single 5. Since there are not three of a kind, there can not be formed a full-house. But how are we to be certain that we can not make five flushes and straights with these 25 cards? We can not examine the more than 5,194 billions of ways of arranging the 25 cards into five sets of five each, not distinguishing the order of the cards in a set or the order of the sets. We shall resort to the following conclusive analysis:

Since there are only three diamonds, no one of them occurs in a flush, and they are too far apart for two of them to occur in a straight. Hence 2d, 7d, Qd occur in three separate straights.

First, let both 3h and 4h occur in a straight with 2d, and hence with 5c, the only 5. Since there is no 5 left to go in a straight with 3c or with 2s, there is a flush of clubs and a flush of spades. These with the three straights mentioned must exhaust the 25 cards. But Qh is too far from 2d or 7d to be in a straight with one of them, nor can it be in a straight with another queen, Qd, nor in a flush of clubs or spades.

Second, let either 3h or 4h be not in a straight with 2d, and hence not in another straight (since a new 5 is lacking). Thus either 3h or 4h lies in a flush, containing all our five hearts. Since 2s can not occur in a straight (5 lacking), there is a flush of spades. Hence we have these two flushes and the three straights containing 2d, 7d, Qd. But 7c can not occur in one of these five poker hands.

This completes the proof that the above 25 cards can not be arranged in five complete poker hands.

L. E. DICKSON

SCIENCE IN FICTION

TO THE EDITOR OF SCIENCE: I am getting up a little catalog of fiction on scientific themes and should like the help of SCIENCE readers. Such books belong mostly to four classes:

(1) Fantastic and futuristic fiction, such as Jules Verne's "Twenty Thousand Leagues Under the Sea" (submarine) or "A Voyage to the Moon" (astronomy) and Wells's "The Food of the Gods" (hormones) or "The Story of Davidson's Eyes" (fourth dimension). This seems to be the largest and most popular group.

(2) Novels based upon some scientific discovery or showing the influence of applied science upon society, such as Hergesheimer's "Three Black Pennys" (development of the iron industry).

(3) Stories in which some scientific fact or theory forms the theme, such as Arthur Reeve's detective stories and Rebecca West's "The Return of the Soldier" (Freudianism).

(4) Historical fiction where a distinguished man of science plays an important part, such as Merejkowski's "Romance of Leonardo da Vinci" and Guitry's play of Pasteur. This which would seem to be a fertile field for fiction has apparently been rather neglected.

I should be very much obliged if those who happen to know of good novels or worth while short stories of this sort would give me the titles and authors' names, also if convenient the publisher and the scientific motif.

EDWIN E. SLOSSON

SCIENCE SERVICE,
WASHINGTON

QUOTATIONS

THE WORK OF GENERAL GORGAS

ONE of the last acts of Congress before adjournment was to send to the President a bill to pay a monthly pension of $150 to the widow of General William C. Gorgas, who died in London on July 4, 1920. In 1918 General Gorgas was placed on the retired list, having reached the age of 64. In the two years of life remaining to him his services were in great demand as an expert in sanitation. The Rockefeller Foundation made him director of the yellow fever work of its International Health Board. He visited Guayaquil to see what could be done to clean up that pest-hole. The government of Peru engaged him to carry out a sanitary program in that country. General Gorgas did not live long enough to earn the reward to which he was entitled as a renowned specialist in sanitation. His army pay had increased slowly as he rose from grade to grade. It was not until 1916, two years before he left

the army, that he became a major general. Upon his retired pay, which, of course, ceased with death, he could live comfortably with his family, but only by practicing economy. To gain a modest fortune it was necessary for him to live the strenuous life of scientific investigation in tropical countries, and the time at his disposal was too short. He carried on until he died worn out.

It was an irony of fate that the soldier who had saved an incalculable number of lives by his campaigns against yellow fever and malaria in Havana and in Panama should be struck down at sixty-five while risking his own health to provide for his family after his death. The republic is not ungrateful to its Deweys and Pershings, who are rewarded with special rank and high pay for life for fighting its battles, but may not the charge of failing to recognize the merits of a great soldier-sanitarian like William C. Gorgas be preferred against it? There might be extenuation if the world had not acclaimed him the most efficient plague-fighter of his day. Great Britain sent for him when its own medical men were baffled by the virulence of influenza in the Rand gold mines in 1913, the War Department lending Colonel Gorgas to find means of checking the epidemic, in which he was successful. If he had been an Englishman, Great Britain would have known how to reward as well as to honor him for his invaluable services. Great Britain could only give to him a decoration coveted by its own scientists. France made him a commander of the Legion of Honor. It can not be pleaded for Congress that it has not the power in such a case to reward conspicuous merit and service. If a precedent had been made when General Gorgas retired from the army, there would not now be the spectacle of a belated effort to do something in a small way for the relief of his widow.—New York *Times*.

SCIENTIFIC BOOKS

Plane and Solid Analytic Geometry. By WILLIAM F. OSGOOD, Ph.D., LL.D., and WILLIAM C. GRAUSTEIN, Ph.D. New York, The Macmillan Company, 1921. Pp. xvii + 614.

This book is somewhat larger than the usual American text-book designed for an elementary college course in analytic geometry. The material is so arranged that it is easy to select therefrom suitable subjects for comparatively short courses, and hence the book will be welcomed by those teachers who believe that it is desirable to place in the students' hands books which will enable the most gifted to go beyond what is discussed in class. Emphasis is laid on presenting the subject in the simplest and most concrete form, and on pointing out its relation to physics whenever possible. It may be recalled that Descartes, who is commonly regarded as the founder of analytic geometry, once said in a letter to Mersenne that all his physics was nothing else than geometry.

In view of the fact that the various mathematical theories are so interdependent good text-books for courses in elementary mathematics must cover the same fundamental ideas. There is, however, considerable latitude as regards the mode of presentation, especially as regards illustrative examples and the choice of the problems which the students are expected to solve for the purpose of developing their ability to use the subject. Students can usually prove a large number of theorems which they do not understand until they have applied them in the solutions of different types of problems. The present volume contains a large number of problems selected by men who are well qualified to determine what is most essential for the later progress of the students in pure and applied mathematics.

About 200 pages of the book are devoted to solid analytic geometry. Most of our courses for engineering students are too weak along this line. Many of the standard texts on applied mathematics presuppose a thorough knowledge of the rudiments of solid analytic geometry, and even the ordinary courses in integral calculus and mechanics frequently make greater demands on space conceptions than the student has acquired in the brief course which he followed. The developments found in these last 200 pages are especially to be recommended to students who seek a clear presentation of very useful facts lying just beyond the ordinary elementary course in analytic geometry.