at that time the continuous spectrum of the eclipsed secondary component is invisible and the lines are free of blending with continuous light of the secondary. Similarly, the emission lines are strong at superior conjunction because they must belong to the secondary component and these lines are weak at inferior conjunction because at that time the secondary component is eclipsed.

The result of this study is the discovery of an unusual kind of star. The secondary component of HD 163181 has a strong continuous spectrum with weak emission lines, but without perceptible absorption lines. The interpretation of the spectrographic observations would have been easier if there had not been another complication: The emission lines of the secondary show a permanent red shift of some 100 km/sec. with respect to the absorption lines of the primary. This phenomenon had previously been found in two or three other stars, but its origin is unknown.

OBITUARY

DAVID EUGENE SMITH

(AN APPRECIATION)

IN the passing of Dr. David Eugene Smith, who died in New York on July 29, the world has lost a profound scholar and a distinguished teacher. Dr. Smith's accomplishments were so unique and varied that he not alone enriched his own life but also the lives of thousands of his pupils and admirers the world over. His life is worthy of a full volume of many pages, instead of a few pages as here permitted. Others undoubtedly will express appreciation of Dr. Smith's mathematical accomplishments in research and teaching, but this sketch will take the more special phases of his life work into consideration. He made, of course, no distinction in his life's activities; that is, he did not overemphasize one activity against the other. He was equally energetic as teacher, research worker, book collector, connoisseur of portrait prints and manuscripts, bibliographer, traveler and genial host to his many fortunate friends. If ever a man enjoyed a full life, surely Dr. Smith accomplished that.

In reviewing these many and varied activities and their results, one is sure to find only one theme or subject controlling his life. This subject was mathematics in its many ramifications. It received the full benefit of his keen analytical mind, although his method was synthetical in producing results. These results are well known to scholars, particularly in the form of books and special monographs. He may not be famous as a great mathematician in the technical aspect, but to the world of scholarship he will ever be known as the "Great Humanist in Mathematics."

May we not say, in his own words which he spoke concerning Newton at the bicentenary celebration in 1927, as chairman of the program committee and as presiding officer in the opening address: "When we review his life, his idiosyncrasies, his periods of contrast, . . . may we not take some pleasure in thinking of him as a man—a man like most other men save in one particular—he had genius—a greater touch of divinity than comes to the rest of us. Few men have ever lived who explored so successfully as wide a range of human activities and few who could so justly have used the well-known phrase, *Homo sum, et nihil humani a me alienum puto.*" Dr. Smith too had genius in a degree, though of another kind.

(a) He had capacity for friendship and hospitality.

(b) He had capacity to inspire and aid scholars.

(c) He had appreciation of the works of others.

(d) He had capacity for recognizing beauty in mathematical prints and instruments and in Oriental art books.

(e) He had capacity for organization and administration.

Dr. Smith was not a Newton scholar in the technical aspect, but a Newton in the discovery of the humanistic and in the interpretation of the very abstract thoughts of mathematics. His range was from the elementary to the advanced, for he could teach the child to understand numbers as well as discuss abstract formulas with the graduate student. The classroom was not his only sanctum for teaching; his home —his country—and in fact the world, for he lectured whenever called upon, in New York, Paris, Arabia or Yokohama.

His historical writings are authoritatively manifested in his well-known "History of Mathematics" (Vol. I, "General Survey of the History of Elementary Mathematics"; Vol. II, "Special Topics of Elementary Mathematics"). And again, a more advanced treatise was his "Source Book of Mathematics." His little volume, "History of Mathematics in America before 1900," with Dr. J. Ginsberg, will always remain a standard source book. The constant use of these source books is revealed in the teaching research in our mathematical courses. A large number of smaller books and monographs on phases of teaching and history of mathematics are listed in a very complete bibliography of Dr. Smith's writings issued in the first volume of *Osiris,* presented to him to commemorate his seventy-sixth birthday in 1936.

The culmination of his historical research and writings may properly be assigned to the public recognition accorded to his work when Dr. George Sarton presented to him at a special gathering at Columbia University on January 21, 1936, a beautifully bound volume appropriately known as a Festschrift. This Festschrift acknowledged to Dr. Smith the debt the world of learning owes him.

Intellectual insight is not all that is necessary to bring about improvement in our culture; it needs to be accompanied by the will to do, to create and to analyze the needs of the day. In the founding of the History of Science Society in 1924, Dr. Smith became the father of this cultural movement in America. The society has now become the largest and most important association of its kind in the world. The farsightedness of its founder was again revealed when in 1931 he presented to Columbia University a unique and valuable collection of rare books, manuscripts, prints, medallions and scientific instruments illustrating the history and development of mathematics. It will be evident to those who know this library that Dr. Smith kept in mind the importance of teaching as well as research, for it contains illustrated material necessary for any serious student. In this same library is the George A. Plimpton Library of rare arithmetics collected primarily by Dr. Smith for Mr. Plimpton. It is known that in the fifteenth and sixteenth centuries approximately four hundred different books were printed that may be, strictly speaking, called arithmetics. These have been preserved in this library.

The most elaborate and scholarly bibliography of arithmetic yet attempted was prepared from the Plimpton collection. This bibliography presents in upwards of five hundred pages a list of arithmetics published before 1601. It contains a complete bibliographical description, as well as a large number of illustrations, such as title pages, of most of the important arithmetics of the formative period of the modern history of the subject. This volume illustrates the keen, critical bibliographer its compiler was. The beautiful format is in keeping with all that Dr. Smith did.

As a traveler Dr. Smith supplemented and enriched the curriculum of his mathematical courses, particularly that of the history of mathematics. Undoubtedly the teaching courses received the same benefits, for such treasures as manuscripts, rare books from the Greeks or the Hindus or from the Renaissance or, more pleasing, probably those of the Arabians or Persians, and again the Chinese and the Far East are represented. The peculiar insight for anything mathematical which he must have had when traveling in foreign lands was indeed unbelievable, unless one was fortunate enough to be his student, friend or guest at his seminar or home, and there be shown his "wealth from the Indies." For years previous to his world tours he spent each year in the city of his greatest love and fascination, namely, Paris. Here he was more at home than most travelers, for he spoke French with traditional ease, and roamed its streets and sought out its historical monuments. His love for Paris and French mathematicians present and past is revealed by two publications. The first was published in 1924, "Historical-mathematical Paris," and the other "Mathematica Gothica," 1925. These two little volumes were issued as mementoes of his love for Paris and presented to his intimate friends.

Dr. Smith was virtually possessed by the search for truth and beauty in the field of mathematics, its history and teaching, so that he set no limit or expense to attain the end and the material possession of the object. As a result, his own researches have attained the greatest possible distribution in the form of publications of nearly six hundred items—books, monographs and reviews, in English, French, Italian, German and Spanish, and perhaps other languages. His work in the history of Japanese mathematics was published in 1914. This was done in conjunction with Yoshio Mikami. His interest in the early history of mathematics in this country was again manifested when he had reprinted "The Sumario Compendioso of Brother Juan Diez, the Earliest Mathematical Work of the New World." This book was first issued in the City of Mexico in 1556. Again, Dr. Smith published with a facsimile of the first edition "The Geometry of René Descartes," translated from the French and Latin with the assistance of Marcia L. Latham. In addition to these, he published Greek mathematical tables and Hindu and Arabic numerals. These and many others too numerous to cite illustrate his universal tastes, interests and accomplishments. Again, nearer home, his interest in Colonial science, particularly in mathematics, was manifested in his constant search for the first beginnings of the teaching of mathematics in the Colonies. This was rewarded by his discovery of a Colonial algebra manuscript notebook written in 1739, found in a museum in York Village, Maine. He manifested keen delight in the works of others whose special interests were in Colonial science. This was one of the common bonds of interest between the writer and Dr. Smith. He himself wrote a number of biographical sketches of Colonial mathematicians for the "Dictionary of American Biography."

Dr. Smith's enthusiasm for the history of mathematics was due to the fact that to him it revealed what is most precious and most significant in our civilization. He believed the achievements of the past gen-

eration should be made the means of attaining still greater ends.

Brief as this appreciation is, we are all too conscious of the magnitude of the task. However, we can not close without a statement concerning the special delight which came to him in an honor which is rarely bestowed upon scholars. During an absence of four months in the winter of 1932 and spring of 1933, spent chiefly in Persia, Iraq and Syria, Dr. Smith traveled by motor upwards of 10,000 kilometers from the time he left Haifa until he reached Turkey. He secured more than 150 manuscripts—mostly Persian, Arabic and Hebrew. Among them were several mathematical pieces of importance, chiefly Arabic translations from the Greek classics, together with a fourteenth century manuscript of Omar Khayyám's algebra. The translations from the Greek include two Euclids, Archimedes on the circle and Aristarchus on astronomy. Also he supplemented his early nineteenth century manuscript of Ulug Begh's tables by three other earlier sets. In the lot were commentaries on al-Khowārizmī's algebra and Beha Eddin's arithmetic.

His collection, which contained also manuscripts of works on the Persian poets, he enlarged by copies, usually with miniatures, of the classics of Ferdousi, Hafiz, Sa'di, Omar Khayyám, Nazāmī, Omar ibn Ghares and others. His large library of Korans and Koranic literature, a few specimens of which are now in the Islamic exhibition in the Metropolitan Museum (New York), was greatly enriched by about 100 additional manuscripts, several with unusually fine decorations and bindings. These acquisitions formed part of his personal library of over 20,000 items which he presented to the library of Columbia University (the additional works to the special library of Teachers College).

It is well known that mathematical scholarship has a correlation with musical interpretations and appreciation, but seldom with poetical temperament and metrical construction.

In appreciation of Dr. Smith's new metrical version of Omar Khayyám's "Rubáiyát" in 289 quatrains, which was the first work to be worthily illustrated by a Persian artist of high standing, and in recognition of his interest in the mathematical achievements of the country, the Persian Government conferred upon him, in the presence of a distinguished audience, the gold star of the Order of Elim, decoration of the first rank. After an address by Professor Smith, who was introduced by H. Highness Feroughi, Minister of Foreign Affairs, the presentation was made by H. Highness Esfandiari, the oldest of the former ministers of state. The addresses upon the occasion were published in full in the Persian papers, in some cases with an English summary. An autographed portrait of H. I. Majesty, the Shah, was also among the highly prized souvenirs which were presented to him. He gave addresses in several of the cities and visited a number of the important excavations then in progress in Syria, Iraq and Persia.

In closing this brief sketch of his life and the material and spiritual aspects of it, may these always remain as a permanent tribute to his memory, to perpetuate his name and to enhance the already distinguished collection into which he has breathed the spiritual life of mathematics.

FREDERICK E. BRASCH,
Consultant in the History of Science
LIBRARY OF CONGRESS

SCIENTIFIC EVENTS

VITAL STATISTICS OF ENGLAND AND WALES

THE wartime upward trend in the birthrate in England and Wales was maintained during the first three months of this year. According to statistics given in *The Times*, London, the Registrar-General's Return of Births, Deaths and Marriages registered in the quarter ended March 31 records a total of 184,145 live births. This represented a rate of 17.9 per 1,000 of the population, the highest first quarter rate since 1926. There were 11,874 more births than in the first three months of 1943, when the rate was 16.9.

Boy babies numbered 94,964, giving a proportion of 1,065 boys to every 1,000 girls. The average for the 10 preceding first quarters was 1,060. Births registered exceeded deaths by 37,941.

The provisional infant mortality rate, 58 per 1,000 related live births, was 14 below the average for the 10 preceding first quarters, and was the lowest rate on record for this period of the winter.

The death-rate was 14.2, compared with 13.5 during the same period a year ago. From 1938 to 1942 the average rate was 16.2.

The number of marriages, 62,599, was the second lowest for any quarter since the war and exceeded by only 262 the number in the same period a year ago, when the lowest war-time quarterly total was recorded. The marriages were 12,972 fewer than the average number for the first quarters of the five years prior to 1943, but were 8,338 higher than the corresponding first quarter average for the five years immediately preceding the war.