In their present development they constitute the most practical methods known, because they are the most economic while they are also adequately accurate.

The succeeding article by Dr. Mathews on 'Maps and Map Makers of Maryland' is of much historic interest. Dr. Mathews has ably assisted Professor Clark in his effort to make the Survey of Maryland a success, and to them both, as well as to the Geological Commission, belongs the credit of raising the standard of economic surveys to a grade that few can reach and none have surpassed.

BAILEY WILLIS.

La vie sur les hauts plateaux. Par le PROFESSOR A. L. HERRERA et le DR. D. VERGARA LOPE. Published by A. L. Herrera, Museo Nacional, Mexico. 1899. 4to. Pp. 786. Price, $6.

This remarkable work won the Hodgkins prize of the Smithsonian Institution, and now, translated from Spanish into French, is published in beautiful form through the munificence of President Diaz, of Mexico, to whom it is appropriately dedicated.

Professor Herrera, as the best type of a man of science, is an honor to our sister republic. His epoch-making ideas on the subject of museums have been very influential in France.

The present important volume is on matters for whose investigation the authors are most advantageously situated, having lived that life on the high plateaux of which they so ably treat.

The book opens with a chapter on the relief of both continents; the distribution of the great plateaux; their relations, ethnographic and hygienic. Chapter II. is on the vertical distribution of vegetable life and the phenomena of adaptation in the species of high altitudes. This is particularly rich in regard to the flora of Mexico and especially the Valley of Mexico. The action of the increased intensity of the sunlight is exhaustively studied.

Chapter III. devotes two hundred pages to the vertical distribution of animals, with the phenomena of adaptation, and in particular the influence of rarefied air. A study is made of mountain sickness as exhibited by animals.

Chapter IV. passes to the vertical distribution of mankind. Chapter V. is devoted to anthropometry and physiology of man at high altitudes. Worthy of note is the part on digestion, illustrated by considerations on the food supply of the City of Mexico. Chapter VI. is very short, treating of atmospheric pressure in geologic epochs and its supposed influence on organic evolution. Chapter VII. is largely taken up with experiments on the action of rarefied air. Chapter VIII. is on combustion and fermentation at high altitudes. Book II., applications, begins with Chapter IX., on typhus and scrofula at high altitudes. But of intense interest, of universal importance, is the matter of Chapter X., on the treatment of tuberculosis by altitude.

Statistics prove that the maximum of mortality from this dread destroyer pertains to low regions, the minimum to high. In more than 60 cases the curve of mortality rises as that of altitude descends.

In Mexico, even among the poor and the soldiers, there are less deaths from tuberculosis than in the low regions of Europe. For a thousand victims in regions below 500 meters there are only 255 in regions above 500. In Mexico out of 100 persons the parents of 3 will have died of tuberculosis; in Lima the parents of 18.

A residence at high altitudes is indicated for persons with hereditary or any other predisposition toward tuberculosis; for persons with defective chest-conformation or respiratory capacity, or in whom inflammatory affections have been incompletely cured. Even for animals the data show at high altitudes a certain immunity against tuberculosis.

In 1885 of 73,000 cattle killed at the general abattoir of the City of Mexico only 45 were tuberculous, while in England the proportion rises as high as 20 in 100

It is known, say our authors, that in tuberculosis the climate of high altitudes, even for those far advanced, prolongs life. What is it, then, that can diminish the number of cases or help those already attacked? Our authors attack this momentous question in the true spirit of experimental science. The illumination by the solar rays attains its maximum at high altitudes, and experiment proves that light

kills the bacilli and their spores with incredible rapidity. The dryness and cold also work against the existence of microbes.

But how can the rarefied air influence favorably pulmonary tuberculosis? After prolonged experimental study our authors sum up their results in certain theorems, which are discussed separately: (I.) Lessening pressure increases the circulation of air in the lungs, dilates them and obliges torpid parts to functionize. (II.) Lessening pressure determines a greater quantity of blood to the lungs. (III.) Lessening pressure, dilating the lungs, permits a uniform distribution of blood, makes regular its circulation and thus combats congestion. (IV.) Lessening pressure diminishes intrapulmonary tension in general and in particular intravascular tension. (V.) Augumentation of red globules and white globules. (VI.) Desiccation of mucous surfaces. The favoring of evaporation.

Numerous experiments on animals were followed by the actual treatment of tuberculosis by rarefied air, diminution of pressure. The results were highly encouraging and remarkable. Of the 13 healthy persons and numerous consumptives submitted to the action of rarefied air not one experienced the alarming symptoms described by P. Bert (Pression barométrique, p. 750). The experiments of Paul Bert having been credited, put a stop to all progress in these matters, and the whole world is indebted to Herrera and Lope for removing the embargo and smashing the tabu.

Of 13 cases of pulmonary tuberculosis treated by baths of rarefied air only one lost weight, one remained stationary, eleven increased most notably in weight, one increasing 300 gr. each day, one increasing 28 gr. each day during 4 months of treatment.

Our authors hold that the acclimation of plants, animals and man to the atmospheric conditions of high altitudes is rapid and in general perfect, without the slightest loss of vigor.

The vegetable kingdom reaches its maximum at high altitudes. As for mere size we need only mention the great tree of Tula and the tree of Montezuma. Any limitation is question of temperature, not atmospheric density. Species ascend the summits as they approach the equator. This is a pregnant hint for scientific agriculture. The more intense light of the altitudes, as also the dryness and decreased pressure, influence favorably the formation of chlorophyl, the decomposition of carbonic acid, the formation of amidon, the movement of protoplasm, the multiplication of epidermic cells, the force of transpiration, the absorption of oxygen.

As for animals, the fact that many species emigrate periodically to high altitudes and flourish there proves that often acclimation is exceedingly quick. Mammals are subject to 'mal des montagnes' and then must undergo a period of acclimation more or less troublesome. The symptoms are analogous to those in man. But the result is perfect adaptation. Longevity is not decreased, nor fecundity, nor secretions (*e. g.* milk).

In the blood the number of red globules augments with the altitude. There is an exact proportion between this number and the barometric pressure of the locality. This is so little known that in Mexico reputable physicians have declared patients not suffering from anemia despite most evident symptons, simply because microscopic examination of the blood disclosed the number of the globules considered as normal in Europe! The tension of the blood diminishes with the altitude. On the other hand, the intensity of intra-organic combustion, the temperature, the colorification is exactly the same for inhabitants of the City of Mexico, at an elevation of 7,350 feet, as for man at the low European levels.

This whole book is so unexpectedly rich in scientific contributions of the most momentous practical importance that no one working in any of the subjects touched can afford to be without it, and our sister republic deserves to be publicly congratulated on its appearance.

George Bruce Halsted.

Austin, Texas.

Books Received.

A History of Physics. Florian Cajori. New York and London, The Macmillan Company. 1899. Pp. viii + 322. $1.60.

The Microscopy of Drinking Water. George Chandler Whipple. New York, John Wiley & Sons; London, Chapman & Hall, Ltd. 1899. Pp. xii + 300 and 19 plates.