der Professor Newbold does not see that the definition given in the first chapter is only provisional to start the work with, that the nature of suggestion and suggestibility is worked out in the course of the first part, and that the final definition is not arrived at before the end of the eleventh chapter.

A few words more before I conclude. Professor Newbold finds my physiological theory rather incorrect when confronted with Apathy's investigations. I do not find that my theory is to any extent shaken by Apathy's 'anastomosis.' Apathy's work may hold good for the nervous system of the lower invertebrates, but not of the cerebro-spinal nervous system and especially of the association areas. Apathy himself admits it. I am happy to say that the eminent pathologist, Professor Ira Van Giesen, accepts the same physiological theory, and in a special work will take up this point about Apathy and will furnish experimental data demonstrating the truth of the position taken by me in the book 'The Psychology of Suggestion.'

Professor Newbold's criticism is fair and candid, and one cannot help contrasting it with the virulent, almost personal, onslaught of those academic psychophysicists, especially of the Wundtian fold, who lack and neglect all knowledge of mental pathology and who attack bitterly any one who has the courage to proclaim openly the poor and sterile state, the trivial nature of the scholastic laboratory science of normal 'student psychology.'

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CELLULOID FILMS.

TO THE EDITOR OF SCIENCE: My own experiments and sad experiences in the use of celluloid 'cut films' instead of glass plates for photographic purposes on long expeditions prompt me to write a warning to those who will read the note quoted in SCIENCE, July 22, 1898, page 106. If the advice given by Mr. Stillman were followed by scientists without further test I greatly fear that their return from a six months' expedition with numerous undeveloped 'films' safely stowed away for development at leisure would be made less enjoyable after a few hours in the dark room. Two years ago I made trial of some fresh films and thought them so superior to glass because of their lightness that I adopted them for use on a visit by bicycle to the astronomical observatories of Europe. I could not find ten dozen in stock in New York without taking some that were three months old. I was in Europe only three months, and during that time carried those films and a camera with other baggage on my bicycle for two thousand miles, on hot days buoyed through the 'slough of despond' by the expectation of having at least one hundred fine photographs of observatories and scenery. The camera was a familiar one, and I had had long experience in photography in America and in South and Central Africa with glass plates which had always proved successful. But, alas! when I returned to the States and at once proceeded to develop the films I could find only the faintest traces of the scenes which ought to have been there. There was every indication that the acids in the celluloid had destroyed the sensitiveness of the emulsion either before or after exposure. Since then experiments on 'films' of various ages and the questioning of professional photographers who have developed many thousands of these 'films' have confirmed my belief that *as a rule* they may be regarded as practically worthless after they had been made a year, and are very unreliable after six months. I mean by 'unreliable' that it is impossible to predict by the action of one plate what the time of exposure on another plate of the same emulsion ought to be.

Hence I conclude that one should be very cautious in adopting the suggestions of Mr. W. J. Stillman, from whom you quote, if the expedition is to last more than six months from the time when the plates were made; and in every case I should prefer to get fresh films every month and develop them as they are exposed.

HERMAN S. DAVIS.
COLUMBIA UNIVERSITY, July 22, 1898.

SCIENTIFIC LITERATURE.

Au Pays des ba-Rotsi. By ALFRED BERTRAND. Paris, France, Hachette et Cie. 4to. Pp. 333 and 10. 104 illustrations.

This volume, prepared in the handsome style of the famous French publishing house from

which it has emanated, has a great many things in its favor. The illustrations are particularly good.

It deals with a country whose northern boundary, as yet unknown, probably reaches the watershed lying between the Congo and the Zambesi. On the east it is limited by the Kafukwe river and on the west by an indefinite boundary at about 20° east of Greenwich. On the south it is bounded by the Zambesi and the Linyanti. The extent of the country, therefore, might be defined by stating that it lies between the 12°th and the 18°th south latitude, and between the 20°th and 29°th in east longitude. The essence of the book, however, is not in the three hundred pages of the text; but in the twenty pages of the two appendices.

The first part of the volume deals with a visit to the diamond mines at Kimberley. It is interesting to note that, while there were no houses upon the site of this city in 1870, Kimberley now contains nearly twenty thousand inhabitants and its daily product reaches the sum of $50,000. The railroad from the Cape extends through this city to Mafeking. It is only at this latter point that the signs of civilization begin to disappear. Here it is that the caravans start for the interior.

Some of the comments of our writer upon the phases of life through which he passes are interesting, because they indicate the watchful French mind, wide open to new impressions. He seems to admire immensely the 'Bouledogues' taken along as guardians of the camp. Then come a series of observations upon the experiences of the caravan in its trip to the northward, along the border of the desert of Kalahari. At Palapye he meets King Kahma, the disciple of Moffat and Livingston, who apparently is a model monarch. It appears that there is at least one place where the sale of alcoholic beverages can be prevented by regal enactments, and this African king seems to be more successful than some of his white brethren in the prosecution of this work.

The author comments upon the supervision of these colonies by Great Britain with great satisfaction, as he finds that they are managed with much good sense and are practical because they are adapted to the conditions.

It is hardly necessary to devote any space to the consideration of the details of the trip to the Zambesi, with which nearly one-third of the volume is taken up. At length, however, the Machile river is reached. This stream is a branch of the Zambesi, and, though known before, has only been tentatively placed upon the maps. The author can be interesting, but a great deal of the story suggests nothing but lists of mud settlements, terribly hot days, bad water and various subsidiary rhapsodies upon each new dish of game which seem to produce a novel sensation upon his digestion. He seems to have paid a profitable visit to King Lewanika, who gave him a great deal of information with reference to the country he was exploring; but much of the information given is still a secret between himself and the king, as the description given of this new region is very scanty, indeed.

The author visits the celebrated Victoria Falls of the Zambesi before starting out upon his return trip, and his description of the trip down the river in canoes is well done, in spite of the fact that we become tired at length of the groans of the hippopotami and the yawns of the crocodiles.

His account of the beauty and grandeur of the famous falls is well worth reading, though it would seem that geology and geography rather suffer in his hands from neglect. On his return journey the author has a bad attack of fever in the 'thirst' desert, where he is nearly prostrated and has some very sad experiences. Eventually, however, he reaches Pretoria. From this city he visits the gold mines of Johannesburg, of which a careful description is given. He happened to be in the city at the time of the Jameson raid in January, 1896, and his experiences as a prisoner in the city at that time are well given. The trip occupied nearly a whole year, from March 23, 1895, to March 2, 1896.

The author was fortunate in obtaining from M. Jalla the records of ten years of temperature observation, from which the following notes are taken:

Hot season.

+ 47° C. in shade 2 to 4 p. m.

+ 20° to 22° C. at night.

End of October.

Cold season.

+ 24° to 25° C. during day.

+ 6° to 10° C. during night.

May, June, July.

In the hot season the thermometer in the sun reaches 60° C., and the author comments upon the necessity of taking the thermometer under shelter to prevent its bursting.

The country generally is considered very unhealthy, as even the natives suffer with the fever.

In the first appendix notes are given upon the fragmentary history of the people of this region, which is about equal in area to that of France. The habits and customs of the people are briefly discussed. The earlier type of punishments for disobedience or neglect are of the most cruel character for even the slightest offenses, as, for example, when one of King Lewanika's rowers became tired he was deliberately thrown overboard to keep company with the crocodiles.

The religious ideas of this section of the country are more advanced than in any other portion of Africa. They have a modified form of ancestral worship, without idols or fetiches. They have both male and female supreme beings, the former symbolized by the sun and known as Nyambe, while the latter is represented by the moon. She was the mother of the animals, and finally of man. Eventually Nyambe and the men of the world came into disagreement, and while he showed his power by resuscitating the animals which men killed, man, however, became so very intelligent that Nyambe was forced to escape to the heavens by means of a spider's web and has been invisible since that time.

They believe in metempsychosis and during their life choose the animal form in which they prefer to return to the earth. They initiate themselves by eating worms from the decayed bodies of their chosen animal. They will then, upon any festal occasion, act the part of these animals by imitating their motions and their cries.

They are very superstitious, believing in charms of all sorts, and they attribute the better shooting-powers of the white man to be due to the possession of an amulet of which they are ignorant.

These natives are an industrious people and work metals very well, and although their methods are of the most primitive sort they produce good spears, axes and knives. Under proper guidance they could easily develop along mechanical lines, and missionaries who have lived with them many years wish very much to start an industrial school with this in view.

The resources of the country are little known. Iron is known to exist, but the main value of the region, so far as seen, is in its woods, many of which would be valuable even for transportation. Animals are still found in great numbers and variety, although the most valuable of them all, the elephant, is said to be disappearing rapidly. The insects are likewise numerous and are said to be a terrible pest.

The words of the missionary Coillard concerning this part of the world, where the waves of immigration are dashing their foam well in towards the center of the continent, are significant:

"Listen to the native songs in a minor key; they are in reality but groans. Hear them tell you that their heart is black, *i. e.*, that it is full of sadness, yes, black as their skin, and you will realize that from the cradle to the grave they carry through life the symbol and the livery of sorrow. If these races are to have a future, as seems certain, what will it be? It seems that it will undoubtedly be dependent upon the character which the mental, moral and physical powers of the white race will choose to give it."

The second appendix gives a summary of the report made by Captain A. Saint-Hill Gibbons, Percy C. Reid and the author to the Royal Geographical Society on January 4, 1897 (see *Geographical Journal*, Vol. IX., No. 2).

WILLIAM LIBBEY.

The Art of Taxidermy. By JOHN ROWLEY, Chief of the Department of Taxidermy in the American Museum of Natural History, New York City. New York, D. Appleton & Co. 1898. Pp. xii + 244. 20 plates and 59 text figures.

This book is a good exemplification of the adage that there is always room at the top, for while scores of books have been written on the art of taxidermy, and the best of them within the last decade, this is none the less indispen-