there is a lake of molten lava, in the shape of the figure eight, approximately 800 feet long by 400 feet wide. Near the center of the northern lobe of the lake is an island some 78 feet in length, in the shape of a half moon. Within the little bay formed by the points of this island there is an almost constant boiling of the molten lava, with explosive bursts of gas every minute or so, which throws masses of the molten fluid into the air some 30 to 40 feet, and scatters it over an area of approximately 100 feet in diameter. Immediately after each outburst of gas a tremendous suction draws the lava from a radius of 100 feet of the bay into a vortex like that of a maelstrom, great cakes of lava 15 or 20 feet in diameter being turned up on edge, sucked in and disappearing like chips down a whirlpool.

Immediately north of the island, at a distance of not more than 100 feet therefrom, there is a gigantic outpouring of lava from beneath, without any bubbles or explosions. It looks like an enormous spring, the lava simply welling up and flowing off in all directions. The current is so rapid that the surface of the lake does not have time to cool, except in spots, and these spots are at frequent intervals upheaved by convulsions from beneath, and the black crust engulfed in the liquid lava beneath. The crusts striking the banks of the lake, which are from four to six feet high, are either shoved bodily upon the banks, like ice cakes in the Arctic, or upturned on edge and swallowed up in the fiery depths below. At intervals boiling spots appear at various points on the lake; engulfing the black cakes of lava floating thereon. The outpouring of the lava from the great spring is so great that the level of the liquid lava is raised faster than the surrounding banks can retain it, and at frequent intervals the banks give way and torrents of lava flow out into the surrounding territory in the pit, until that portion of the pit is raised to a level that stems the flood.

This action has been going on now for several weeks, the lake constantly enlarging and the floor of the pit being raised by the overflows of lava.

The brilliancy of action can be judged from the fact that a lantern is not needed in crossing the rough floor of the crater, the light from the lake being more than sufficient to show the trail in its details. The glare of the lake can also be seen any clear night from Hilo and Honuapo, at distances of 31 and 35 miles, respectively.

The probability is that this brilliant display can be seen for several weeks or months yet; but it would be well for visitors to lose no time in starting for the volcano for fear of disappointment. It will be many years before another equally good opportunity is likely to present itself.

C. H. Hitchcock

Hanover, N. H.,
June 10, 1908

SCIENTIFIC BOOKS

Air-ships, Past and Present. By A. Hildebrandt. Translated by W. H. Story. Pp. 364; 222 illustrations. New York, D. Van Nostrand & Co. Price, $3.50 net.

There have been hitherto few satisfactory books in English upon aerial navigation and information in newspapers has not always proved accurate. We now have, however, a book by a thorough expert, Captain Hildebrandt, instructor in the Prussian Balloon Corps, who wrote the work in 1906, and it was found so good as to warrant translating into English by Mr. W. H. Story. There are twenty-six chapters and profuse illustrations.

The greater portion of the book is naturally devoted to balloons. These vessels have now been developed to almost adequate speed and efficiency in the "dirigible air-ships" of the present day and the European nations are providing themselves with war aerial navies which are described and illustrated by Captain Hildebrandt, in a popular way so as not to repel untechnical readers.

He begins with the early history of the art, this referring chiefly to flying machines, and then gives two chapters to the hot-air balloon and its subsequent supersession by the hydrogen balloon. In the fourth chapter the theory of its flotation is taken up and formulæ are given for calculating the "lift" at different heights, or with different atmospheric pressures. Also for the effects of temperature upon the enclosed gas. Then four chapters contain the history of the dirigible balloon, with copious illustrations of the vessels which have marked the gradual increase in speed. This was twenty-two miles an hour for the French "Lebaudy" in 1906. Since then it has been increased by increased sizes to about thirty miles an hour, which must be very near

the limit and will probably enable such craft to cruise about three quarters of the days of the year. A misprint on page 63 states the length of the German "Zeppelin" as 85 feet instead of 414 feet.

A rather scant chapter follows on flying machines, but it can be profitably studied to ascertain the various steps which have led to the success of the last two years.

After devoting one chapter to kites and another to parachutes, both of which are fairly well written, the author passes to military ballooning, in which he is evidently thoroughly proficient. He takes up its development, describes its uses in the Franco-Prussian war, and then devotes two chapters, the ablest in the book, to the modern organization of military ballooning in some fourteen different countries. This brings us to chapter XVI., Balloon Construction and the Preparation of the Gas, followed by one on Instruments, and then follows Ballooning as a Sport, in which the author is evidently an adept, having made many such expeditions and relating them in an entertaining way.

Chapter XIX., on Scientific Ballooning describes the various journeys (in some of which the scientists lost their lives) made to ascertain the laws of decrease of air pressure, of temperature changes, of saturation, of the composition of the air, of its electrical and its acoustical properties. The greatest authentic height attained by man has been 35,500 feet, while kites have been flown to 21,100 feet and unmounted balloons with recording instruments (ballons-sondes), have reached 85,000 feet (16.1 miles) and have furnished data which will presently be utilized in foretelling the weather.

The next six chapters treat of balloon photography, of the outfit required, of the interpretation of photographs, of the uses of kites and of the methods for interpreting the bird's-eye views obtained for topographical purposes, in all of which the author is evidently an expert. He has also had much experience with carrier pigeons and devotes a chapter to them. The reader may be surprised at the statement quoted that the mean speed of these birds is only about 26 miles an hour; feats mentioned in sporting books having been probably accomplished by the aid of the wind. Swallows fly faster than pigeons, but efforts to train them have failed so far.

The last chapter is on Balloon Law. The author states that such law can hardly be said to exist, but "that some sort of international regulation will be necessary in the future, seeing that balloons are now much more common than they were and that the dirigible air-ship is a practicable possibility."

The book is well written and well translated. Its perusal will enable the reader to follow understandingly the great advances since 1906 which are now in process of evolution.

O. CHANUTE

CHICAGO, ILL.

Laboratory Exercises in Physical Chemistry. By FREDERICK H. GETMAN, Ph.D. Second Edition. Pp. x + 285. New York, John Wiley & Sons. 1908.

The first edition of this laboratory manual was issued in 1904. Its author had set for himself the task of selecting for American students only such exercises as are typical, describing these in the clearest way possible, giving all reasonable discussion of theory and directions for work, and saving the student the labor of searching out his needs in such volumes as Ostwald's "Physiko-Chemische Messungen" and Traube's "Physikalisch-Chemische Methode." These must continue to be standard authorities, but with such wealth of detail and so many references to the German literature of the subject as to be often discouraging to the student who is not already well advanced.

While physical chemistry is now fairly differentiated as an individual branch of physical science, a laboratory manual on this subject is necessarily restricted in range, and the demand for it can never be large. Dr. Getman's aptness in clear statement and good arrangement is manifest, even without more than a cursory examination of the book. The best evidence that he was successful in giving satisfaction to students of his favorite subject is the unexpected discovery that a new