair of

$$\begin{aligned} &(A+B+C+D) (A+b+C+D) (A+b+C+d) (A+B+C+d) \\ &(A+B+c+D) (A+b+c+D) \\ &(a+B+c+D) \\ &(a+B+C+D) \end{aligned}$$

$$(a+B+C+d),$$

which is the same as what is seen on the unshaded portions if we regard the small letters as affirmative and the capitals as negative, and interchange addition and multiplication, that is, as—

$$\begin{aligned} &aBCD+abCD \\ &+ABCD+ABCD+ABCD \\ &+ABcd+ABcD. \end{aligned}$$

Or, looking at the unshaded portion, we may regard it as the negative of the above, or—

$$\begin{aligned} &(A+b+c+d) (A+B+c+d) \\ &(a+b+c+D) (a+b+c+d) (a+B+c+d) \\ &(a+b+C+D) (a+b+C+d), \end{aligned}$$

or, what is the same thing, as—

$$\begin{aligned} &abcd+aBcd+aBcD+abcD \\ &+abCd+abCd \\ &+ABcd \\ &+Abcd \end{aligned}$$

$$+AbcD.$$

There are two other obvious interpretations. We see, then, that the machine always shows two states of the universe, one the negative of the other, and each in two conjugate forms of development. In one interpretation simultaneously impressed terms are multiplied and successively impressed combinations added, and in the other interpretation the reverse is the case.

sylogistic premises; it merely presents a list of all the possible species in the universe, and leaves us to pick out the sylogistic conclusions for ourselves. Thus, with Marquand's machine, we enter the premise All A is B in the form $a+B$, and the premise All B is in the form $b+C$; but instead of finding the conclusion in the form $a+C$, it appears as—

$$\begin{aligned} & ABCD+ABCD \\ & +aBCD+aBCd+abCd+abCD \\ & \quad +abcd+abcD. \end{aligned}$$

As we only want a description of A, we multiply by that letter, and so reduce the conclusion to $ABCD+ABCD$, but there is no elimination of the B nor of the D. We do not even get the full conclusion in the form $ab+BC$, although it is one of the advantages of Marquand's machine that it does give the conclusion, not only in that form just cited, but also, simultaneously, as

$$\begin{aligned} & (a+B+c+d) (a+B+c+D) \\ & (a+B+C+d) (a+B+C+D) \quad (a+b+C+D) (a+b+C+d) \\ & \quad (A+b+C+D) (A+b+C+d). \end{aligned}$$

The secret of all reasoning machines is after all very simple. It is that whatever relation among the objects reasoned about is determined to be the hinge of a ratiocination, that same general relation must be capable of being introduced between certain parts of the machine. For example, if we want to make a machine which shall be capable of reasoning in the syllogism

If A then B,
If B then C,
Therefore, if A then C,

we have only to have a connection which can be introduced at will such that when one event A occurs in the machine, another event B must also occur. This connection being introduced between A and B, and also between B and C, it is necessarily virtually introduced between A and C. This is the same principle which lies at the foundation of every logical algebra; only in the algebra instead of depending directly on the laws of nature, we establish conventional rules for the relations used. When we perform reasoning in our unaided minds we do substantially the same thing that is to say, we construct an image in our fancy under certain general conditions, and observe the result. In this point of view too, every machine is a reasoning machine, in so much as there are certain relations between its parts, which relations involve other relations that were not expressly intended. A piece of apparatus for performing a physical or chemical experiment is also a reasoning machine, with this difference, that it does not depend on the laws of the human mind, but on the objective reason embodied in the laws of nature. Accordingly, it is no figure of speech to say that the alembics and cucurbits of the chemist are instruments of thought, or logical machines.

Every reasoning machine, that is to say, every machine, has two inherent impotencies. In the first place, it is destitute of all originality, of all initiative. It cannot find its own problems; it cannot feed itself. It cannot direct itself between different possible procedures. For example, the simplest proposition of projective geometry, about the ten straight lines in a plane, is proved by

von Staudt from a few premises and by reasoning of extreme simplicity, but so complicated is the mode of compounding these premises and forms of inference, that there are no less than 70 or 80 steps in the demonstration. How could we make a machine which would automatically thread its way through such a labyrinth as that? And even if we did succeed in doing so, it would still remain true that the machine would be utterly devoid of original initiative, and would only do the special kind of thing it had been calculated to do. This, however, is no defect in a machine; we do not want it to do its own business, but ours. The difficulty with the balloon, for instance, is that it has too much initiative, that it is not mechanical enough. We no more want an original machine, than a house-builder would want an original journeyman, or an American board of college trustees would hire an original professor. If, however, we will not surrender to the machine, the whole business of initiative is still thrown upon the mind; and this is the principal labor.

In the second place, the capacity of a machine has absolute limitations; it has been contrived to do a certain thing, and it can do nothing else. For instance, the logical machines that have thus far been devised can deal with but a limited number of different letters. The unaided mind is also limited in this as in other respects; but the mind working with a pencil and plenty of paper has no such limitation. It presses on and on, and whatever limits can be assigned to its capacity to-day, may be over-stepped to-morrow. This is what makes algebra the best of all instruments of thought; nothing is too complicated for it. And this great power it owes, above all, to one kind of symbol, the importance of which is frequently entirely overlooked—I mean the parenthesis. We can, of course, dispense with parentheses as such. Instead of $(a+b)c=d$, we can write $a+b=t$ and $t=c=d$. The letter t is here a transmogrified parenthesis. We see that the power of adding proposition to proposition is in some sort equivalent to the use of a parenthesis.

Mr. Marquand's machines, even with only four letters, facilitate the treatment of problems in more letters, while still leaving considerable for the mind to do unaided. It is very desirable a machine on the same principle should be constructed with six letters. It would be a little more elegant, perhaps, instead of two keys to each letter, to have a handle which should stand up when the letter was not used, and be turned to the right or left, according as the letter was to be used, positively or negatively. An obvious extension of the principle of the machine would also render it possible to perform elimination. Thus, if six letters, A, B, C, D, E, F, were used, there could be an additional face which should simply take no notice of F, a third which should take no notice of F or E, a fourth which should take no notice of F, E or D; and these would suffice. With such a machine to represent $AB+CD$, we should proceed as follows: Put down handle E to the left. [The left hand would naturally signify the negative.] Leaving it down, put down handle A to the right and then bring it back after pulling the cord. Put down handle B to the right and pull the cord, and then restore handles B and E to the vertical. Next, put down handle F to the left and successively put down the handles C and D to the right, as before. After restoring these to the vertical, put down handles E and F to the right, and pull the cord. Then we should see on the third face

$(A+B+C+D)$ $(A+b+C+D)$ $(A+b+C+d)$ $(A+B+C+d)$
 $(A+B+c+D)$ $(A+b+c+D)$
 $(a+B+c+D)$
 $(a+B+C+D)$ $(a+B+C+d)$

or, what comes to the same thing,

$aBCD+abCD$
 $ABCD+ABCD+AbCD$
 $ABcd+ABcD$

I do not think there would be any great difficulty in constructing a machine which should work the logic of relations with a large number of terms. But owing to the great variety of ways in which the same premises can be combined to produce different conclusions in that branch of logic, the machine, in its first state of development, would be no more mechanical than a hand-loom for weaving in many colors with many shuttles. The study of how to pass from such a machine as that to one corresponding to a Jacquard loom, would be likely to do very much for the improvement of logic.

C. S. PEIRCE.

Crying Wolfe

BY CHARLES SCRIBNER III

In October 1983, Mr. Scribner presented to the Library a group of inscribed or signed copies of well-known books—Leaves of Grass, A Farewell to Arms, The Spirit of St. Louis, Their Finest Hour—and a special packet of Thomas Wolfe material which had reappeared in an unlikely place. In the same month his description of this discovery was published in the pages of Vanity Fair, along with some of the Wolfe material. With the permission of Vanity Fair, of the administrator of the Wolfe estate, and of Mr. Scribner, we are reprinting the account of this discovery and adding reproductions of this recent gift.

The desk had belonged to the legendary Scribners editor, Maxwell Perkins. Before that, it had belonged to my (great-great) Uncle Arthur, youngest of the three Charles Scribner's Sons. I had "inherited" it the first day I started work (largely because the senior editor with the best claim to it complained that she ran her stockings on it). The massive Victorian oak piece had occupied the fifth-floor office on the southwest corner of 597 Fifth Avenue ever since the company's move to the building in 1913.

Perkins conducted his voluminous correspondence from that desk, with his prized authors Hemingway, Fitzgerald, Wolfe, and company. The desk was the scene of Hemingway's impromptu wrestling match with the critic Max Eastman. It was the target of Fitzgerald's homburg, which he invariably tossed over the oak-and-glass partition to announce his arrival. And it was the workbench for Perkins's most laborious undertaking: the extensive cutting and editing of Thomas Wolfe's first two novels, *Look Homeward*, *Angel* and *Of Time and the River*.

Perkins's relationship with Wolfe went beyond that of editor to author: he was also Wolfe's confidant, champion, and surrogate father. Wolfe often said that he couldn't have written his books without Max. Perkins, by nature a shy and self-effacing man, was profoundly embarrassed by his author's hyperbolic tributes. He paid a bitter price for them when Wolfe later decided he had to prove—to himself, to the public—that

he *could* write a book without Max. After writing several ston reproachful letters, Wolfe left Perkins and Scribners in 1 His last books were published by Harper & Brothers (pos mously, as it turned out) and with the final irony that Perkins, whom Wolfe had appointed his literary executor, to oversee their publication personally.

Perkins kept the angry letters buried in his desk, where were found only after his death. Evidently, he could not to have his colleagues see the negative side of Wolfe's per ality.

The desk had been cleaned out several times as it passe senior editors John Hall Wheelock and Burroughs Mitchel fore I, too, had the chance to fill its drawers with a mixtur official and personal business. We believed that the orig contents of the desk had found their way into the comp archives (now in the Princeton University Library). But sev months ago, while clearing out the desk for its first move new office, I became irritated that one drawer would not completely. Something was blocking it. I removed the dra and reached into a half-century of dust to find two crum sheets of paper clipped to a photograph. Not exactly bu treasure—at least not at first sight.

The battered photograph was of Thomas Wolfe—a phot a painting, to be precise. On the back was inscribed: "The Wolfe, from a portrait by Douglas W. Gorsline," with a signed by Elizabeth Nowell, Wolfe's agent: "This is Max Perkins' *only* personal copy. Please *be sure* not to mark or de it in any way."

The accompanying sheets of paper were a typescript poem, titled (in a very rough hand) "Last Poem," with "Broo (1934)" written below the title. It took no literary Sherlock Ho to deduce its authorship. Aside from the circumstantial dence of the desk and the photo, the impassioned voice baroque imagery were as telltale as the frenzied handwrit

It just happened that the very next week we were to ho party for the Thomas Wolfe Society in our editorial lib where Wolfe had spent many a night sleeping on the floor had wanted to read all his publisher's books). What better to welcome the society than with Wolfe's lost and last poe

The first public reading of the poem resulted in more good cheer. One of the guests, Professor Richard Kennedy noted Wolfe scholar and biographer, immediately recogn

the title from an itemized list of manuscripts that Wolfe, before his final trip west, had sent to his new editor, Edward Aswell (at Harpers). One item on the list had never been accounted for: "Last Poem." For this, there had been no corresponding manuscript—until now.



Photograph of a portrait of Thomas Wolfe by Douglas W. Gorsline
Gift of Charles Scribner III

Last Poem
Brooklyn (1934)

Oh, will you ever return to me,
my wild first force, will you return
When the old madness comes to
blacken in me and to burn
Slow in my brain like a slow fire
in a blackened brazier - dull
like a smear of blood,
Humid and hot and evil, slow-swelting
up in a flood!
Oh, will you not come back again - will
you not come back, my fierce song?
Jubilant and exultant, triumphing over
the huge wrong
Of that slow fire of madness that feeds
on me - the slow mad blood
Think with its hate and evil, swelting
up in its flood!
Oh! will you not purge it from me -
my wild lost flame?
Come and restore me, save me from the
intolerable shame
Of that huge eye that eats into my
naked body constantly
And that has no name
Gazing upon me from the immense and
cruel bareness of a sky
That leaves no mercy of concealment
That gives no promise of revealment
And that drives us on forever with its
lidless eye
Across the huge and houseless level of
a planetary vacancy.

Oh, wild song and fury, fire and flame,
Lost magic of my youth, return, defend
me from this shame!
And oh! You golden vengeance of bright
song
Not cure, but answer to earth's wrong,
Give me, I beseech you, but one touch
of grace,
One atom of your magic, as to one
Who bent before your face
From his first youth, and loved you,
knew you,
Knelt in a little place before you - Oh,
immortal state
Of poetry! - Speak for one who loved
you dearly -
And who spoke too late!
And you, wild words of that wild
tongue that had no voice,
Wild cries of that wild heart that
had no tongue
Be to me aiding now with however
rude a choice
However harsh or by what anguish
wrung,
Come to me, cries that one swept from
me like a song
And songs that were torn from me like
like a cry,
Oh you music of pain and joy and
exultancy strong
You were mad, o furious and intolerable -
so was I.

Thomas Wolfe's typescript of "Last Poem," Brooklyn (1934)
Gift of Charles Scribner III

"Dear Charley": A. Edward Newton's Letters to Charles Grosvenor Osgood

BY MAXWELL LURIA AND RICHARD E. BREWER

Twenty years after his death at the distinguished age of Charles Grosvenor Osgood is well remembered. He an authentically humanist scholar, whose bibliography braces durable work on masters so diverse as Virgil and Johnson, Boccaccio and the *Pearl* poet, and especially Spenser and Milton. Woodrow Wilson brought him down to Princeton from Yale in 1905 to be a preceptor in English. He went on to become chairman of the department from 1918 to 1926, retired in 1937 as Holmes Professor of Belles Lettres. In perspective as in range, Osgood's impressive *oeuvre* has little in common with the cramped pedantries of modern academic specialization but recalls rather a more spacious time. *The Voice of England* (1935) may be the last full-length history of English literature written by one man, and it is still among the best. *Poetry as a Means of Grace* (1941), and the equally remarkable collection of addresses called *Creed of a Humanist* (1963), which was published only months before his death, are eloquent, permanently valuable testimonies to the spiritual potency of great literature.¹

It was in 1907 that Osgood, then 36, made the acquaintance of A. Edward Newton, eight years his senior. (Newton was at Princeton, which he loved, for an undergraduate product of *Doctor Faustus*.) Though his passion for books had asserted itself long before he achieved success as a manufacturer of electrical equipment, Newton's growth into a major collector was only now beginning; and the culminating career as essayist and wit, which would bring him fame on both sides of the Atlantic, was still some years in the future. The two began to correspond almost at once and continued to do so until Newton's death in 1940. Virtually all of Osgood's letters have disappeared; but Newton's, now in the possession of the Free

Library of Philadelphia and hitherto unpublished (though Osgood himself had once contemplated publication and started editing them), chronicle in vivid detail, and with surprising emotion, a powerful and complex masculine friendship. Newton was a man of strong feelings, and the best of these letters convey his elation, depression, anxiety, affection, without compromise, surviving even dictation to his "stenographer" Nellie. When he writes, the hasty script is often hard to decipher, the punctuation and spelling chaotic, syntax vague and paragraphing non-existent. In his eagerness to communicate directly and copiously to his friend, Newton is apt to give scant attention to copybook proprieties.²

It must be allowed that they were something of an odd couple, the prim-looking Princeton preceptor, erudite, proper, irredeemably Presbyterian, and the expansive, eccentric, earthy, self-educated Philadelphia industrialist, who was generally bored by business and businessmen and confessed to understanding very little about the circuit breakers which had brought him a fortune, but who had a consuming appetite for Lamb and Trollope and Johnson and Boswell; who prided himself on being a hard worker and an old-fashioned parent, but craved leisure and genially mocked his friend's "Calvinism"; who enjoyed the airs of a man of the world and affected a half-cynical, half-hedonistic posture, but delighted in his expensive bibliophilic toys as innocently as a child, and confessed his pains and pleasures, loves and hates, with poignant candor. Newton had a rare talent for friendship. Never having attended a university and being "self-made" in letters as in business, he was attracted to English professors and counted several among his friends, declaring that he envied them their life of literature and civility.

¹ The Newton letters are printed here with the kind permission of the Free Library of Philadelphia, to which they were donated by Professor Osgood in 1956, and of the heirs of A. Edward Newton. We are grateful to Mr. Howell J. Heaney, former head of the rare book and manuscript department, to his successor, Miss Marie E. Korey, and to Mr. David K. King of the rare book and manuscript department, for their cooperation. The four extant letters from Professor Osgood to Newton are in the Princeton University Library (AM 13100, A. Edward Newton Collection), the gift of Newton's son Swift; and Newton's letters to Chauncey Brewster Tinker are in the Collection of American Literature of the Beinecke Rare Book and Manuscript Library, Yale University. Selections are printed here by permission of these libraries, and of the Osgood and Newton heirs. We wish to thank Mr. Richard M. Ludwig and Mr. David Schoonover for their kind assistance. The fullest biographical account of Newton may be found in the pamphlet *Remarks Made by E. Swift Newton on the Occasion of his Presentation of the Personal Library of His Father A. Edward Newton to the Free Library of Philadelphia*, issued by the Free Library in 1954.

² A select bibliography of Osgood's publications appears in *Creed of a Humanist*, title: University of Washington Press, 1963), pp. 131-139.

What Newton and Osgood most conspicuously shared from the start was a love of Dr. Johnson and an attachment to Boswell's *Life*. In 1938, when Newton was thought to be dying, Osgood was invited to prepare a memorial notice, he was to observe that his friend "was, one might say, primarily educated upon one book—Boswell's *Life of Johnson*, which he had read from early youth and knew almost by heart. The vigor of his wit and style owed something no doubt to his long association with Johnson."³ Newton eventually acquired a superb Reynolds portrait as well as Dr. Johnson's teapot—the only "relic" he cared to own—and in 1930 was the first American to be elected president of the Johnson Society of Great Britain.⁴ Echoing Johnson sound throughout his letters, not least when the subject is friendship itself, and in Newton's last years, darkened by illness and pain, his reflections on Johnson have a special poignancy. But in 1908, when the extant correspondence began, Johnson is simply a reciprocal enthusiasm. Acknowledging a gift of books or discussing the theatre, Newton naturally invokes him.⁵

January 7, 1908

My dear Mr. Osgood,

You will pardon my dictating an answer to your very charming note but the fact is I am so accustomed to dictation that when "I take my pen in hand to send you the few lines," I find that my thoughts decline to flow, and they are flowing so freely at the moment that I avail myself of the use of the machine.

I opened the package of books before I read your note. Indeed I did not find it until later. Before I saw the inscription I remarked to myself, I am sorry that fellow sent me this book because I foresee that it is going to be very difficult for me to return it to him. Judge then how pleased I was to read your letter and turn to the inscription in the book itself. As to the "Pearl," I reserve comment except to say that I thank you for it and to call your attention to the omission of your name therein.⁶ This is only one matter

³ Letter of Osgood to Moncure Biddle: January 6, 1938 (Free Library, Philadelphia).

⁴ Letter of Newton to Chauncey B. Tinker: January 31, 1928 (Yale).

⁵ Unless other indication is given, Newton's letters are written from Philadelphia. We have modified Newton's punctuation and spelling where this seemed necessary and made a few changes of paragraphing and arrangement.

⁶ The book in question is Charles Grosvenor Osgood, ed., *The Pearl; A Middle English Poem* (Boston: D.C. Heath & Co., 1906).

that demands your early return to Daylesford to supply the omission.

Coming back to Dr. Johnson and the "fair sex," the charm of a book of this kind is that it tickles in a most delightful way the memory. You knew it all before but it seems like meeting an old friend, than which there is nothing more pleasant, unless it is making a new old one. Do you remember in one of the talks between Johnson and Boswell, the former remarked, "Sir, how seldom it is we meet anyone we want to meet again!" I haven't the Doctor's words but I know I have his thought and the same idea has frequently occurred to me. Either I like a man or a woman or I don't, and I usually don't. Keeping one's friendships in good repair is fairly difficult without the proper material at hand.

... Business is very bad. My mail consists almost entirely of requests for duplicate copies of that little Whitman "bit" I sent my friends and a lot of these requests come from people I never heard of.⁷ One fellow writes me today that his calendar was taken by a friend and handed to Rockefeller. Much good may it do him. ...

Would it not be pleasant for us to meet sometime in New York? You will very much enjoy spending a little time at the Grolier Club, of which I am a member. Moreover we might hear a bit of music or go to the theatre, if there is anything worth seeing. I confess that I am getting so old that actresses, unless they are very beautiful and I am very near to them, no longer "excite my amorous propensities." With this final quotation I come back to earth. ...

Osgood went to Europe that summer, Newton in the fall (on the *Lusitania*), and Newton's letters are full of the mutual concern with books and people, as well as the personal affection, upon which their friendship was establishing itself.

August 1, 1908

... I have no end of enthusiasm over books in general and my own hobbies in particular, but most of the people I know take little or no interest in book collecting, and it is

⁷ At Christmas 1907, Newton printed for his friends a calendar of the new year with a quotation from Walt Whitman and commentary by himself. This would become the first of an annual series of Christmas publications which Newton sent out until the year of his death.

more or less hard to go it alone. It is something like courage. A man may be very courageous if he sees people looking at him, but to be courageous without an audience is more difficult. The virtue, therefore, seems to lie more in the audience than in the individual. Have I expressed a thought? It seems to me I had one in my mind when I began. A glance at my stenographer tells me I have not made it clear to her mind at any rate, but then her mind is fixed on her vacation, which begins as soon as this letter is finished. .

August 25, 1909

... I have a lovely copy of Forster's Goldsmith which I have just finished, and I have a lot of things which I never would have bought but for you. You came into my life just about the time I was tired of going it alone. You have got to have someone to show your treasures to: someone you know who would like to have them. Then they become doubly precious to you. Isn't it mean? Most true things are. . Your last letter was from Tintagel. It is a lovely spot, isn't it? But people interest me more than places; places only when they are peopled. The people do not have to be alive. I will attend to that. In fact, I am not sure that I do not prefer them dead. This is one of the reasons I love Florence so well. . . .

September 14, 1909

... I very much wish you would do your Johnson work in my house.⁸ Why don't you? I can offer you every facility. I also want to talk and listen and see you very much. . Your letters have been a great delight to me, and as long as you do not object to typewritten ones in return, I will deluge you with them. As there is no fear of their ever being published, I will put as much in them as I can. Then you will remember Johnson said "he would not do."

Grand Hotel, Paris November 30, 1909

... How is it that the moment I see a thing or do a thing I want to tell you about it—and I have seen and done a lot. I am not sure, however, that the greatest pleasure in travelling is not the getting home, into an easy chair by

⁸ Osgood was evidently working on his *Selections from the Works of Samuel Johnson* (New York: H. Holt & Co., 1909).

good fire, and thinking it all over. Speaking of which reminds me that I am not sure that you like Dickens. I hope you do. . . .

Behind the Dickensian good cheer, however, was an impending "mid-life crisis," and his deepening relationship with Osgood gave Newton a timely confidant. His electrical business was beset by tedious and potentially costly patent suits; beyond that, he was losing interest in the business itself, becoming disenchanted with the work, turning more and more to books and literature and travel. According to his son Swift (1894-1974), writing years later, Newton was never deeply interested in business, except for its rewards.⁹ In any event, though he could not know this in 1909, Newton was nearly on the verge of his own literary career. His letters to Osgood will now alternate between petulance and a cynicism sometimes edging towards despair, and wishful reflections upon the kind of life he would like to lead. Books, and Osgood's friendship, are consolation.

January 28, 1909

... I'm in a helpless and hopeless funk over my patent suit which something tells me is going against me. I won't be ruined if it does. I wouldn't a bit mind going out of business, but a man hates to be kicked out. . . . Bought a few books and a lot of curious 18th century caricatures at a sale. I went to the other day to get rid of myself for a bit. Have a nice letter which I can't quite read from Andrew Lang, to whom I sent a calendar. . . .

March 17, 1909

... I made up my mind last night sitting alone in my library to write and ask you to come down and spend Sunday with me. Can you do it? . . . A fine big fire, a lot of books, some tobacco and a little whiskey are the best ingredients I know for a fine night, all excepting a pretty girl, which thank God I do not need as much as I used to.

April 14, 1909

After eight years of litigation with the Allied Westinghouse and General Electric Co., whose resources total something like an hundred and fifty millions, we go down

⁹ *Remarks Made by E. Swift Newton*, p. [16].

to defeat—in other words, we have met the enemy and are *theirs*. . . . I'm 45, don't want to work, don't have to a won't after this year is out unless I can help my men going on for a little longer. You remember Dr. Johnson's letter . . . ? I don't want to place what I have in jeopardy to make money I don't need. Leisure to travel, read, a enjoy life are now within my grasp. My wife approves my determination—and there you are. *Meantime* I have bought a lot of books and next year I hope to fit out a book-hunting expedition through the British Isles. How can I wait! . . .

April 20, 1909

. . . I was in New York on Saturday and had a very satisfactory interview with my friends, the enemy. I feel convinced that out of this scrimmage something more or less good will be handed to me, possibly something very good. If it is an opportunity to work hard and make money I won't take it. I don't have to. . . .

August 7, 1909

. . . I received a very nice letter from Gauss enclosing a specimen of his friend's book plate, which I do not care for, and the address of the engraver.¹⁰ I am going slow in this matter, however. I have been flirting with the subject of book plates for years and my intentions are now serious. . . .

September 7, 1909

. . . As to your not having time to spend a night at Daylford on your way to Princeton, if you knew how flat, stupid and unprofitable your excuse seems to me, you certainly would have made a better one. The big problem of my life, namely, the making of both ends to meet, has I think been solved. All of the various contracts with my friends in New

¹⁰ "I have known Ned for thirty years. During that time he attained what I consider to have been the two greatest achievements of his life. One of these was his founding of his electric company, single-handed, from annihilation at the hands of the electric concerns, General Electric and Westinghouse. . . . Ned, unaided by me, brought the matter to a settlement by which he and his partner retained control of the 'Cutter Company' (Osgood to Moncure Biddle: January 6, 1938 [Free Library, Philadelphia]).

¹¹ Professor Christian Frederick Gauss (1878-1951) was one of Newton's friends at Princeton.

York have been signed, sealed, and delivered, and I am about celebrating my victory, for such I think it is, by the purchasing of several very scarce books—one, *The Vicar* at \$600, I have practically decided upon—and I have a scheme for a new library which will be an extension of my present one, which will make your eyes water. . . .

The Engineers' Club, New York [October 1909]

We did have a nice time on Sunday, didn't we? Mrs. Newton thinks you are much more—what shall I say?—not so amiable but pleasantly cheerful than you were a year ago, and if I have in any way contributed to this I am glad. You have a lot to be thankful for. You are not married. Most married men don't give much thought to their wives. My wife isn't perfect but I don't know a better one or one near so good. You will always be poor, but you are not in line for great anxiety or temptation. On the whole, you men basking in academic shade or sun have most business men beat at a pulp. . . .

November 2, 1909

I pretend to have discovered that most marriages are not prudent and few remain virtuous. The inherent difficulties are so great that I am inclined to echo the advice of Mr. Punch and say don't. There is a strong measure of selfishness in this. . . .

Despite the combined representations of Newton and Mr. Punch, Osgood was married in January 1910, to Isabella Owen (whom Newton would invariably call Brynbella, after Mrs. Piozzi's Welsh villa), and took her to Italy that summer. Newton, not a man to suffer illness or pain with fortitude, had meanwhile to endure an attack of neuralgia. His letters of this period often sound a querulous note.

February 28, 1910

Last week was practically the first business I have done since the beginning of the year and I find myself in very unsatisfactory mental condition, I suppose due largely to the dope which I have been consuming. Never a very good sleeper, since free from pain I have very carefully refrained from the use of drugs, with the result that I am desperately sleepy at nine o'clock, go to bed about ten, and twist and

toss for three or four hours before I fall into an uneasy slumber. The result of all this is a very disturbed set what I have been pleased to regard as my reasoning faculties. I am apprehensive of I don't know just what, altogether I am not having a very nice time. I hope you are, but it will be nicer after a while when you and your wife get adjusted to each other's peculiarities. . . .

For the moment, at least, Newton was more enthusiastic about his business, and now wrote his first "book"—about circuit breakers. With his acutely literary disposition, he relished irony.

May 10, 1910

. . . I have just written a book, a flippant, villainous thing describing the I-T-E Circuit Breaker so that he who reads may read and he who reads will run. I will make more money out of it than Milton did out of his *Paradise Lost*; you the *Pearl*, combined. It will also have a larger circulation. The first edition will never be rare because there are 25,000 copies of it. It has been some work, and more fun doing it. . . .

May 23, 1910

. . . I am sending you, under separate cover, by this mail a copy of my book on circuit breakers in lieu of fuses for the protection of motors. I admit that this is a work of genius. Do not take it seriously, and when you don't like it, please remember that Dr. Johnson would—for several reasons which will occur to you, only one of which I venture to point out, namely, that it was written for more of which I stand in some need. . . .

Only Newton could have addressed circuit breakers and Dr. Johnson with the same breath; and it was equally like him to have assuaged his anxieties about public affairs by reading the *Alchemist*.

June 10, 1910

. . . I do not think we are going to ruin; indeed, I am sure we are not, but I heard a very clever remark the other day made to the effect that the American people were like men on a raft, they were always getting their feet wet but

got drowned. However, it is very uncomfortable to go around with wet feet. . . . I came through the last political-financial scrimmage in fine form, but when a year ago I decided that I would stay in the business, I spread my sails for a steady blow of the trade winds and in this condition sailed into a hurricane. This is what makes me blue and mad and disagreeable.

. . . I am doing what I can for my head; nevertheless, I am reading Trollope over again and I just love him—Dukes and Duchesses and Lords and Ladies and week-end parties at great country houses and M.P.'s with tea on the terrace—it's just lovely, in a book anyhow, and I shall never get any nearer to it than that. Indeed, I am not sure that I want to; but in my distracted state of mind I do not think I could tend store without Trollope. If I remember, you know nothing of him. Well, why should you? In your business, you do not need a sedative particularly. . . .

Newton even in his "distracted state of mind" summoned up recollections of Italy, in an ambivalent and revealing letter to Osgood, who was travelling in that country.

July 22, 1910

Your letter from Venice and your card from Florence reached me in due course and only add to the indignation I feel with the world in general and myself in particular to think that I should be tormented as I have been, and am, and am likely to be, while you are sitting under the portico of Florian's Cafe sipping your cognac and coffee (this is what one always does in books at Florian's), watching the Venetian argosies loaded down with their rich cargoes of straw and vegetables. . . .

And Florence! As Harry Lauder says, I could cry and cry and cry, but what's the use? By the way, this is what Dante did, and for much the same reason. And now I suppose you are in Rome, and if Rome don't make you feel small, nothing will. In Florence, one feels as though if one put one's mind to the job, one could at the end of a long life encompass the whole of it, but no one can feel this way about Rome. It is like the old lady who remarked, "I cannot tell you what Aristophanes has been to me, words fail," and it comes pretty damned near to being "tea on the

terrace" when you sit on the Pincia and watch the cro
and listen to the music. Rome has a gorgeous past, a by
means to be despised present, and a future which I w
to have a hand in for at least six months when my argo:
come in. But unfortunately, those which were richly lac
have gone to the bottom and those which promise to m
the shore carry nothing but straw. I appear to be a
flowery this morning. I am not sure that I have made
meaning clear. In fact, I am not sure that I have any me
ing. But being a scholar, you will detect some, maybe.

... So you and your wife get on well together. I
discourages [*sic*] me somewhat, for by this time the w
is over.¹²

This is a flat, stale, and unprofitable day, or I would
be taking up so much of your time.

Newton's troubled summer was aggravated by difficultie
his son Swift (whom he now determined not to send to col
but redeemed inevitably by the buying of books. Osgood
turn from Europe drew a characteristically frank expressi
affection and relief—"It seems good to think you are so
I want to see you horribly"—and a playful gift of cigars:
that box of stogies on a silver tray, remove your outer and
clothing, tie a scarf around your loins and dancingly pr
them to yourself."¹³



Newton seems to have come to terms with his malaise a
have allayed, at least temporarily, the conflict between h
luctant though abiding attraction to business and his bur
ing desire for books, leisure, and travel, by plunging wi
newed energy into all of them. Like many other lives, his v
take a sharply different course when the Great War came
in the three remaining years of peace, he managed his
personae, and enjoyed the brilliant climax of the *Edwa
belle époque*, with delight and vigor. We find him now, in
augmenting his electrical interests with a chocolate candy
ness, and writing about it to Osgood with grim amuseme

¹² One presumes that Newton meant "encourages," but the slip seems revea

¹³ Letters of Newton to Osgood: August 19 and October 15, 1910 (Free I
Philadelphia).

January 30, 1911

I have been submerged in boiling sugar, and the differ-
ence between boiling sugar and melted lead is hardly ap-
parent. Honestly, I don't know what has become of the last
sixty days. To be sure, I have quite a large chocolate mill
to show for it, but then my bank account looks like the
"Wreck of the Hesperus." All this is just to explain—al-
though I feel that no explanation is necessary—why I have
not before answered your letter of dear knows how long
ago. I have had nothing interesting to write about. What
I have done with this candy mill is very much like stopping
a stage coach filled with people, dashing madly down hill
toward a precipice. You make such an effort as would have
saved Mrs. Dombey's life and you stop the damn thing just
as it is about to go over the brink, help the people out,
then, examining your own scars and discovering that the
stage coach was an old rattle trap and hardly worth saving,
you wonder if it was worth the effort. This is exactly where
I stand this morning; but, honestly, I am rather pleased at
what I have done and I don't doubt that I am going to
make a success of it, and although some of my friends don't
think so, I feel the success will be worth while. . . .

But a few weeks later he deserts his businesses for an excep-
tionally important bibliographical recreation.

May 5, 1911

I was in New York yesterday and the day before, spend-
ing the evenings at the Hoe sale.¹⁴ I have not bought a
single book, and I should have supposed it was impossible
to sit in a room hour after hour and see and hear books
sold which I had never heard of before, and, moreover, to
see them bring fabulous prices. I met Mr. Huntington, but
all this is a matter for discussion rather than for a letter. I
spent a couple of hours with half a dozen other men in
Mr. Beverly Chew's apartments going over his collection
of early English poetry, three or four thousand volumes,
many of them first or early editions which are now worth
ten times what he paid for them. His knowledge is very
remarkable. I suppose now that Mr. Hoe is dead, he is the

¹⁴ The great collection of Robert Hoe (1839-1909), the American manufacturer and
bibliophile, was being auctioned off at this time.

most scholarly collector in the country, and he is certainly as amiable as Hoe was disagreeable. . . .¹⁵

In 1912, he is in England twice, in February and again in June, ebulliently buying books and rejoicing in his spoils, making literary pilgrimages, and mourning the shocking death of the *Titanic* of his wealthy young friend Harry Widener.

Carlton Hotel, Pall Mall February 10, 1912
My dear Charley:

We are having a perfectly splendid time and what I've bought in the way of books—oh my eye—I'm just about ruined. Save your money for me. If I'm to pay my bills, all my friends will have to come to my rescue—your royalties for a year are gone—Babette's wedding ring's gone too—I would give seven pounds nine shillings three pence ha'penny to have had you with me today—and then some. There's one more Johnson item in London, and I think I'll have it too—it's a *prayer* MS—1784—and I now have Lamb's receipt for the copyright of *Elia*!

Pray pour moi
Kiss your wife
Don't forget me

April 24, 1912
I am sorry that you are not coming down tomorrow, more sorry than I can say, for I want to get my mind off my troubles, which are very perplexing at the moment, and over them all is the shadow of Harry Widener's death, which was especially tragic. I understand that all of his books go to Harvard College, and it is quite possible that a fund may be created with which to increase the collection from time to time. Having so recently crossed in the "Olympic" with Captain Smith, having sat face to face with John Jacob Astor and his wife, lunched with Harry Widener the day before he sailed and had an appointment to meet him at the Hoe sale last Thursday night, I am sufficiently near the event to feel it hanging over me like a pall. . . .¹⁶

¹⁵ Beverly Chew (1850-1924), a banker-turned-collector, became a close friend Newton's.

¹⁶ Harry Widener (1885-1912) would of course be memorialized by the great Harvard Library. Years later, Shane Leslie wrote to Newton's daughter Caroline: "I can't recall Dr. Rosenbach's grief when young Widener was lost in the *Titanic*. Young Lyci had died utterly untowardly—Alas—alas!" (Letter of July 21, 1966, Princeton University, Caroline Newton Collection.)

Station Hotel, Ayr June 27, 1912
Took a motor at nine this morning and visited the Boswell family vault and Auchinleck Place, pronounced here as spelt—no one seems to know of the other pronunciation. Could not get in the house though I tried hard. Fine old country house with large grounds, now the residence of Lord Talbot, who married a Miss Boswell. The journey, 13 miles, was to me worth the effort. Afterwards spent some hours in well-worn Burns tracks, interesting birth place (seen before), and beautifully kept museum. We go to Glasgow tonight. . . .

Economic depression kept Newton at home in 1913, though he looked longingly to Italy and London, which he hoped to visit early the following year. For Osgood, 1913 was the year he achieved his professorship at Princeton.

June 14, 1913
How full of disappointment the world is: one picks up the newspaper in the morning and finds that one's investments have all gone to hell and the country is on the verge of ruin.

How full of disappointment the world is: one reaches one's office and finds nothing but bills with requests for prompt payments. Existing orders are cancelled and expected orders fail to mature.

How full of disappointment the world is: one reaches home and a thick envelope, suggesting a long letter from a valued friend, is opened and found to contain—nothing, or next to nothing. Such is life. . . .

July 7, 1913
When Mrs. Newton told me that you and your wife were not coming to see us as we had expected, I just gave one single vivid damn and went on with my business. We thought and spoke of you a number of times during this recent torrid spell. The next time those budding young intellects come, bringing you things to read, bid them stop and fan you, but gently, so that the slips be not disturbed.

I write promptly because I want to say how pleased I am at the news of your professorship. Of course, you deserved it long ago, but that's no particular reason why you should get it. When will the news be generally known? I want to

tell everybody and make them pretend they are as pleased as I really am.

... I shall continue to damn the Concordance until it is in press.¹⁷

August 11, 1913

This note is to be regarded merely as an expression of good will, not that you deserve such an expression for having broken your promise to spend a week with us at Daylesford. This was the only holiday I was counting on, and I don't like being deprived of it. ... Of course, you know that Tinker sailed a week ago.¹⁸ I would have gone over to New York to see him off but he told me that he would probably be surrounded by weeping relatives, and I took the hint thankfully, for if there is anything I hate it is relatives, weeping or otherwise. As Charles Lamb says, "Damn 'em—at venture." In what state is the Concordance? Not that I care, because it got between us early in the summer, but it is polite to ask, and how is Mrs. Osgood? Give her my love.

November 20, 1913

Your note of the 16th together with the book reached me in due course. We did have a pleasant Sunday in a quiet way, which only goes to show that rational people make few demands. There is little happiness in the world—most people seem to think that happiness is dependent upon yachts and automobiles, and there are not enough yachts and automobiles to go round.

I am glad to have the Hill "Gibbon" as a souvenir of your visit. I have only had a moment to glance at it as yet but I know just what to expect, knowing enough about the 18th century to appreciate Hill's immense learning. An editor like Hill, in his way, is as rare a genius as Shelley. ...

I am becoming more and more firmly convinced that your wife has about as much charm as anyone I know, and a head, the inside of which I am not competent fully to appreciate. Tell her so.

¹⁷ Osgood published his *Concordance to the Poems of Edmund Spenser* (Washington, D.C.: The Carnegie Institution of Washington) in 1915.

¹⁸ Chauncey Brewster Tinker (1876-1963), legendary Yale professor and bibliophile, was an intimate friend of Newton's and Osgood's.

The Newtons sailed on January 10 for Naples, aboard the *Adriatic*. As always, Rome delighted him. Newton was acutely sensitive to its social distinctions and amused by them.

Hotel Bristol, Rome

February 1, 1914

... Have met a lot of nice people, including the Schellings, and Felix is obviously trying to treat me as an equal.¹⁹ Everyone I meet is wearing a button or a ribbon or a title, and I *decorated myself* this afternoon with a piece of string in my button hole. I see people regarding this piece of string curiously, wondering what order it belongs to. The weather, the news from home and everything is nice and I am very happy. I wish for only one other thing, now I have my decoration—you, you dear fellow.

Hotel Bristol, Rome

February 6, 1914

... The weather is superb and Rome is *ROME*. How I love it. I have met some very interesting people and I'm not strong on galleries. I don't mind churches but I hate busts and fragments of the human form divine—or carnal—if that's the right word—and by busts I don't mean the "busto" part but the endless heads, which only serve to make my ignorance more discouraging than usual. But who knows anything in Rome. ...

The Newtons enjoyed their last weeks of the Old Europe in appropriately old-fashioned style. After a leisurely winter in Italy, they made their way by degrees to London, with its enticing amenities of books, friends, and literary ghosts from the 18th and 19th centuries. They returned home in April to find business "dreadful—it makes one just sick at heart"—and President Wilson deeply mired in Mexico. Newton was coming to dislike Wilson vehemently, though he sometimes hesitated to disclose to Osgood the intensity of his animus for fear of giving offense. As the doomed summer drew near, Newton's state of mind, as communicated to his friend at Princeton, was far from tranquil.

April 28, 1914

... We might just as well have been plunged into Civil War because Woodrow Wilson did not like Andrew Fleming

¹⁹ Felix E. Schelling (1858-1945) was professor of English at the University of Pennsylvania.

West. I am getting very sick of idealists in high places. . . I am indeed in a very distracted frame of mind when allow myself to refer to politics in a letter. It is bad enough in conversation.



During the first weeks of the war, we find Newton complaining about the condition of the sugar market and contemplating the possibility of "a strong revulsion of feeling in Germany in favor." In due course, as financial anxieties recede and business improves, he perceives with dismay that the world he has known and especially the Old England he loves—are probably dying. He does what he can. At Christmas 1914, he plans to send chocolates to the Belgians. A year later, he proposes sending his wife and daughter to the French. (This latter scheme, at least, which would have had Newton fitting out a small hospital to be staffed by the female members of his family with several assistants, was rejected by the State Department, and he reluctantly abandoned it.) As the fighting drags on, as America joins it (his son Swift served on medical duty in France), Newton is oppressed by the dimensions of the horror.

In his personal life, the years of war are a turning point. Books finally replace business as his primary interest, and though he continues for some years to play an active role at his office, there is no mistaking that his heart is in his library—and in the auction rooms. Moreover, unable to travel, he now writes. Inspired by the war of book-hunting expeditions to London, he composes essays about earlier forays. He had already prepared a small volume of papers on book collecting, but the outbreak of war discouraged him from his intention of publishing privately. *The Amenities of Book-Collecting*, of which these essays formed the germ, would be published commercially at the very end of the war, and would give Newton a literary reputation. His letters to Osgood allow us to trace the formation of his career as publishing author, the crucial role played by Ellice Sedgwick (editor of the *Atlantic Monthly*), and the important help rendered by the Osgoods themselves.

August 11, 1914

. . . I am not going to publish my book at all—chiefly for the reason that I do not think many of my friends will at

this time be interested, and for the further reason that I had planned to make a rather expensive book and have at the moment no money to spare. I am thinking, however, of sending it to one of the magazines, leaving out a too personal touch here and there. I do not think any magazine would print it, but you never can tell. I would be pleased if they did, and not greatly disappointed if they did not. I do not care for the title "On Book Collecting" either, but I do not know that I like "On Collecting Books" any better. I had thought of "The Amenities of Book Collecting." How does this strike you? But why bother about what is not going to happen, when there are such fearful goings on in other fields. . . .

November 2, 1914

. . . In spite of your judgment, and largely to discover whether what I had written would appeal to others than my personal friends, I sent my copy to the "Atlantic" a week or two since, and this morning received the enclosed, which pleases me mightily. This is to be a secret in which you and Mrs. Osgood and Nellie and I alone are [*sic*] and should be, until the article comes out. Later on I hope to gather together all my little outpourings and publish them in a bound book, but this is probably years away. Am I foolish to be pleased that the "Atlantic" has accepted my article? After all, it is not every business man who could get an article into the "Atlantic," and I am sure that mine never would have been accepted but for the careful scrutiny that you and Mrs. Osgood gave it. . . .

We had quite a gathering at Daylesford yesterday. Sternberg fresh from Germany, and Bigelow from London, both full of news and gossip. Of course the one subject of discussion was the war, and finally Sternberg summed up the matter in this way: "Well, Ned, one thing is sure, the Germans will fight until they haven't a soldier left, and the English will fight until there isn't a French soldier left." The idea in Germany is that England, perfidious Albion, has inveigled France, Belgium, and Russia into this war, and that she is standing off, more or less remotely looking on, while her chestnuts are as usual pulled out of the fire. I sincerely hope that the entrance of Turkey into the combat will not add a fine religious flavor to the sufficiently appalling mess.

In March and April 1915, the *Atlantic* published "The Americanities of Book-Collecting" and "Collecting at Home"—which would eventually form the first two chapters of the 1918 *Amenities*—and Newton, 51, happy, bemused by his success, flattered by invitations to lecture and introductions to notable literary personages, was launched. His letters are playful, warm, gossipy and, despite some constitutional grouchiness, full of *joie de vivre*.

April 8, 1915

... I regard my "Atlantic" success as a huge joke, and I am not as yet quite sure on whom. I have been asked to address the Browning Society in New York, and also to talk about the London of Dickens before the Dickens Fellowship, and I am to perform tomorrow evening in any role I please at the Franklin Inn.

I am thinking very seriously of building the long discussed fire-proof room. ... I cannot play with my toys where they are, and I must play with them. Such a room as I plan will not cost very much, and will house all the books I am ever likely to own. ...

May 12, 1915

I am burning up. In the midst of this crash of nations what does Rosy do but buy this library and give me, poor me, first choice.²⁰ I bought today a lovely presentation *Rasselas* to Mrs. Percy, presentation Boswell's *Life* to Boswell Jr. Esquire, presentation J to Mrs. B—presentation Lamb to Mary Kelly, whom he wanted to marry—and half a dozen other things—\$5,000 in all. I'm ruined! I'm also yours—

July 14, 1915

... Will you ask your wife whether she has a very large blue pencil with a sharp point, and if I send up two sophomore papers, one on Temple Bar and one on James Boswell, whether she will read them critically—not that they are worth it, perhaps, but in order to prevent me making a fool of myself. ...

My friend Bigelow, whom you may remember, married Mary Lowell in Boston the other day, and I had hopes to get to the wedding, but thought it best not to leave Phila-

delphia, so Babette²¹ and Swift went together and had a wonderful time. They saw the Widener Library, which had been dedicated the day before, and on their return spent a night in New Haven, Tinker dining with them. He promises to visit us in September. The report is that he seemed very blue. I think he suffers from nervousness over that bad eye of his. He is fearful of losing the sight of the other one, I fancy, and for a man as dependent upon his sight as he is, it must be very distressing. ...

October 7, 1915

... How does Sunday, November 7, suit you for the Johnson paper at Oak Knoll, and just what shall we call this paper?

I have been asked by the Philobiblon Club to read a paper on James Boswell to occupy one hour. My little Boswell story which you read takes twenty minutes. How to pad this into an hour occasions me some concern. I am for the first time reading Boswell's letters to Temple. They tell the story of Boswell's life, and a most pathetic story it is. I have as many and varied opinions as to Boswell's character as there are colors of ribbon on a ribbon counter.

I have been looking at a fly on the ceiling for a minute, wondering whether I had anything else to say. I think I have. It is to tell you that your wife is one of the dearest of women. This comes from a woman hater.

Newton's claim to be a "woman hater"—and elsewhere, more than once, he calls himself without qualification, in Johnsonian phrase, "a good hater"—is belied by his letters and by the testimony of his friends. A woman to whom he became deeply attached, through admiration as well as affection, was Amy Lowell.²² He made her acquaintance at this time, and although there is no reference to their meeting in his letters to Osgood, Newton sent a detailed account to Chauncey Tinker at New Haven.

November 4, 1915

... Mrs. Newton and I went up to Boston on a little literary pilgrimage. Ellery Sedgwick was very charming and toted

²¹ Mrs. Newton.

²² See Maxwell Luria, "Miss Lowell and Mr. Newton: The Record of a Literary Friendship," *Harvard Library Bulletin*, 29 (1981), 5-34. It is stated erroneously in this article that Newton did not meet Miss Lowell until 1918.

²⁰ Dr. Abraham Simon Wolf Rosenbach (1876-1952), the influential rare book dealer, was known to his friends as "Rosy."

me round some, but the event of the visit was an evening spent with Miss Amy Lowell, President Lowell's sister, and a great book collector. She has the best collection of Keats in the world, and while her Johnson is not as good as mine, she has some wonderful items, including Mrs. Thrale's copy of Boswell, full of characteristic notes. If she had not been a dear woman, I would have killed her and taken chances. I think I never spent such a delightful evening in my whole life. I met President Lowell at luncheon and twitted him somewhat merrily, as is my wont. I was entertained, and entertained Winship, the curator of the Widener Library. I called on your friend Post and told him of my weakness for college professors and that I was shy of Harvard professors, and for this reason called upon him. He seemed amazed, and doubtless was, but I took lunch with him and we had a very pleasant hour together. For sheer nerve I acknowledge but one superior, James Boswell of Auchinleck, no longer pronounced Affleck.

... Oh! by the way, I have forgotten to say that my invitation to Miss Lowell was over the 'phone, and we were invited to dinner. She is the most unconventional woman living; sent word down to us that she would be late but that we were to go on with the dinner. She came down when dinner was half over, and I should have been embarrassed, but I was not. Making a profound bow, I observed, "Madam, if this visit is unpleasant to you, you are to regard it as one of the inconveniences of eminence," as my friend Dr. Johnson said. Her reply was, "I could easily have escaped had I wanted to, but I read your 'Atlantic' articles, etc." Miss Lowell is around forty years, is very short, very stout, and smokes the finest of the cigars. Think of it! She reminds me very much of Mrs. Thrale. I told her so and she was not displeased. ...

Meanwhile, Newton's personal involvement in the war had become more immediate with his plan to send Babette and Lina²³ to Paris, "to take charge of a small hospital, the expenses of which I have offered to defray," and he requested Osgood to try to obtain a letter of introduction to the French officials from the man who had brought him to Princeton and now

²³ Newton's daughter, Caroline (1892-1975).

occupied the White House.²⁴ But the scheme collapsed, and Newton turned again to books and writing.

December 1, 1915

... The State Department strenuously objects. ... Mrs. Newton went to Washington to see Miss Mabel Boardman, the head of the American Red Cross ... and Miss Boardman urged her not to go. Against advice of this character it is useless for us to protest, so here we are back again, safe and sound, with my lower office loaded full of supplies of every conceivable character from bandages to boracic acid.

January 19, 1916

... I am rather surprised at the cordial reception my "Temple Bar" story has met with.²⁵ I thought only a few of us would be interested in the subject. It appears I was mistaken, or perhaps people are fooling me. At present I am trying to put together a little story of Charles Lamb and Fanny Kelly. I have stolen all the material, of course, but I have threaded it together rather nicely, I think. ...

June 27, 1916

... I have finished my "Old Catalogues and New Prices" and I tried it on Babette the other evening. She liked it, but she is partial, sometimes. I have been thinking of the Dickens, but it does not unfold itself to me, or perhaps another idea has taken its place, and my mind will only hold one idea at a time. I am thinking of doing a paper on Dr. Johnson's Dictionary. Now don't laugh. For some reason or other, I never read the Preface to the Dictionary until the other evening. Aside from the technical matter, if so I may call it, therein it is the old man at his very best, very human, very modest, and yet with the confidence of solid learning. It is very different in style and very much better than the Prospectus which he had published some ten years earlier. This is only a thought and nothing may come of it. ...

²⁴ Letter of Newton to Osgood: November 23, 1915 (Free Library, Philadelphia).

²⁵ "Temple Bar Then and Now," eventually published in *The Amenities of Book-Collecting and Kindred Affections*, started life as Newton's Christmas booklet for 1915.

October 18, 1917

When your Boswell came, I read the introduction rapidly and sent you a line.²⁶ I have since had an opportunity of reading it carefully. It is charmingly written and I should think the book would be a success, containing every line (as I am sure it does) of importance in the big book. It has always been my opinion that this book could be expanded or contracted to taste (as the cook books say), expanded by the use of letters which Boswell knew not of, and contracted by the omission of the parts which have now no interest for anyone.

But I did not start to tell you this. I have lived through an agonizing summer, and the winter of my discontent is approaching, I fear. The liquidation of the Windsor Chocolate Company was an awful strain . . . in addition to which I find my investments shrinking in value day by day until they look ridiculous. On top of which I am urged to buy Liberty Bonds. . . . And over all is this appalling and apparently interminable situation abroad. But I have a feeling that the end is in sight and that the Germans will have to swallow a very bitter pill. But when one begins to talk of the Germans, one's mind gives way. . . .

December 5, 1917

. . . I am slowly reaching the conclusion that no nation is going to win this war, but that it will be won along the lines laid down by labor with a capital "l," and that we capitalists (I suppose I am a capitalist, although a very small one) are going to smart. This idea has been gradually making headway with me, and this, I take it, is the meaning of the paragraph that runs to the effect that the Congress that concludes this war will feel the full strength of the tides that now run in the hearts and consciences of men. When the armies get through tormenting this old world of ours, I fancy we shall hardly know it. . . .

The new year was of course a year of consummation. The war with its dislocations and anxieties was suddenly and blessedly over, and one might hope even now "to get back to a pre-war

basis as rapidly as possible."²⁷ For Newton, it was the year that he finally, as he would have put it, "commenced author." Since 1907 he had been writing literary essays and circulating them among his friends as Christmas greetings. In 1914, Sedgwick had accepted his two papers on book collecting, and an essay on William Godwin ("A Ridiculous Philosopher") in 1917. Now, Sedgwick wanted more of Newton's "stories" for the *Atlantic*, and proposed to assemble them in a book.

January 24, 1918

We had a delightful visit at Princeton, but then we expected to have. I never go anywhere with as much pleasure. Is it understood by you that you are coming on Saturday, February 2? We are going to have a little Hoover supper and are asking the Pennells and several other people. The confusion into which my affairs have been thrown by the coal closing order and the consequent freezing of pipes and resultant leaks is enough to drive one mad. I am just about at my wit's end, but nevertheless Yours sincerely.

March 11, 1918

. . . Ellery Sedgwick wishes to publish four of my papers in the "Atlantic" this year, viz. Harry Widener, Mrs. Thrale, Temple Bar, and Charles Lamb. He then offers to bring out a very nice book in the autumn, containing everything I have written—"Newton's Complete Works," so to speak—and he talks about making a \$5.00 book. I protest that \$2.50 must be the limit, but the book will be full of illustrations, title pages, facsimiles, etc., etc. Sedgwick is very enthusiastic and has said things that would make me blush had I not a red face already. . . .

April 10, 1918

In happier days we used to write each other occasionally, but how can one do anything when one's heart is in one's mouth? . . .

My leisure has been devoted to getting material together for my book, which will come out in all probability just at the time when no one will care to read anything. . . . Swift, after very strenuous experiences, was when last heard from

²⁷ Letter of Newton to Osgood: November 18, 1918 (Free Library, Philadelphia).

²⁶ Charles Grosvenor Osgood, ed., *Boswell's Life of Johnson* (abridged), (New York: Charles Scribner's Sons, 1917).

very near the front. . . . Mrs. Newton is working with vigor which will be her undoing sooner or later, and I am the chairman of the Liberty Loan committee for T. dyffrin Township and is working night and day. I may say that she has been successful beyond our wildest hopes

June 26, 1918

When I saw your envelope on my desk this morning I had a cold chill for a moment; I was fearful that you were not coming. I am humoring myself these days, pitying myself in the belief that I have not been well, and getting whatever pleasure I can. Do not let anything prevent your joining us for dinner on Friday. From now on, I intend to govern myself by the wisdom contained in the opening paragraph of "Rasselas."²⁸

November 18, 1918

. . . Speaking of books, I am reminded that the epoch-making volume will appear in about a week's time. I am not going to send you a copy. You already know it more or less by heart, and I have made a vow not to bore a single one of my friends with it. I am not going to talk about it even, but I am in lieu thereof sending you a box of cigars which, brief as their life may be, will probably outlive the fame of the volume. . . .

On Monday, December 2, in the evening and afternoon there will be a rather important book auction at the Anderson Auction Galleries. If you can plan to spend a few hours with me and take dinner at the Engineers' Club about seven, I will be very glad. After the auction in the evening a dozen or twenty of us are going to meet at the Plaza for beer and sandwiches and bookish talk. Perhaps I should say talk about the prices of books. . . .

The Amenities of Book-Collecting and Kindred Affections was formally published on the day the Armistice was signed.²⁹ "Liberty Byron," wrote Osgood 20 years later with a touch of genius

²⁸ "Ye who listen with credulity to the whispers of fancy, and pursue with eagerness the phantoms of hope; who expect that age will perform the promises of youth, and that the deficiencies of the present day will be supplied by the morrow. . . ."

²⁹ The first impression carries the date August 1918; but cf. *Remarks Made by E. S. Newton*, p. [20].

exaggeration, "he woke to find himself famous in literature."³⁰ Within three weeks, over a thousand copies had been sold—an unusual success for a volume of bibliophilic essays—and by spring a second impression of 5,000 copies was ordered.³¹ More would follow. Newton celebrated by buying half a dozen choice Blakes at the December 2 auction, an extravagance from which he was "still recovering" some weeks later. He shared his elation with Osgood.

[December 1918]

As I see it, Dr. Osgood, the choice you give me is—do you prefer to wait for us an hour or two in Princeton, or a week or more in Philadelphia? That being the case, the choice is quickly made. We will take the first train after ten o'clock from Broad St. on Saturday next, and we hope you will not put yourself out in the least to take care of us. And I am not going to take with me my press clippings about my book nor speak of it more than I must to keep from busting. . . .

[To be concluded in the Autumn 1984 issue]

³⁰ Letter of Osgood to Moncure Biddle: January 6, 1938 (Free Library, Philadelphia).

³¹ Letter of Newton to Tinker: December 30, 1918 (Yale).

The Graphic Art of Children's Book Illustration in America, 1840-1880

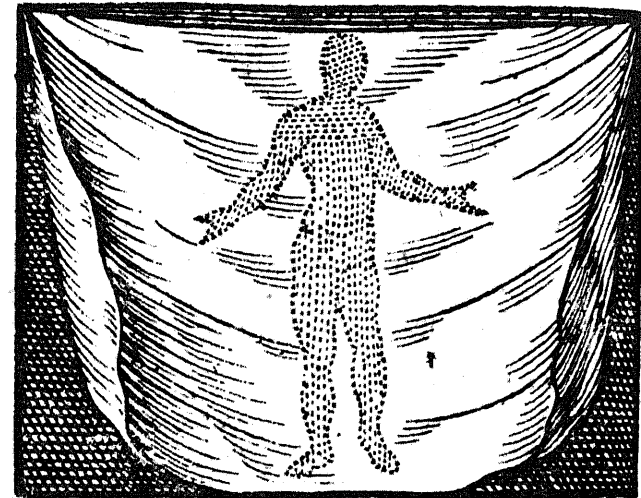
BY DALE ROYLANCE

On March 2, 1984, the Graphic Arts Collection opened a major new presentation in its second-floor gallery in Firestone Library. Entitled "The Enchanted Image: An Exhibition of Historic Illustration in Children's Books," it was designed in conjunction with a symposium on the subject which began that evening and continued through March 3. The symposium was organized by Ruth B. Bottigheimer, Lecturer in Germanic Languages and Literatures, Princeton University, under the title "Fairy Tales and Society: Illusion, Allusion, and Paradigm." Participants delivered 13 scholarly papers and came from Harvard, Rutgers, Winnipeg, Milwaukee, Los Angeles, and Berkeley as well as Princeton. One of these papers was given by Dale Roylance, Curator of Graphic Arts and organizer of the exhibition. Since the paper is devoted so heavily to the Sinclair Hamilton Collection of Early American Illustrated Books, in Princeton University Library, it is printed here in order to give our readers a glimpse of one portion of that generous gift.

The first recognized picture book for children was published in Nuremberg in 1658 under the all-embracing title of *Orbis sensualium pictus*. Written by Johann Amos Comenius, the book is an early landmark in the recognition of teaching by pictures. "Boyhood," Comenius wrote, "is distracted for years with precepts of grammar infinitely prolix, perplexed, and obscure . . . [whereas] pictures are the most intelligible books that children can look upon." *Orbis sensualium pictus* is exactly that, containing 106 small woodcuts, neatly matched up with their verbal equivalents in Dutch, German, Latin, French, and in later editions, English, giving an exactitude of woodcut outline to everything from "crawling insects" to God himself. Even an otherwise mysterious form like the soul is given graphic delineation in dotted lines (fig. 1).

Comenius went through many editions. Vestiges of a didactic purpose survive right up to the series of small woodcuts that give some pictorial grace to our otherwise dour early American New England primers. In both England and America, these

☛:☛:(166):☛:☛:
XLII.
Die Seele des Menschen. Anima hominis



| Die Seele ist des Leibes Leben/ eintig in dem ganzen: | Anima f. i. est corporis vita, una in toto: | Corpus, n. s. der Leib Vita, f. i. das Leben Unus, a, um, einzig Totus, a, um, ganz |
|---|---|--|
| Allein eine Wachsenthümliche/ in den pflanzen; zugleich eine Sinnliche/ in den Thieren; auch eine Vernünftige/ in dem Menschen. | tantum vegetativa, in plantis; simul sensitiva, in animalibus; etiam rationalis, in homine. | Vegetativus, a, u. Wachstenthümlich Planta, f. i. die Pflanze Sensitivus, a, um, empfindend Animal, n. s. das Thier Rationalis, c. i. e. vernünftig Homo, m. s. der Mensch Consistere, a, s. bestehen Tres, c. s. ia, n. s. drei |
| Diese besteht in dreien Dingen: Erstlich in der Vernunft | Hæc, consistit in tribus: primò in mente | Mens, f. s. der Geist |

Fig. 1. Woodcut illustration from
Johann Amos Comenius, *Orbis sensualium pictus*, 1679
Graphic Arts Collection

edifying woodcuts continued to dominate a child's early book education throughout the 18th century and well into the first part of the 19th.

Here at Princeton, the Sinclair Hamilton Collection of American Book Illustration, 1670-1870, in the Graphic Arts Collection of the Library, includes an abundant representation of these fine and rare little children's picture books. They are full of factual illustration, but the earliest books also dwell with Puritanical zeal on original sin, death, and damnation in a way well calculated to inhibit rather than permit, let alone encourage, any imaginative flights in the infant mind. They are also all printed in the black and white of simple woodcut.

As we progress chronologically through the Hamilton children's books, it is possible to observe from example to example two distinct changes, changes that mark the emergence of elements that are most conspicuously missing from earlier American children's books but which are among the most appealing aspects of the best of modern children's books. The first of these is freedom of imagination; the second is color.

Both of these important elements had difficult if not barren terrain in early America. A strong imaginative force in historical children's literature, the fairy tale had been rapidly emerging in European juvenile books with successive editions in French, Dutch, and English ever since the first printing of Perrault in France in 1697. In America, however, the fairy tale tradition and its imaginative aspects had a slow start. Among other prim souls of the time, Samuel Goodrich (1793-1860) launched a campaign against the importation of these fanciful tales. He argued that young minds would be harmed by such mythical events, and that hard truth was the best teacher.

Certain English children's books of the period also had their censors. Religious tract societies cleverly adopted the miniature toy book format but delivered tales more terrifying than charming. Their moral position sternly regarded fairy tales as subversive: "Cinderella," wrote Sarah Trimmer (1741-1810) in *The Guardian of Education*, "is perhaps one of the most exceptionable books that was ever written for children. It paints some of the worst passions that can enter the human breast, and of which little children should if possible be totally ignorant; such as envy, jealousy, a dislike of mothers-in-law, etc."

Cinderella, in spite of all this, arrived in America in the late 18th century. The Hamilton Collection includes a little blue

duodecimo packet published in 1824 in Cooperstown, New York that seems the epitome of innocence despite Mr. Goodrich and Mrs. Trimmer.

Then, in 1847, one of America's best 19th-century artists and illustrators, Felix Octavius Carr Darley (1822-1888), lent his gifts to the first collected illustrated edition in America of the classic fairy tales. *Grandfather Lovechild's Nursery Stories* (by Eleanor F. Fenn), published in Philadelphia in 1847, includes the tales of Bluebeard, Sleeping Beauty, Jack the Giant Killer, and Aladdin, each with six full-page woodcuts after drawings by Darley. Although Darley's wood-engraved illustrations present a thoroughly new homespun American garb for the tales, the printed text still sees to it that proper moral conclusions are drawn. The *Boston Daily Advertiser* of 1847 assured parents that Lovechild's tales were "interspersed with such morality that they may be read without damage by the tenderest minds." While the texts plod through their dully versified morality, Darley's wood-engraved illustrations present a freshness and vigor of conception that is startling in the midst of the prosaic American book illustrations typical of the 1840s. Also unusual is the stencil daubing on of bright, primary colors. In a book world of black and white, the color must have seemed in mid-19th century America as appealing as a very similar hand coloring was to buyers of 15th-century German woodcut books. Two of Darley's original pencil drawings for the Lovechild Cinderella are in the Graphic Arts Collection at Princeton (fig. 2). Comparison with the print reveals how expertly the wood engravers of this period were able to translate an artist's conception onto the printing woodblock despite the incredibly arduous task of cutting away all wood surfaces of the block to leave only the finely hewn printed line standing.

The Lovechild fairy tale edition is an excellent transitional example both for its carefully treated morality and for its early and unusual use of color, in this case the antique technique of stencil. In spite of this single example, color, that most appealing aesthetic element of children's book illustration, remained conspicuously absent in America well into the 19th century. The children themselves seem to have intuitively missed this element, judging from the frequency of hand-crayoned copies of early American children's books.

Random examples of hand coloring, wildly varying in quality from the most squalid to the most elegant, are to be found in



Fig. 2. Pencil drawing by Felix Octavius Carr Darley
for an illustration of Cinderella
in *Grandfather Lovechild's Nursery Stories*, 1847
Graphic Arts Collection

both European and American children's books in the early 19th century. But it is the development of printed color that has the most fascinating history, particularly as it relates to American children's books. Printed color has been the ardent but sporadic pursuit of both printers and printmakers ever since the invention of printing in the 15th century, and that pursuit continues even in our time. In the 19th century, a new color printing process, lithography, would revolutionize the look of American children's books.

Lithography, invented by Alois Senefelder in Bavaria in the late 1790s, had begun to appear widely in England, Germany, and France in the first 50 years of the 19th century. In America, lithography's development was slow until its potential for printing in color began to be realized. American printer Bass Otis first used lithography in 1819 and color experiments by other printers soon followed. The process is a chemical one involving the natural antipathy of oil to water. The artist is able to draw directly on the printing stone; by visually separating and drawing each color on a different lithographic stone, the various colors may be successively printed to create a full color print that is very close to the artist's original. One of the earliest American color printers, William Sharp of Boston, did not overlook the appeal of color to children and included in his works a naive but charming book printed in full color, *In Fairy Land*, published in Boston in 1847.

By 1860 knowledge of color lithography had progressed sufficiently for a young and ambitious New York lithographer, Julius Bien, to attempt the staggeringly difficult project of reprinting in color lithography an entire, fully American, edition of Audubon's *Birds of America*. Not surprisingly, this was never finished.

In 1866, Bien more sensibly turned to the modest project of illustrating and printing in color two fairy tale classics, *Puss in Boots* and *Cinderella*. Both have six color lithographs of considerable charm, but are more technically interesting than imaginative. Fantasy is still highly restrained. American taste 90 years after the revolution still seemed to prefer what was pragmatic, democratic, and down to earth, with traces of suspicion lingering about kings and queens, princes and princesses, even in fairy tales.

Printing in color from woodblocks, rather than lithographic stones, also had its early American experimenters. Among the

early children's books of the Hamilton Collection is an unusual and rare little book, printed in four colors, of *The Babes in Wood*. Checking with English editions of this title, we discover that the printer has directly copied William Harvey's illustrations for an English edition of *Babes in the Wood* for 1831. Our unusual American color woodcut edition was printed in Harrisburg, Pennsylvania, by one G. S. Peters. It is interesting to observe that although this isolated country printer crudely copied an English artist's work, he has managed to give Harvey's overworked images a new simplicity and rustic charm. Peters also knew enough about color printing to use transparent inks and overprinted his yellow on blue to create an important fifth color, green.

A far more sophisticated example of color printing from wood-engraved blocks appeared in American bookshops in 1873. This extremely rare book is an edition of *Little Red Riding Hood* illustrated by Alfred Fredericks. While not the first edition of *Little Red Riding Hood* in America, it is certainly the most beautiful and one of the most successful of the hundreds of illustrated editions of this tale. The book's printed color is all the more remarkable in the long procession of black and white illustration that preceded it in American books. The color plates were brilliantly engraved and printed in colors by Alfred Bowett, who was to remain Fredericks's engraver in at least two other neglected but masterful works in American children's book illustration.

In 1873, Fredericks illustrated a long fairyland poem composed by William Cullen Bryant, *The Little People of the Snow* (fig. 3). Bowett was again Fredericks's engraver, and outdid himself in the engraving of the chiaroscuro plates, impeccably printed by Bowett in silver gray and black. Fredericks's imagery is truly fantastic, with a Ruskin-like rendering of the most elaborately detailed snowscapes and fairy scenes. In 1876, Fredericks and Bowett again collaborated to produce still another little known, splendidly imaginative children's picture book, *The Catskill Fairies*. Virginia Johnson's (1849-1916) text for this book shows Lewis Carroll's influence, but Fredericks's images have their own visionary charm all their own.

Fairy tale picture books were at last coming of age in young America. An apostle for imagination in his time, Nathaniel Hawthorne not only wrote his *Wonder Book* retelling Greek myths for American children, but also wrote a fanciful tale about



When autumn days grew pale, there came
a troop
Of childlike forms from that cold mountain top ;
With trailing garments through the air
they came,

Fig. 3. Engraved illustration by Alfred Fredericks in William Cullen Bryant's *The Little People of the Snow*, 1873
Graphic Arts Collection



Fig. 4. Engraved illustration by Marcus Waterman
in Nathaniel Hawthorne's *The Snow Image*, 1864
Graphic Arts Collection

snow fairy, *The Snow Image*, published in 1864. The Hamilton Collection has a beautiful copy of this book, with printing in full woodcut color of the illustrations by Marcus Waterman. (fig. 4). The children in this tale find a living friend in their sculptured snow image, but the philistine father crassly insists on bringing this frozen being into the house to get warm, where, of course, it melts, the evaporated result of no imagination.

The last quarter of the 19th century thus saw greatly increased interest and appreciation of fantasy and fairy lore. Strong contemporary European influences now included the widespread popularity of Cruikshank's illustrations for the first English edition of Grimm's *Popular Stories*. Mendelssohn's glorious

incidental music to *A Midsummer Night's Dream* revived interest in Shakespeare's play and brought new appreciation for the fairy world of Titania and Oberon to the Victorians. One of the best delineations of fairyland also appeared in England at this time, Richard Doyle's *In Fairyland*, engraved and fully color printed by Edmund Evans in 1870.

The importance of the engraver and printer of finely illustrated books is very well represented by Evans, who must be given credit here for the immense success in the 1880s of the famous triumvirate of English children's books: Walter Crane, Randolph Caldecott, and Kate Greenaway. It was Evans who brought the decorative style of each of these artists to flower in his extraordinary color printing.

At the same time in America, an important Boston color printer named Louis Prang developed, from 1860 to 1880, a flourishing business in the color print trade. His specialty was the chromolithograph, a type of print that would become emblematic of high Victorian taste in America. It was the chromo age. Like Currier and Ives before him, Prang saturated the market with his prints, and produced a multitude of chromos for children and the classroom. His "Aids to Object Teaching" includes a fine chromo plate showing the lithographer's printshop. Chromolithography with its brilliant color, gloss (the result of a final printed varnish), and large editions was the ideal democratic and popular medium. Every American Victorian parlor now had not only its own framed art in chromos, but also albums full of homemade chromo *découpage* valentine, Christmas, and birthday cards lovingly put together by the children on rainy days.

Louis Prang must be seen as a model of good taste and originality, however, in comparison to what was to follow. While chromolithography may have been the ideal democratic medium, its quick financial success soon led to a runaway cheapening of production values. Profit before quality became the standard in a plethora of cheap pirated versions of English children's books of the day. Aunt Louisa's London Picture Books became, with a quick change of imprint, Uncle Ned's New York Picture Books. The English version was already mediocre work; the American version reached even lower levels of quality, with garish color, poor paper, and truly ugly imagery.

One particularly terrible version of Mother Goose included in its pictures a tedious practical explanation of how the cow

jumped over the moon. It shows the moon reflected in a stream which the cow easily jumps across. To any child of imagination, this must turn an exhilarating poetic image into an exercise in boredom. The American publisher of these excesses was McLoughlin Brothers of New York, a firm which has had the longest and most prolific of records in the printing of children's books. Beginning in 1828, the firm survived well into our own time as a printer not only of children's books, but also of every variety of children's paper toys from paper dolls to board games and prints. The quality of their work, as we have seen, varied greatly. Some of the worst examples actually have their own strange primitive charm, as in the McLoughlin Brothers toy book of *Puss in Boots*. A later line of gift books developed a much more attractive and strongly Victorian style of their own in their decoratively stamped cloth covers inset with a chromo label. More than any other printing and publishing firm McLoughlin Brothers gave America the Victorian image we now most strongly associate with the 1880s and 1890s.

By the end of the century wood engraving and chromolithography as picture printing techniques were superseded by new discoveries in photomechanical illustration. The invention of the line cut predisposed a new style of pen and ink drawing which found true virtuoso practitioners in such early 20th-century children's book masters as W. Heath Robinson in England and Ernest Shepard in America. Similarly, the development of the halftone and color process printing led the way for the photomechanical color printing of the delicate watercolors of Edmund Dulac, Arthur Rackham, and Maxfield Parrish. As in the past, innovative artists conspired with developments in printing technology to produce an entirely new art of illustration for the children's book.

Library Notes

MURDER, DEATH, AND DETECTION

Murder has existed since Biblical days when Cain killed Abel, and has fascinated man ever since. The human desire to rationalize, to explain, to justify, may account for this fascination. On 27 January 1984, the Library opened in the Gould Gallery an exhibition entitled "Crime and Punishment: Eight Centuries of Murder, Death, and Detection" which attracted a wide audience for the next four months. The exhibition drew on Princeton's diverse resources to show sundry aspects of this subject and also to illustrate Princeton's own connections with murder, the real thing and the literary expression.

The exhibition showed first the idea of violent death as artistic inspiration: murder described by Dostoevsky in *Crime & Punishment* and illustrated by Fritz Eichenberg in proof copies of his brilliant wood engravings for a 20th-century printing of the novel. The idea of murder as a literary source was shown in T. S. Eliot's *Murder in the Cathedral*, inspired by the historical murder of Thomas Becket, 29 December 1170. The span of the whole exhibition was illustrated by Umberto Eco's 1983 best-selling novel, *The Name of the Rose*, about murders taking place in an Italian monastery in 1327, shown alongside a vellum 14th-century illuminated manuscript depicting murder, written in an Italian monastery ca. 1330.

The earliest murder illustrated was Cain's killing of Abel, dramatically engraved by Gustave Doré in a French Bible of 1866. The earliest exhibit was the Sweetheart Bible, made for Sweetheart Abbey in Scotland ca. 1280, showing an illuminated miniature of Judith killing Holofernes. The oldest punishments exhibited were in two 16th-century woodcuts, continuing with depictions of 17th-century scaffolds and 18th-century gallows. Executions in their time attracted the kind of crowds today drawn by rock stars, and gallows-confessions were popular reading. One exhibition case was devoted to an assortment of 18th-century English murderesses in contemporaneous accounts and engravings: Catherine Hayes, Hannah Dagoë, Elizabeth Brownrigg, and Mary Blandy.

An historical highlight nearer home was the original record of the coroner's inquest on the dead body of Alexander Hamilton, found to be murdered by Aaron Burr (Class of 1772) in the famous duel in Bergen County, New Jersey on 11 July 1804. This was shown with the manuscript letter of condolence from General Philip Schuyler to his daughter Mrs. Alexander Hamilton, written the day after Hamilton succumbed, 12 July. In the same case was a pair of contemporary dueling pistols of the period, the gift of Andrew Hunter, also Class of 1772, to his son, Lewis Boudinot Hunter, Class of 1824, and later presented to the Library by a Hunter descendant.

Illustrated chapbooks are colorful pamphlets, often luridly illustrated with color plates and pullouts, and they filled the large case in the center of the room, some with factual reports about real 18th- and 19th-century murders, some with fictional stories such as *The Blood-Stained Mantle* and *The Mysterious Stranger*. They all made lively reading in their day for a few pence each. After the French Revolution in 1789 the early detective story begins, and we showed a first edition of William Godwin's *Caleb Williams*, 1794, lent by Robert H. Taylor '30. A whole case devoted to Edgar Allan Poe showed three special fine printings, and a facsimile of the manuscript of "The Murders in the Rue Morgue." The first edition of Wilkie Collins's *The Moonstone*, 1868, contrasted with Collins's manuscript pages sent to the printer full of corrections, interlineations, and marginalia. Also from the Parrish Collection, next to the Collins, were the pristine monthly parts of Dickens's *The Mystery of Edwin Drood*, a mystery still unsolved since Dickens died before completing the last half of the novel. First editions of *The Adventures of Sherlock Holmes* and of *The Hound of the Baskervilles* were lent by Dr. Howard T. Behrman, along with an autograph letter from Conan Doyle to a Mrs. Huddart in Sussex dated 6 July 1920. We also showed Mark Twain's *A Murder a Mystery and a Marriage*, written in 1876 but not printed until 1945, and then in only 16 copies. It is a relatively unknown tale by so famous a novelist.

Modern detective stories on exhibit included Princeton's Carlos Baker, *The Gay Head Conspiracy*, 1973, and Joyce Carol Oates, *Mysteries of Winterthurn*, 1984. Professor Margaret Doody's *Aristotle Detective*, 1978, was featured in various stages from manuscript notebook to typescript version to editions published in different countries and languages. We also featured Helen MacInnes, whose manuscripts are at Princeton, and showed her *The Venetian Affair* developing from pencil manuscript through

typescript to galley proof, publication, reviews, and foreign translations. Princeton alumni also wrote detective fiction and we included manuscripts of Aaron Marc Stein '27, *Sitting Up Dead*; Philip Wylie '24, *Perkins Is Summoned*; Jack Iams '32, *What Rhymes with Murder*; and even F. Scott Fitzgerald '17 in a juvenile work, a play called *The Captured Shadow*, 1912. Princeton collects manuscripts of all these writers, and it is interesting to compare how authors write their original manuscripts: Professor Margaret Doody writes in ink in hardbound notebooks; Helen MacInnes writes in pencil on rather yellow separate sheets; Joyce Carol Oates prefers making notes on typing paper folded lengthwise; Jack Iams doodles as he goes and makes cartoon-like sketches of the characters. Publishers' correspondence was also represented, usually from Scribners.

For "campus murder" we turned to Harvard. Books and pictures about the notorious murder of Dr. George Parkman by Professor John W. Webster in 1850 were accompanied by modern detective stories set on the Harvard campus, such as Jane Langton's *The Memorial Hall Murder*, 1978, and Amanda Cross's *Death in a Tenured Position*, 1981. Finally women writers merited a case to themselves, with letters and first editions of some of the great English stalwarts: Agatha Christie, Dorothy L. Sayers, and Margery Allingham. A surprising addition to this case was the original manuscript of Gypsy Rose Lee's *The G String Murders*, 1941, presented to the Library by the famous stripper herself.

Throughout the gallery were copious illustrations: examples of the wood engravings of Fritz Eichenberg for *Othello*, *Macbeth*, and *Hamlet*, as well as for Poe stories; proof copies of Rowlandson's *Dance of Death* in a case surrounding De Quincey's tongue-in-cheek essay *On Murder Considered as One of the Fine Arts*; engravings by Hogarth—*The Idle Prentice Executed at Tyburn* and *Cruelty in Perfection*—and Cruikshank's *The Cato Street Conspirators*. We hope the exhibition showed not the horror of murder itself but its fascination to writers, readers, and artists through the centuries.

—JEAN F. PRESTON, Curator of Manuscripts

THE NEW FINE ANNEX

In February 1984, the University's library system opened a new annex which will eventually house 600,000 volumes. It is the second such storage library in the system and is housed in

the basement of Fine Tower. Construction was long awaited, even longer overdue.

The first annex, built in 1968 on the Forrestal campus across Route 1, houses the William Watson Smith Library, commonly known as the Forrestal Annex. Obviously many of the books and journals in the Princeton collections are not used with any great regularity, and on that assumption a deposit library was developed to keep the University from expanding an ever larger main library. The Forrestal Annex started out with large segments of the religion collections; shortly thereafter it became a popular answer to the space problems in the science branch libraries. The capacity of this annex was estimated at 375,000 volumes. By 1978 it was what a librarian calls full (i.e., 80 percent). By 1981 virtually all book transfers had to cease; it was full by anyone's standards.

In the meantime a solution had to be found. A generous bequest from the late Levering Cartwright '26 made it possible to plan a new annex, this time on the main campus and with newly invented equipment, called compact shelving, which doubles the expected capacity. Instead of fixed shelves with aisles between each range, compact installations provide one moveable aisle which can be created, wherever one wants access, by moving the shelves by hand along substantial tracks fixed to the floor. Before the renovation of the Fine Tower basement began, it was an 8,000 square foot area, empty, a typical basement full of service pipes. We filled the area with compact shelving units and created a staff section and a reading/study section (about 2,000 square feet) adjacent to the main elevator. In the shelving area the walls were painted and a new floor was installed to accommodate the tracks and the moveable units. But in the "reading room" there is a more welcoming atmosphere: carpets, warm-colored felt on the walls, study space for 25 people. Collections in this kind of library are apt to be fragmentary, but in the new Fine Annex a very large section is devoted to the science books, approximately 200,000 volumes moved from the Forrestal Annex. All books in both of the annex collections have been grouped by size to allow more efficient use of shelf space. Within each size, books are shelved by call number. Prior to the move, books in the Forrestal Annex were shelved in five sizes. At the time of the move to Fine Annex, the books in both locations were merged into three sizes, making browsing much more practical.

Helen Hansen is in charge of the Fine Annex which she operates with one full-time assistant and several students. The hours are from 9 AM to 5 PM, Monday through Friday, and anyone with a University identification card or a Library access card may use the books there. All of the volumes in both annexes can also be recalled at the circulation desk in Firestone Library or from any branch library. Excluding some misadventure, such as a lost book, service usually gets the volume to the reader the day after the request is made.

—GLENDON T. ODELL, Associate Librarian

New and Notable

TITLE II-C GRANT

Between October 1, 1982 and September 30, 1983, the Princeton University Library expended a grant of \$110,000 received under the provisions of the Higher Education Act, Title II-C, Strengthening Library Resources. The grant enabled the Library both to conserve and catalogue two collections: a more than 600-volume gathering of rare books in the history of women forming part of the Miriam Y. Holden Collection on the History of Women and a 1,400-volume collection of Edwardian novels. The two collections were treated as a continuous whole while they proceeded through the two phases of processing for use by readers. First, in the area of conservation, virtually all books underwent deacidification. This treatment was performed in a facility especially built with a portion of the grant money for the purpose of meeting one of the goals of the project. The facility, now valued at \$50,000, was installed in the rooms of the Department of Conservation Services in the Library under the direction of its head, Robert Parliament. It consists of five spray booths together with spraying equipment, auxiliary benches, and other equipment. The booths are necessary since the method of buffering the acid in the book paper is done by applying an alkaline solution directly to the pages. This buffer is sprayed lightly on each page and since pages are done in large lots, proper fume evacuation hoods as well as heavy duty spraying equipment are required. The facility took about eight months to build and once operational it made possible the deacidification of more than 500,000 pages. The Library now plans to use the facility for deacidification of many other books in need of such treatment. Such work depends, however, on identification of other books on acidic paper as well as salaries and staff beyond that provided by the grant money.

Furthermore, conservation of the two collections was carried out in other ways. More than 285 protective boxes and folders were made for books which needed them. As well, over 280 microfilms were made of selected women's books and Edward-

ian novels. In all cases, the material selected to be filmed was chosen so that it did not duplicate titles already available from commercial publishers of microfilmed books.

The second phase of the processing—cataloguing—was completed using the Research Libraries Information Network (RLIN) system. This system provides access to more than 14 million records of books, serials, maps, and other materials in more than 45 major research libraries in the United States. Catalogue records for these two collections were added to this pool of information and, because the system is co-operative and uses a time-sharing computer, these records are available to all member libraries for reference and use. By providing this cataloguing as well as insuring that the material catalogued is in stable physical condition through conservation, it is hoped that the Princeton University Library has strengthened the library resources of the nation.

—STEPHEN FERGUSON, Curator of Rare Books

LITMSS—PRINCETON'S MANUSCRIPTS DATA BASE

Operating for the past five years adjacent to a basement manuscripts vault, removed from the service functions and demands of its public counterpart upstairs, a small but productive project has been developing a computer data base of Princeton's manuscript holdings. LITMSS, the name of that data base, currently contains over 35,000 records representing manuscript material for 10,000 literary and historical figures in over 200 collections. Originally begun under a Title II-C grant, and augmented recently with three-year funding from the National Endowment for the Humanities, the data base project has now become a permanent part of the Library's operations, fulfilling two important roles: providing the Manuscript Division with physical and intellectual control of its holdings and servicing the information requests of researchers and scholars.

Princeton University has been fortunate in the distinction of many of its alumni and friends who have been generous in donating to the Library their collections and the records of their achievements. Its local history collections attract additional research interest because of the prominent role Princeton as a locale has played in American history. Ultimately, LITMSS will reflect the breadth and richness of all of these collections and will be able to monitor new accessions as they are acquired. At

the moment, it represents about 30 percent of Firestone Library's manuscript holdings and adds approximately 600 new records each month.

Literary collections now covered by the data base include the Sylvia Beach Papers, containing both personal and Shakespeare and Company material; the F. Scott Fitzgerald Papers; the Morris L. Parrish Collection of Victorian Novelists, which has correspondence, documents, manuscripts, and occasional artwork of 27 authors; the Janet C. Troxell Collection of Rossetti manuscripts (Dante Gabriel, William Michael, Christina Georgina, Maria Francesca); the Allen Tate Papers; the R. P. Blackmur Papers; the Archives of *Story* Magazine and Story Press; the Archives of Charles Scribner's Sons; the Archives of Harold Ober Associates, the New York literary agency of Faulkner, Fitzgerald, Langston Hughes, Pearl Buck, John Gunther, John Creasey, Muriel Spark, Philip Wylie, and other well-known 20th-century writers; the Booth Tarkington Papers; the James Gould Cozzens Papers; and the Carl Van Doren Papers. All contain extensive correspondence files, as well as drafts of literary works and documents. In addition, there is a growing number of collections of papers from Spanish-language writers, such as Joseph Blanco White, José Donoso '51, Guillermo Cabrera Infante, Mario Vargas Llosa, and Jorge Edwards.

On the historical side, significant collections served by LITMSS include the Andre de Coppel Collection of American Historical Manuscripts, emphasizing the Revolutionary and Civil War periods and containing boxes of material from our first presidents, Washington, Adams, Jefferson, Madison, and Monroe, as well as Lincoln; the Rush Family Papers, which contain papers dealing with early diplomatic negotiations between the United States, Great Britain, and France; the Aaron Burr (father and son) collections; the Crane Collection of James and Dolly Madison Manuscripts; and a collection of manuscripts by the signers of the Declaration of Independence.

The forms of manuscripts themselves often provide historical and literary interest, and an incredible variety exists in the collections already mentioned: 19th-century ships' papers and letters patent; 18th- and 19th-century bills of lading, diplomatic dispatches and protocols, some of which are coded; diaries, journals, letterbooks, holograph manuscripts of novels, plays, and poems dating from the early 1700s; proofs, sketches, photographs, legal briefs, presidential documents, sermons, slave

records, publishing contracts; correspondence of artists, editors, journalists, biologists, presidents, book collectors, clergy, actors, publishers. The list is practically endless. LITMSS is the key to them all.

The data base consists of two kinds of records—indexing and collection. Indexing records identify where specific material is (collection, series, box, and folder), what kind of material it is (letter, story, document, etc.), and who created it. Such records are made for each *new* location of an individual's manuscripts. Categories of material indexed are: letters *by*, letters *to*, manuscripts (i.e., works in prose or verse), documents, artwork, proofs, and volumes (such as diaries and journals), plus all related dates.

For all collections indexed, records are created that describe their scope, size, arrangement; furnish inclusive and bulk dates of material and any restrictions regarding their use; and provide accession and other in-house related information. (The records perform the same function in the data base for the collections that catalogue cards do for books; they are the collections' identification and represent the Manuscript Division's minimum level of control over a collection.) The collection records also contain added entries for those people or corporate bodies whose manuscripts occupy significant portions of the collections, and they supply subject-title-form headings as other access points.

In terms of retrieval, the records determine the types of information LITMSS can provide. The indexing records allow for retrieval of material by location, category (including dates), and circumstances of creation. John Doe, for example, may have three letters in Collection A, four letters in Collection B, and five letters in Collection C; the three locations would require three indexing records, and, because of such records, data about the letters are retrievable. If, as well, Collection D consisted entirely of John Doe's papers, then the collection record describing it would also be retrieved in a search for John Doe's manuscripts. Thus LITMSS would indicate that Princeton had a John Doe Collection and 12 Doe letters distributed in three other collections.

Searching by subject-title-form headings permits users to locate manuscript collections that may be appropriate for research in specific subject areas or with specific forms of manuscripts. Through LITMSS users can also identify the existence

of manuscripts with specific titles (in most cases, the titles of published works of book length). Though some headings refer to the presence of single items in a collection, the majority reflect a *collection level* approach. Ideally, the user, after learning the names of collections relevant to his interest, would turn to inventories or guides to those collections that could offer more detailed descriptions of material.

The headings used in the collection records are essentially Library of Congress Subject Headings with modifications that emphasize forms and time periods; upper and lower cases are used to distinguish between subject-oriented material and the manuscripts (photographs, diaries, correspondence, etc.) themselves. Here are some typical examples:

| | |
|---------------|--|
| sub- jects | { UNITED STATES—FOREIGN RELATIONS— FRANCE—19TH CENTURY UNITED STATES—HISTORY—CIVIL WAR, 1861-1865 |
| forms | { Women poets, English—19th century— Correspondence Bills of lading—United States—18th century |
| titles | { Mutiny in January / Carl Van Doren Great Gatsby / F. Scott Fitzgerald |

Because the data base is utilized in batch mode (i.e., it is not available online to provide users with immediate feedback to their queries), various reference tools have been created for the user that may preclude the necessity of a computer search:

- 1) an authority file of indexed names, providing a brief identification for each as well as appropriate *see* references. Any name not on this list will not appear in LITMSS.
- 2) a master index to the entire data base, arranged by author, collection, series (if used in a collection), box, and folder. This several thousand-page printout is bound in handy volumes for use in the Manuscript Division's card catalogue area. Depending on what collections were indexed during the interval between "editions," the probability is good that a user could quickly find from the volumes the answer(s) to his manuscript questions about specific literary and historical figures. Since lo-

cation information is provided in the index, the user readily knows which boxes of which collection(s) to request. Sample entry:

TWAIN, MARK, 1835-1910
Laurence Hutton Correspondence Collection
Box 3
59 letter(s) by: 1883-1901
1 manuscript(s): 1892
verse, "Postscript," AMsS, 1 p.

- 3) an index of headings—subject, title, and form—that provides access to the names of collections and collection records to which they apply. Included with this index is a list of portions of the collection records from which the user can learn the scope of the collection, how it is arranged, whether or not there is a checklist or guide, and the names of added entries. (These latter he could, of course, pursue in the master index.)

Oral or written requests for personalized searches will be granted, however. As a rule, computer searches are run by staff overnight, and the minimum fee charged for this service is five dollars (\$5.00); hard copy results are provided. Lengthier printouts or searches that are run to produce indexes to specific collections will cost more.

While the Research Libraries Group, the Library of Congress, and the Society of American Archivists proceed in the creation of a national data base of manuscript and archival holdings, LITMSS offers the richness of one institution's data base of manuscripts and suggests the bounty of information that will be made available by the computer in the foreseeable future.

—JOHN DELANEY, Literary Manuscripts Cataloguer

CONTRIBUTORS TO THIS ISSUE

RICHARD E. BREWER has taught English at Monmouth College since 1960. A student of religion, with a Th.M. degree from Princeton Theological Seminary, he is also a social historian (author of *Perspectives on Ocean Grove*, 1969) and a poet.

KENNETH LAINE KETNER, Charles Sanders Peirce Professor of Philosophy at Texas Tech University, is the author of *An Essay on the Nature of World Views* (1972), *An Emendation of R. G. Collingwood's Doctrine of Absolute Presuppositions* (1973), and a number of articles on Peirce. He has been active in the movement which is making all of Peirce's voluminous writings available for study through new editions and redactions.

MAXWELL LURIA received his Ph.D. in English literature from Princeton University in 1965. He teaches medieval literature at Temple University, and his most recent publications include *A Reader's Guide to the Roman de la Rose* (1982) and a selection from A. Edward Newton's correspondence with Amy Lowell (*Harvard Library Bulletin*, January 1981).

CHARLES SCRIBNER III '73 received his Ph.D. in art history from Princeton University in 1977. His book *The Triumph of the Eucharist: Tapestries Designed by Peter Paul Rubens* was published in 1982. He is executive vice-president of Charles Scribner's Sons, New York.

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