suggested: Use typewriter paper on which perforations divide each sheet into ten sections. Or, better still, use rolls of paper 4 inches or 5 inches wide, with perforations 3 inches apart. Type one entry on each section, and when the index is completed tear the sections apart and arrange the slips alphabetically. These slips are a handy working size, can readily be edited and rearranged, and then may be sent directly to the printer. This method avoids putting a card or slip into the typewriter and taking it out for each entry.

MABEL HUNT DOYLE
MARY A. BRADLEY

INDEXING SECTION
DIVISION OF PUBLICATIONS
UNITED STATES DEPARTMENT OF AGRICULTURE

EVIDENCES OF A PRE-CERAMIC CULTURAL HORIZON IN SMITH COUNTY, KANSAS

A CULTURAL horizon, buried some ten feet or more below the top of a twenty-one foot terrace along the banks of a small intermittent stream in Smith County, Kansas, has been under investigation by a University of Kansas field party under the direction of Dr. L. C. Eiseley, assistant professor of sociology and anthropology at the latter institution. The archeological material recovered consists of numerous flakes and rejects, a few scrapers and a single point. The material is intermixed with the charred and fossilized remains of bison and other animals. Although the material suggests more than a casual occupation of the site, no evidences of pottery or agriculture were secured.

According to Dr. H. T. U. Smith, assistant professor of geology at the University of Kansas, who conducted geological investigations at the site, the geomorphic changes which have taken place involve the following stages: First, a deposition of over ten feet of alluvium above the site; second, a lowering of the local base level and the formation of a flood plain fourteen feet below the top of the fill; third, a second lowering of base level and the development of a new flood plain twenty-one feet below the top of the original fill. This flood plain has a width of a hundred yards and is entering middle maturity. The geological evidence suggests that these changes could not have taken place much under a minimum of five thousand years ago, and the site may actually be older.

Inasmuch as the point recovered is not Folsom, but a well-worked artifact of a size suggesting its use with the bow, and as, in addition, there is no reason to refer the bison remains recovered to an extinct species, it seems reasonable to assign the site a dating later than the Folsom culture, but predating by a considerable margin the appearance of agriculture in the central plains. The importance of the site lies in its contribution of additional evidence of the existence of nomadic bison hunters in the central plains below the recognized ceramic cultures, but evidently later in time than the Folsom horizon, judging both from the probable use of the bow and the associated remains of a living species of bison. At the same time, because of its genuine geological antiquity, the site is an added check on the postglacial, early Recent fauna associated with man in the Plains region.

LOREN C. EISELEY

SCIENTIFIC BOOKS

TRAVELS OF A PLANT EXPLORER

The World was my Garden. Travels of a Plant Explorer. By DAVID FAIRCHILD, assisted by ELIZABETH and ALFRED KAY. Chas. Scribner's Sons, New York and London. Pp. 494. Many illustrations. 1938.

A MORE charming and interesting autobiography could scarcely be imagined. Fairchild is not known to the world from any great discovery or generalization, such as those of Darwin, Mendel and the Curies; but taken all together, his contributions to horticulture and thus to human welfare have been so great that he deserves to rank with those who have done most for their country and the world. The present book, giving a connected account of his activities, is especially valuable as showing what has been done, not only by Fairchild but also by those who cooperated with him, to all of whom full and generous credit is given. The results of all this work may be found in every part of the United States, where introduced plants are growing and producing increasingly valuable crops. It would be impossible to estimate the value of the products which have been made available to us through Fairchild, or to say what limit there may be to their increasing value, as they become better known, and the conditions of their cultivation better understood.

How are such men produced? Fairchild says:

> Going back through the mists of sixty-odd years, I realize that I both had the suitable heredity and was born into an environment adapted to the development of a naturalist or horticulturist. In other words, my path was almost predestined at my birth. I do not believe that I consciously chose its direction, but rather wandered down its attractive way unconscious where I was going. . . . Had I the choice of a place to be born, a family to be born into, and an environment with which to surround myself, I could hardly have chosen more wisely than Fate chose for me in 1869 when I was born at Michigan State College. My parents belonged to the class to whom the intellectual future of this country meant more than anything

else in the world. As a boy, I heard countless discussions in my father's house concerning some of the most fundamental changes which have taken place in the education of the youth of America; discussions among pioneers who have left their mark on much that is fine and splendid in the civilization of our country.

When he was ten years old, the family moved to Manhattan, Kansas, his father having been made president of the then small agricultural college. Here, as he grew up, he was fortunate in coming under the influence of some active-minded men, who were concerned with the practical problems of the farmers. He early appreciated the nature of these problems and the fact that they had to be solved by scientific research. It was the beginning of many things, and, says Fairchild: "We were all to be actors and supers in a gigantic drama. Its importance has meant little to the press, which sees news only in the startling headlines of the day, but I believe that history will evaluate our work more highly, for historians view life in terms of related instead of unrelated days."

In 1889 he was invited by B. T. Galloway to go to Washington, to serve in the Department of Agriculture, with a salary of a thousand dollars a year. It was not a very attractive prospect, and there was some hesitation about accepting, but as a matter of fact it opened a broad way to new opportunities, and was the foundation for the work to which he devoted his life. Although the department in those days was poorly housed and appeared to be a rather insignificant branch of the government service, it included a group of very remarkable men, who are now famous in the annals of science. One wonders how they got there, and how much was due to their native ability, how much to the fact that they were pioneers in important fields just then beginning to be cultivated in this country. It was indeed a wonderful opportunity; the broad continent of North America, with all its different conditions of soil and climate, so rich in its possibilities, so poorly developed in comparison to what might easily be. No doubt in some directions the prospects appeared brighter than they actually were, the many difficulties not being fully appreciated, but the resulting optimism did no harm, and the outcome has been a very notable enrichment of our standard of living.

Broadly speaking, the problem for agriculture and horticulture was to find the crops which it was most profitable to grow in each locality. It was not purely a question of making money for the farmer, but also of serving the public. Whether or not the crops produced more income, it was worth a good deal to have interesting and diversified foods on the market. In different parts of the world, from very early times, people had striven to improve their crops, or had selected those they preferred. Sometimes nature had done the selection, as by the survival of hardy varieties in a cold climate, or of resistant varieties in the presence of parasites. Some of these variously improved varieties had been introduced into the United States, with very excellent results, but the world had never been systematically explored for them.

So any one might have reasoned, but what could be done about it? Certainly the American government had no idea of initiating such a great enterprise. Fairchild, now fairly launched as a scientific worker, did not yet see himself as a botanical explorer. He wished to go to Europe to increase his scientific knowledge, and the opportunity came when Dr. Stiles got him appointed to the Smithsonian table at the Naples Zoological Station. The voyage across the Atlantic was very stormy, "the roughest and most uncomfortable of my life." "One morning I was amazed to see a man standing in the doorway of the second officer's cabin, clad in wrapper and pajamas. It was the first pair of pajamas I had ever beheld; heretofore every one I had seen attired for slumber had worn a nightshirt. Somewhat stunned, I stared at this tall stranger in open-mouthed astonishment. . . . He was very good looking, standing there in the sunlight, quite the distinguished man of the world." This was Barbour Lathrop, who nicknamed Fairchild "Fairy," but was himself the good fairy who directed his destiny and made his great work possible. When Fairchild got acquainted with Lathrop, he told him about his various ambitions, and especially how he longed to go to Java, but of course could not stand the expense. When Fairchild had been at Naples about a month, Lathrop turned up, along with Professor Raphael Pumpelly, of Cambridge, Massachusetts. Lathrop wanted to see what Fairchild was doing, but was not much interested in karyokinesis. So he said: "You told me on the boat that you wanted to go to Java. Have you given up that idea?" Presently he added: "I've decided to give you a thousand dollars with which to go to Java. I want you to understand that I look upon this thousand dollars as an investment, nothing more. I have had you looked up, and you seem to be all right, and when you are ready for the money I will send you a letter of credit for that amount."

One might suppose that Fairchild would have taken the next boat for Java, but he explained to Mr. Lathrop that he thought he should continue his training in Europe, so as to become better fitted to justify the "investment." So we find him at Breslau, Berlin and Bonn, and there is much to tell of his experiences there.

But "every few months a letter would reach me from Mr. Lathrop asking why the devil I had not gone to Java." Eventually, in 1896, the great day came, and Fairchild sailed for Java "under Dr. Treub's chaperonage." In his work at Buitenzorg, he specialized in

the natural history of termites, finding out some very interesting facts. Perhaps he would have become a noted entomologist, following the methods of his friend, W. M. Wheeler, had not Mr. Lathrop again interfered. The next chapter is headed "The Lathrop-Fairchild Odyssey Begins." Mr. Lathrop carried him off, and one fateful night as the vessel lay off the Island of Penang, the two men had an earnest conversation, at the end of which "I had promised Mr. Lathrop that I would take up a study of the plants useful to man, and together with him, find a way to introduce their culture into America. It was a rather vague, ill-defined agreement, but it was a turning point."

We now find the two men spending many years going up and down the world, exploring for useful plants. Mr. Lathrop had no particular interest in scientific research as such, and apparently did not even care much for ornamental plants, but no expense or trouble seemed too great if it resulted in securing some plant valuable as food or for some commercial product. One would like to review all these adventures in some detail, but they must be left for readers of the book. Mr. Lathrop was not always easy to get along with, and had an impatient temperament, so that he often wanted to leave a place at the very time when Fairchild thought it most profitable to stay. But whatever his faults, he was a constant friend and supporter, and without him, many splendid opportunities would have been missed. On the other hand, we must recognize that in Fairchild Lathrop found an extraordinary treasure, and it is greatly to his credit that he so readily appreciated this fact. The book is written in a modest vein, but we are amazed at the energy, enterprise and resourcefulness exhibited, and the ability to enlist the aid and interest of all sorts of people in many countries. The narrative is full of side-lights on the people and countries visited; thus, for example, in Egypt he visited the palace of Queen Hatshepset (1570 B.C.) where he found a bas-relief representing the introduction of the incense tree from the land of Punt. "A warm feeling of understanding surged through me for this woman who, like myself, appreciated the value and romance of plant introduction. Here on the walls of her palace in Thebes, she had commanded a bas-relief to be cut commemorating her importation of a new tree into her domain. It was quite thrilling, for, as far as I know, there are not a half dozen memorials commemorating the introduction of new plants."

At length Fairchild returned to Washington, to superintend the now great enterprise which had grown up, largely through his activities. "I had expected to find it difficult to settle down to a desk in Washington, but on the contrary it proved so fascinating that there were not hours enough in the days or nights in which to accomplish all there was to do. Beside each day's mail, and routine, and reports on my travels to be written for future reference, there was the world-wide field of plants still waiting to be introduced."

On one occasion, he was invited to a dinner party. "It was a small party, and I found myself seated beside Miss Marian Bell, who had recently returned from New York, where she had been working in the studio of Gutzon Borglum. Our conversation was largely on art, about which I knew nothing but could talk a good deal, having traveled with Mr. Lathrop, who was a real connoisseur. It was the first chance I had to talk to Miss Bell, and I was fascinated by her. . . . I left the house, my mind in a whirl, a whirl which has really never stopped since. It was the beginning of a part of my life which has been completely different and vastly more beautiful than anything I had dreamed possible."

Thus he became a son-in-law of Alexander Graham Bell. Of these later happy years, not yet finished, much might be said, but I hope I have written enough to arouse some of the enthusiasm which should greet such a stimulating book.

T. D. A. COCKERELL

UNIVERSITY OF COLORADO

REPORTS

PILOT FITNESS FOR NIGHT FLYING[1]

A LIGHT sense tester correct in principle and convenient for use is an important instrument for testing pilot fitness for night flying.

Important functions to be tested are: (a) the ability to see at night and at low illumination and the effect of dark adaptation on this ability, and (b) the amount and speed of dark adaptation. Normal or better-than-normal sensitivity in light adaptation is also important. The eyes that are needed for night flying are the best of what might be called the normal group; that is, of those that have both good dark and good light vision. More important than speed and range of adaptation, however, is the place in the scale of sensitivity at which the adaptive change occurs. Some eyes have a good range and speed of adaptation, but the adaptive change begins so low in the scale of sensitivity that they never attain the degree of sensitivity that gives the special fitness needed for night flying.

The ability to see at night and at low illumination

[1] From the Research Laboratory of Physiological Optics, Baltimore, Md.