DAVID EUGENE SMITH—IN MEMORIAM

With the death of David Eugene Smith on July 29, 1944, at age eighty-four, the world lost one of the most colorful and influential figures in the fields of the history and teaching of mathematics. It is not possible to choose the one in which Professor Smith accomplished the most or reached the greatest number of individuals. He lives on in the lives of innumerable persons whom he inspired as teachers and whom he inspired as writers, as well as in his own writings. He will live on long after all these persons have gone, in the great library that he presented to Columbia University in 1931. In the limited space at our disposal, we shall try chiefly to give some idea of the immense value of this collection for the history of mathematics.

Let us first note briefly some facts concerning Doctor Smith's career. He was born at Cortland, N. Y., in January 1860, and here he received his early education to the extent that he spoke both Latin and Greek as a boy. When the Cortland Normal School opened, he was the first student to enroll, and at seventeen years of age he entered Syracuse University. During the years 1881–87, Syracuse conferred on him the degrees of Ph.B., Ph.M. and Ph.D. From 1881–84, he practiced law at Cortland, N. Y., before taking up the teaching of mathematics at the State Normal School in Cortland until 1891. For the next seven years, he was professor of mathematics at the Michigan State Normal College, Ypsilanti, and then for three years principal of the New York State Normal School at Brockport. In 1901, he accepted an appointment as professor of mathematics at Teachers College, Columbia University. Here he continued until his retirement as professor emeritus in 1926.

Already in 1900 he had commenced to attract attention by his writings and had started the publication of the series of elementary mathematical texts which were later enormously popular, some of them being translated into Spanish, Arabic, and Chinese. For several years about 1930, more than a million copies of his books were sold annually. It was not long after coming to Columbia University that Doctor Smith started the series of annual trips to different parts of the world, and the collection of items for the Library, now at the service of scholars in beautifully appointed quarters.

Professor Smith was a collector from his youth up. He once related that as a boy he had read a Victorian novel, *St. Elmo*, by Augusta J. Evans, published first in 1866. In this book he found a description of the furnishings of some "quaint and elegant rooms." A few phrases

from this description will account for his saying to himself: "Some-time I am going to have a room like that." "On a *verd antique* table lay a satin cushion holding a vellum MS., bound in blue velvet, whose uncial letters were written in purple ink, powdered with gold-dust, while the margins were stiff with gilded illuminations; . . . A small Byzantine picture . . . hung over an etagère, . . . where lay a leaf from Nebuchadnezzar's diary, one of those Babylonian bricks . . . . Several handsome rosewood cases were filled with rare books—two in Pali—centuries old; and moth-eaten volumes and valuable MSS.—some in parchment, some bound in boards—recalled the days of as-trology and alchemy . . . " In a not too modest fashion, Professor Smith reached the goal which he had set before himself.

Whatever the beginnings of his passion for old books and related material on the history of mathematics, it possessed him throughout a long life. A census made on April 22, 1940, shows that the David Eugene Smith Library contained the following items: Volumes 10,965, Documents 1,500, Autograph letters (before 1900) 4,000, In-struments 280, Portraits 3,250, Medals, Counters, and so on, 300—a total of 20,295. While the Library adds occasional items, the figures quoted here as well as in Osiris vol. 1 do not change substantially.

It may be well to note at the outset that the Smith collection as enumerated above, the Plimpton collection of incunabula, early text-books and manuscripts, the Dale collection of books on weights and measures, are all housed in the same rooms in the Seth Low Library, and together constitute The Plimpton-Smith-Dale Library. Many of the mathematical items in the Plimpton collection were purchased by or on the advice of Professor Smith. These two great collectors had agreed not to duplicate in their acquisitions, with the result that they gave to Columbia University the greatest collection in America of works on mathematics up to 1600, and one of the greatest in the world. The interest of Professor Smith was the interest of a scholar in his field. This is illustrated by his own notes on the margins of the books, and by his annotations on slips attached to a thousand docu-ments of the fourteenth, fifteenth and sixteenth centuries. There was here the interest of a real lover, for he came in to the Library every day, rain or shine, asked to see a book or just to look around.

Only a few high lights can be turned on to illuminate the figures given above. It means little to say that there are nearly eleven thou-sand volumes without indicating their nature. The comprehensiveness of this collection in books and periodicals dealing with the history of mathematics cannot be too strongly emphasized. It is safe to say that there is hardly a mathematician of any importance before 1900 who

is not represented by some edition of his works. Here are all the out-standing books in the history of mathematics such as the one in which is made "the first serious attempt in England to write on the history of mathematics." This is *De Algebra Tractatus; Historicus & Practicus* by John Wallis. The collection contains his *Opera Mathematica*, 1693–1695, in vol. 2 of which this work is found. There are ninety-four other works on general history of mathematics, in Latin, Italian, French, German, English. In addition, there are innumerable works on the history of mathematics in some twenty-four countries. To these must be added the great number of biographies of individual men.

The Smith and Plimpton libraries together contain probably the most important collection of editions of Euclids in the United States and the largest collection of sixteenth century editions of the *Elements* in this country. Besides the first printed edition of 1482 which is in Latin, it contains editions in other languages including original Greek (from Greek manuscript), Italian, German, French, English. There are manuscripts, in addition. Among the "more than fifty Euclids printed before 1600 are the first printed edition of 1482; the Pacioli edition of 1509; the Peletarius translation of 1557; the first English edition, translated by Billingsley in 1570; four editions of the Clavius translation and the same number of Vivianis. Barrow, Oughtred, Deschalles and many others are represented by one or more editions."

The Galileo collection of books is a rich one in content if not in volume. The most outstanding works are the *Dialogo*, Florence, 1632, and *Discorsi e dimostrazioni matematiche, intorno à due nuoue scienze*, Leida, 1638. Other important works are *Sidereus nuncius*, Venice, 1610, London, 1682 [that is, 1683], *Della scienza mecanica*, Bologna, 1655, and *Trattato della sfera di Galileo Galilei*, Roma, 1656.

In the joint libraries, there is a fine collection of Newton material. Here are found: the first edition of his masterpiece, *Philosophiae naturalis principia mathematica*, 1687 (both first and second issues), 1713, 1714, 1739, 1822, 1846; *Arithmetica Universalis*, 1707, 1732, 1752; *Universal Arithmetick*, 1720, 1728; *A catalogue of the Portsmouth collection of books and papers written by or belonging to Sir Isaac Newton* . . . 1888 ("Many of the mathematical papers contain Newton's preparations for the *Principia*, and notes which sprang out of questions that were started by his own correspondents."); *Correspondence of Sir Isaac Newton and Professor Cotes, including letters of other eminent men*, . . . 1850; *Enumeratio linearum tertii ordinis* (in his *Optice*, 1706); *La methode des fluxions, et des suites infinies*, par M. Chevalier Newton, 1740; *Optice*, 1706, 1719, 1740; *The mathematical principles of natural philosophy* . . . Tr. into English by Andrew Motte, 1729; a

French translation of the *Principia*, 1756; an Italian translation of same, 1925; *Tractatus de quadratura curvarum*, 1706. Added to these works by Sir Isaac Newton himself is a long array of works about him with titles suggesting fascinating reading and study. The greater number of this list is in the Smith library and works of equal value with those in the Plimpton section.

Professor Smith was particularly interested in collecting Italian works. In the purchase of the library of Professor Jacoli of Venice in 1904 he obtained a library which was very valuable in the history of Italian mathematics, and there were very few important works on the subject which he did not have.

Among many treasured association copies of books are: G. Libri, *Histoire des Science Mathêmatiques en Italie* (this is one of eight or ten copies saved from the first edition. Libri had gone to the publisher to get copies for a few friends the day before its expected publication. A fire destroyed the whole edition. This copy contains Libri's corrections for the ultimate first edition); Joseph Raphson, *Analysis Æquatiorium Universalis*, 1690; (a presentation copy from Raphson "To Mr Isaack Newton [*sic*] W$^{\text{th}}$ my most humble service. J. R."); Bombelli, *L'Algebra parte maggiore dell' aritmetica*, 1572 (first edition of his algebra. Autograph presentation copy by his grandson); *The Analyst*, or, *A Discourse to an Infidel Mathematician*, 1734 (this is Bishop Berkley's attack on Newton's fluxions. It is the presentation copy from Berkley to Sir Thomas Hammer, Speaker of the House of Commons). Then, too, there are two bound volumes of the proof sheets of the translation into English of the *Ganita Sāra Sangraha* of Mahāvīra, a gift from the translator, the late Professor Rángachārya. Doctor Smith characterized this work as the most important contribution to our knowledge of Hindu mathematics made in recent times, and regarded it as one of the rarest books he had.

Among the printed material are almost two thousand pamphlets not yet evaluated. These cover reprints, memorials, dissertations, school programs with always an article of less magnitude than a dissertation but still a scholarly one. Professor Smith had a magnetic eye for the little known, and so here is assembled material on many lesser lights, as well as some well known. The collection is especially well equipped in the field of mathematical recreations. All the worthy contributors are represented as well as the most popular but not so worthy.

The books on mathematical and astronomical instruments of historical interest constitute probably the best collection in America. It contains some 265 volumes, all published previous to 1790. Of these,

90 appeared before 1600. The books are concretely illustrated by 280 instruments of historical interest. "Outstanding items include several celestial spheres of the seventeenth century. One of these is from Japan, made of *papier-mâché*; another is of Hindu origin, of bronze with realistic silver stars; while a third is from Persia, made by the grandson of Haddad, the emperor Humayun's chief astronomer. A telescope made by the famous instrument maker, Jesse Ramsden, about 1775, is still in working order. A rare group of old English tally sticks dating from about 1296 has an interesting history. They were found in the Chapel of the Pyx, Westminster, in 1906, where they had lain undisturbed for six hundred years . . . The ancient English tallies were ordered burned in 1834, and it is said that owing to the extra fires made up for this purpose the Houses of Parliament were destroyed . . . Astrolabes of intricate and delicate workmanship and from many lands show the development of this ancient scientific instrument . . . Compasses dating from the beginning of the Christian era, quadrants, protractors and sextants further enlarge the scope of the collection." (*Bibliotheca Columbiana*, June 1936.)

But the rich primary source-material, consisting of thousands of manuscripts and tablets, is undoubtedly the most valuable part of the Smith Library. In his *History of Mathematics*, a considerable number of such items was made available in facsimile to historians and students. The De Ricci *Census of Medieval and Renaissance Manuscripts in the United States and Canada*, 1937–40, gives descriptions of thirty-five of the manuscripts dated 1118–1650. It then continues: "The same collection contains several fragments of Greek papyri, one describing the area of a piece of land; also an extensive series of about one thousand early deeds of the XIVth, XVth, and XVIth centuries, mainly relating to France, and some fifty single leaves of manuscripts, mainly theological. These would be worth listing in detail."

By far the most valuable part of the manuscript material, however, is that from the East. The Indic manuscripts constitute the largest collection of any institution in the United States in the outstanding languages of India—(according to Horace I. Poleman of the Library of Congress who catalogued it). Besides the ones from India, there are manuscripts in Japanese, Chinese, Arabic, Persian.

The Indic manuscripts include the famous work on astronomy by Varāhamihira, of which "only six complete copies . . . in Sanskrit [are] known to Oriental scholars." There are sixteen manuscripts of the *Lilāvati* of Bhāskara, and one complete manuscript of the *Bija Ganita* by the same author. Of the two rare specimens of the best-known algebras of the Moslem civilization, one is the *'ilm al-jabr w'al*

muqabalah' of al-Khowârizmî, a manuscript of the eighteenth century, and the other of the fourteenth century is one in Arabic of the treatise on algebra of Omar Khayyám. There are two Oriental manuscripts of special interest on geometry. One is an Arabic translation of Books I–VI of Euclid's *Elements*, made originally *c*. 890 but this copy is dated 751 A.H. (1350/51 A.D.); "the second of the interesting manuscripts of Euclid is the Chinese version in several volumes of Matteo Ricci, . . . translated in 1603–1607 with the help of two learned mandarins." This copy was probably made *c*. 1800. "This was the first translation of Euclid attempted in the Far East." There is a Persian manuscript of the tables of Ulugh Beg, the prince astronomer of Samarkand, which bears the date 1214 A.H. (1836 A.D.). Of this, Doctor Smith says: "I consider this the finest mathematical manuscript that I bought in the East."

There are more than a hundred specimens of Japanese manuscripts as well as many books. In one of his dictated notes, Doctor Smith says: "In Japan [first visit in 1907], I simply laid down the rule that I wanted to buy every mathematical manuscript or printed book that could be found . . . I had all the important works on mathematics in manuscript or in first editions . . . In my library there is now a very complete collection of the important works on mathematics written or printed in Japanese." Would that it were possible to quote the accounts of the experiences in obtaining some of this material! It is almost fantastic at times. One wonders how Professor Smith survived the emotion of having long-sought or unexpected treasures fall into his hands like manna from Heaven.

It is in order to mention here the exquisitely written manuscript of Omar Khayyám's *Rubáiyát* from the seventeenth century. And Professor Smith's own edition of the *Rubáiyát* must be noted. In this is, as the title page states, "*The Rubáiyát of Omar Khayyám* set forth in meter . . . based upon a verbatim translation by Hashim Hussein." It was most beautifully illustrated by a Persian artist.

While making no outstanding original discoveries in the history of mathematics, Professor Smith made available many works by facsimiles, translations, annotations either alone or in collaboration with some able student. Among these are: *The Sumario Compendioso of Brother Juan Diez, the earliest mathematical work of the New World*; *The Geometry of René Descartes*; *Le Comput Manuel de Magister Anianus*; *A Source Book in Mathematics* [ed.]; and articles on the first printed and other arithmetics. *Rara Arithmetica*, A Catalogue of the Arithmetics written before the year MDC1 with a description of those in the library of George Arthur Plimpton of New York, is

the only thing in its field and is the most important of his works from the librarian's point of view.

The Letters and Portraits are highly important but must be covered in a few sentences. The latest count on the number of autograph letters shows that there are 4056 from some 560 individuals (mainly those written before 1900—later correspondence not included). Among these individuals are found Arago (75), the Bernouillis (23), Carnot (16), Delambre (75), Descartes (1), Euler (16), Galileo (3), Newton (6), Quetelet (19), Voltaire (7). The choice of names is purely arbitrary. These letters throw light on the writers as human beings and as mathematicians. A series of articles *Among my autographs* by Professor Smith in the American Mathematical Monthly (between February 1921 and November to December 1922) presents not only letters, sometimes in facsimile, but with meticulous care an explanation of every item in the letters as well as some account of the writer. *De Moivre expresses himself* and *Legendre and Cauchy sponsor Abel* are two of the accounts. *Descartes's appreciation of Huygens the Elder* is the one precious specimen from the hand of Descartes.

The over three thousand portraits of mathematicians include representations of about a thousand individuals. There are several portraits of many of the men represented; for example, there are thirty of Arago, twenty of Johann Bernouilli, fifty of D'Alembert, eight of Descartes, and some hundred and fifty of Newton. Calls come from all over the world for representations of mathematicians and these have been supplied to many writers.

Professor Smith made other collections, the outstanding one of which is that of some eighty Korans. This also was presented to Columbia University. He himself writes: "My experience in buying mathematical books led me at one time to take an interest in the Korans. I have always felt that the most beautiful manuscripts in the world are the Korans, not that they are illustrated (which would be against the Mohammedan law) but because of the writing itself. I therefore purchased not only complete Korans, but some valuable pages from the older manuscripts . . . There are decorations around the edge of the pages but not of humans, only floral designs, etc. . . . Pages from the Koran of every century since the birth of Mohammed will be seen in the collection." Most of these Korans are on paper since the art of paper making was known very early in the Mohammedan countries (Samarkand, 751). There are two interesting exceptions, one on linen cloth and one on vellum. The most unique volume in the collection is the one on linen. It is a Persian manuscript of the eighteenth century and measures eight by thirteen inches. The opening

pages are exquisitely decorated with the predominating blue that is as thrilling as a glorious sunset or a strain of great music. The most valuable volume is one of the nineteenth century. Even a slight examination by an Arabian scholar has shown this collection to be of textual value. A number of its treasures were loaned for an exhibit in the Metropolitan Museum of Art.

What has been written here gives only a slight hint of the riches in the Smith Library at Columbia University. That scholars shall make use of all this material gathered by Professor Smith will make it live as he made it live, an end to be devoutly hoped for.

In addition to the collections already presented, some others will be touched on. Among these is one of Early Diplomas of the sixteenth, seventeenth and eighteenth centuries, the earliest a diploma of the University of Bologna, dated 1564. Still another is "believed to be one of the finest Ikon collections in the United States." In it are rare old pieces, some of which were made as early as the ninth century. "Almost all . . . were gathered from ancient religious meeting places in Russia, Old Macedonia, Juga-Slavia [sic], and Bulgaria." A further list covers: illuminated manuscripts and calligraphic specimens; medals, coins, and counters, illustrating the history of mathematics; Sumerian and Babylonian tablets illustrating the use of the early numerals of Iraq; and, manuscripts and printed books on education which include manuscripts relating to the history of nursing.

Many readers have in their possession evidences of Doctor Smith's wonderful gifts as a letter-writer. These would make a story in themselves, and it is hoped that that story will some day be written. Then, too, among memories of readers are remarkable dinners and luncheons given by this most gracious host at his home in New York City and abroad at Congresses. Professor C. J. Keyser has recalled these so well that his statement is quoted: "What I remember most vividly was his extraordinary hospitality, his fine and many-sided culture and his gentle representation of the gracious manner of the long since vanished and almost forgotten ways of the mid-Victorian social life." There stand out from such occasions ones on his return from some corner of the globe, always with treasures and always with interesting accounts of their acquisition. Details of these talks have been brought back and strengthened through the privilege accorded the writer of reading notes dictated by Professor Smith, many of them as late as 1936. Let us recount one of these.

"Finally I came back to Colombo and called upon the high priest of the Buddhists in the outskirts of the city. I went to the monastery and was cordially received by two or three priests, but they told me

it would be impossible for me to see the high priest because he was very sick and was not expected to live. I gave them my card telling my affiliation with the University and the American Mathematical Society, and asked that it be presented to him after I left. I noticed, however, that they had called in two or three other priests, and in the corner of the room they looked over my card and then one of them left the room and I was asked to wait a few moments. Soon he returned, saying that His Reverence, the High Priest, wished to see me. I passed through a long corridor, and was admitted to his bed-room, where I saw him lying on his bed in the darkness, the curtains having been lowered. It was rather an embarrassing situation to be going to a man's death bed and talking mathematics to him. I found him, however, one of the finest gentlemen I ever met. He was interested in my inquiry, and he finally said there was nothing in the library of Ceylon that related to mathematics or astronomy. There was, however, he said, a well-known book on astrology which had some mathematics in it, and he sent the servant out and he brought back a palm leaf manuscript which the high priest told me was well-known among all the scholars of Ceylon. He said that it would be impossible to buy one, but that it would give him great pleasure to have a copy made and sent back to me. This was done, and I received it somewhere along the route back to America . . . I had been seated in a small child's chair, the priest having told me that in the presence of His Reverence no one was allowed to sit, but that in this case, if I would sit in the chair of a child, I would be welcome to that rest. When the time arrived for leaving, I arose, and to my astonishment, the dying priest threw off the bed clothes, arose, and conducted me with great courtesy to the door. I treasure that copy that was made, not only for its own value, but also for the great kindness that this man, an invalid, showed me, a stranger. I was glad to learn afterwards that he recovered, and that he lived some years thereafter."

The most outstanding memories of the writer are those of visits with a group of twenty or thirty students which took place for many years at the close of each semester through June 1939. These were made to Professor Smith's home and later to the Smith Library by students from courses in the history of mathematics who had become somewhat familiar with the names and writings of the great workers in the field. When these gatherings were held in his beautiful, treasure-filled home, tea was served and was followed by a talk that was pure magic on the books and other objects assembled on tables at the front. (Professor Smith's talks to general audiences, such as the whole student body at a college chapel hour, and even on a topic like "Leonardo

of Pisa," always held them spell-bound.) In the Smith Library, a display had been especially prepared and Professor Smith acted as guide· par excellence in presenting these treasures. Notice of his death in the daily papers must have carried the thoughts of scores of women in New York City back to these rare experiences, to some of them a glimpse into an unknown world.

The direct association of Professor Smith with the American Mathematical Society was as vice president (1922), associate editor of the Bulletin (1902–20), Librarian (1902–20). In *A Semi-centennial History of the American Mathematical Society*, 1888–1938, p. 91, Dr. R. C. Archibald states: "With the election of Professor Smith as Librarian for 1902 enormous strides were almost immediately made in the Library's development . . . The Library's present excellence is almost wholly due to Professor Smith . . . " The extraordinary growth of the Library in this period is shown by increase in the number of volumes from 121 to 5,862 and in the number of periodicals on the exchange list from 64 to 123 (in 1912, 180).

Professor Smith's activities were legion and cannot all be named in this brief space, but a few others demand a place. He was the Founder of the History of Science Society and the Founder of the journal Scripta Mathematica and for one year (1920–1921) was president of the Mathematical Association of America. He was also a vice president of the International Commission on the Teaching of Mathematics (1908–1920), president (1928–1932), and honorary president (1932+). He was departmental editor in mathematics of the Fourteenth Edition of the Encyclopaedia Britannica.

Apart from being an international educational leader, Professor Smith was a great teacher. On the occasion of his seventy-fifth birthday, he was presented with a large collection of letters from former students. Among these was one from Miss Muriel Bowden which expressed fully their attitude toward him, and we close on this note.

Dedication
TO DAVID EUGENE SMITH

Who by his great scholarship has given to all his
    students a love of sound learning;
Who by his glowing wisdom ever transformed the
    dead letter into the living spirit;
Who by his sincerity and fortitude has inspired
    and encouraged all those who have known
    him in the quest for truth:

MASTER AND FRIEND.

NOTES

1. The first volume of Osiris, 1936, was dedicated to Doctor Smith and presented to him on his seventy-sixth birthday. It contains his portrait, a dedication to him by George Sarton, editor of Isis (official journal of the History of Science Society), a bibliography of his critical, historical and pedagogical writings, as well as thirty-six contributions by different authors and friends.

2. In *Bibliotheca Columbiana*, April 1933; December 1934; June 1936; August 1937, there will be found brief accounts of Doctor Smith's gifts to Columbia.

3. The Mathematics Teacher, May 1926, *In honor of Professor David Eugene Smith* contains addresses (by colleagues, former students and friends, given at a dinner at the time of his retirement), and also a reproduction of an oil painting of Doctor Smith by Leo Mielziner.

4. In *Columbia University Honorary Degrees. Appreciations by Nicholas Murray Butler*, 1933, p. 137, is found a tribute given at the time of the conferring on Doctor Smith of the honorary degree of Sc.D.

5. *Dr. David Eugen Smith, ein hervorrangender amerikanischer Reckenmethodiker*, vom Rudolf Knilling, Reportorium der Pädagogik vol. 52 (1898) pp. 561–569, is another tribute.

6. Brief but comprehensive biographies are found in (a) *Biography*, R. C. Archibald, Scripta Mathematica, April 1936, pp. 182–184; (b) *Seventy years of textbook publishing*, 1867–1937, Thomas B. Lawler, pp. 155–159.

The writer of this article wishes to express deep appreciation of the unfailing courtesy and scholarly assistance of the curator and assistants of The Plimpton-Smith-Dale Library. Acknowledgment is also made of invaluable help from other sources.

LAO GENEVRA SIMONS