raphy; Dr. John P. Nafe, professor of experimental psychology. Oscar W. Richards has been appointed assistant professor of biology.

AT Rutgers University, Dr. Albert O. Hayes has been appointed full professor of geology and head of that department. He has served during the past two years as visiting professor of geology.

DR. CARL STEVENSON, of the University of Chicago, has been appointed acting professor of medical history at Cornell University, Ithaca, for the second term of the coming year, during the absence on leave of Professor Preserved Smith.

THE following promotions have been made in the department of chemistry at Princeton University: Assistant Professor Gregg Dougherty, to the rank of associate professor; instructors William T. Richards, Francis B. Stewart and Thomas J. Webb, to the rank of assistant professor.

DR. A. E. CAMERON, professor of zoology and entomology in the University of Saskatchewan, has been appointed lecturer in medical entomology in the department of zoology of the University of Edinburgh.

DR. JOHANNES WEIGELT, professor of geology in the University of Halle, has been appointed to the chair of geology in the University of Greifswald.

DR. HERMANN STEUDEL, of the department of physiology in the University of Berlin, has been made a full professor.

DISCUSSION AND CORRESPONDENCE

A NOTE ON THE FLUORESCENCE OF TEETH IN ULTRA-VIOLET RAYS

THAT teeth fluoresce under the excitation of ultra-violet rays has been known for some time. Hans Stubel[1] states that rabbit teeth fluoresce with a somewhat bluish intense white light. In human beings he finds the lens of the eye to be the strongest fluorescing organ, although the teeth are almost equally brilliant.

The following observations were made with a cored carbon arc and a Kromayer lamp, using as filters: (1) Corning purple-violet Ultra, (2) Corex G 986A, (3) Uviol cell with paranitrosodimethylaniline and a quartz cell of copper sulphate.

(1) The dentine fluoresces much more brilliantly than the enamel and seemingly with a bluer light.

(2) The white spot indicative of beginning dental caries does not fluroesce even though unpigmented. A similar effect is obtained by scratching through a paraffin coated tooth and placing in dilute acetic acid over night.

[1] *Arch. Ges. Physiol.*, 142, 1–14, 1911.

(3) Ashed enamel does not fluoresce, nor does dentine which has been boiled in 50 per cent. sodium hydroxide. On decalcifying dentine in dilute nitric acid the organic matrix retains its fluorescent power to an appreciable extent.

(4) Whereas serumal calculus fluoresces little if at all, salivary calculus fluoresces quite markedly with a reddish orange color (some old museum specimens emitted a white light).

These observations are significant in an investigation of the teeth as they may give a clue to the steps in the decalcification of enamel. From No. 3 the conclusion might be drawn that it was the organic matter which fluoresces. We have a means of determining on macroscopic pieces that we have enamel free from dentine. Further work is in progress.

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ON THE ANTIQUITY OF RELICS OF MAN AT FREDERICK, OKLAHOMA

IN the issue of SCIENCE for February 10, on pages 161 and 162, is an interesting contribution from Dr. Leslie Spier, of the University of Oklahoma, on the artifacts found recently at Frederick, Oklahoma. The present writer wishes to make some comments on this paper.

The most important statement made by Dr. Spier is that, according to the representations of Mr. Holloman, the owner of the pit, he picked up one arrow head from loose materials at the bottom of the front of the pit as it was being torn down by workmen. On the other hand, Mr. Holloman repeatedly told Director Figgins that he took it out of the hard conglomerate on the floor of the pit. Also the writer has Mr. Holloman's statement to the same effect in two or three letters. In one of these he informs me that he could not free the arrow-head himself, but had to call a workman to bring a tool. A pack knife was brought and with this the utensil was secured. Mr. Holloman further says that Dr. Spier misquotes him in saying that he picked the object from the loose materials. The writer can not for a moment doubt the veracity of either of these gentlemen. There must have been a misunderstanding of some remark made by Mr. Holloman.

In regard to the other flint object, probably a drill, Dr. Spier says that Mr. Holloman scratched it out of the face of the pit with his fingers. Now, if that object had fallen from the surface it would probably have become involved in the red clay which forms the uppermost stratum. In case it had fallen into the sand, this must have been sand which had been

crushed, and it would have required no effort to pick up the little drill. Before the sand is disturbed it is compact enough to stand in a perpendicular face, and to release an instrument protruding from it would require some scratching with one's fingers.

Dr. Spier calls in question the genuineness of the metates. Before he cast this doubt on these utensils he ought to have requested Mr. Figgins to send him one or more of them for examination, and he doubtless would have received them.

Our writer thinks it possible that artifacts may yet be found on the surface of that ridge. I know of no reason why such things should not occur there, and if they are present and if the edge of the pit reaches them they will probably fall down; but this would not prove that those found by Mr. Holloman had fallen down and gotten into the compact sand and cemented conglomerate. And if arrow-heads and metates occur on the surface how is anybody to know whether they are recent productions or those of Aftonian time?

Our writer states certain other possibilities regarding the position of the artifacts. He tells us that we do not know the original position of the surface at this point with respect to the artifacts. He suggests that these lay on the surface of a depression and were subsequently covered by wash. It would be interesting to learn the probable history of a depression of this kind on that ridge. How did it begin, enlarge and finally disappear? It must have been from twenty to twenty-five feet deep in order to let the arrow head down to the conglomerate. There must, too, have been some way of escape for the water which first excavated and later refilled the depression. Mr. Holloman informs me that no ravine now comes within three hundred feet of the spot where the artifacts were discovered. The existing ravines at the foot of the ridge are cutting deeper instead of being refilled. Furthermore, the material filling such a hole or depression must have been mostly red clay; but Mr. Holloman did not observe any interruption of the strata furnishing the sand and gravel called for by his customers. He further says that there are now no depressions on the ridge where water stands after rains and no sink-holes.

Dr. Spier holds that there is an incongruity in the association of artifacts, as identified by our anthropologists, with fossil bones and teeth of animals of Aftonian age. There is an incongruity, but this is the creation of the anthropologists. They measure most things pertaining to human history in America by European standards. Because stone implements appear only late in Europe and are crude it is concluded that the art of working stone must have had a similar development in America. The writer believes that during the first interglacial stage men came from Asia and brought with them the art of skillfully chipping flint. Evidence of this has recently been furnished at Colorado, Texas; possibly, too, at Folsom, New Mexico.

Our anthropologists are forced to admit that the age of human bones and artifacts is to be determined by geology, but they insist on making their own geology. When the geology appears to be opposed to their view a variety of agencies are invoked to account for the apparent occurrences of Pleistocene man under the circumstances. It is rare that it can be established that the agency postulated has actually done the work. A long catalogue of these possible means might be compiled. The latest addition is the action of whirlwinds. This might well be called upon to explain the case at Frederick. What is more probable than that, while men slept, a mighty wind arose and, gathering up a cache of Comanchean implements of the wigwam and the chase, hurled them with violence against the face of that quarry and drove them into the hard sand and the conglomerate?

The writer has always admired the work done by Dr. Spier on the pebbles and artifacts systematically collected at Trenton, New Jersey. It had been declared that the deposit, a few feet thick only, had been so thoroughly disturbed by burrowing mammals, by the uprooting of trees, by the driving of palisades, and in other ways, that no conclusion could be reached as to the age of the artifacts embedded in it. Dr. Spier's work demonstrated that the pebbles and the artifacts had a definite arrangement in the stratum. There is general agreement that the deposit was laid down by Delaware River when the Wisconsin glacier had its front standing about sixty miles above Trenton. Dr. Spier's paper furnishes evidence hardly controvertible that the makers of the artifacts were in that region at the culmination of the Wisconsin glacial stage. The reader will enjoy a perusal of Dr. Clark Wissler's comments on the value of Dr. Spier's work.[1]

As is usual, our anthropological friends, on the announcement of the new discoveries of supposed Pleistocene man, sound the warning that we must proceed with caution. Do they exercise superior caution themselves? Was the anthropologist acting with due caution when he asserted, without the necessary investigation, that the deposit at Trenton had been thoroughly disturbed? Did another anthropologist display a cautious spirit when he insisted that masses of muck, sand and marl thrown back into a grave would soon rearrange themselves into their original relations and when he asserted he found muck, sand and marl undergoing restratification which had been

[1] *Scientific Monthly*, Vol. II, p. 234.

thrown on the dump by the dredge? Was even my friend Dr. Spier proceeding cautiously when he suggested a depression where the Frederick artifacts were discovered, apparently without inquiring of the owner of the pit and of the workmen whether they had observed anything of the kind?

Because certain existing tribes do not use metates Dr. Spier thinks it improbable that they were employed by people of early Pleistocene time. However, we do not yet know much about the climate of that period nor much about the resources and arts of the people.

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ONE HUNDRED PER CENT. HATCH

ON October 31, 1927, the writer artificially impregnated 230 eggs taken from a small two-year-old hatchery reared brook trout, *Salvelinus fontinalis*. Two males were used to effect fertilization. Instead of following the accepted method of washing the eggs soon after insemination, the eggs were allowed to harden in the milt. After sixty-one days of incubation, 230 normal fry emerged tail first with elongated yolk-sacs which is an index of perfect fertilization.

In state, commercial and private hatcheries, the writer has met with wonderful success by holding the eggs in milt during the agglutination period.

These results indicate that the concentration of sperm suspensions may have a direct influence on the micropyle of the egg, which activates complete fertilization when agglutination takes place in the milt.

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MORE DATA

IN spite of all the discussion on the subject that has been going on in SCIENCE, here is Mr. Sainton, of Cornell, saying (in the last number of the *Journal of The Optical Society of America*) "data is." It is known that Cornell is a special sinner in this respect.

As regards the two wrong pronunciations of *data* (lately discussed in SCIENCE), *dăta*, it may be pointed out, is far worse than *dāta*, for the reason that those who adopt the thoroughgoing modern pronunciation of their Latin and Greek may feel obliged to apply it to *datum* too.

It is remarkable what a high literary standard the medical people have preserved in their scientific language. But they are wrong in sometimes saying "photo-sensitive." One can say "photo-esthetic" or "light-sensitive," but "photo-sensory" (or photo-sensitive) is a sad hybrid.

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SCIENTIFIC BOOKS

Romance of the Sun. By MARY PROCTOR, xii + 266 pages. Harper and Brothers, London and New York, 1927. $2.50.

MISS MARY PROCTOR'S book, "Romance of the Sun," contains many interesting pages for those who have little or no knowledge of astronomy, and who wish information about that part of this science which deals with the nearest star, our own sun. The book is written in popular language so that it can be read easily by any one. The sun is so important, not only to astronomers for their investigations, but also to every person and to everything living on this earth, that it is well to have books on this subject written for all types of readers.

After a brief description of the appearance of the sun's surface, four chapters are devoted to the problem of finding the distance from the earth to the sun. Accounts are given of the attempts made to find this distance accurately by observing the various transits of Venus across the sun's disc which occurred between 1629 and 1882. Horrock's observation of the transit of Venus in 1639 is well described, and made more vivid by quotations from the writings of that exceptional young minister who was such an enthusiastic astronomical observer. The chapter on Sir David Gill's observations of Mars in connection with this same problem is likewise made more interesting by several extracts from Lady Gill's book, "Six Months in Ascension." Just at the end of this chapter, on page 70, there is an important misprint. The sun's mass is given as 32,000 times that of the earth instead of 332,000 times the earth's mass.

The fifth and sixth chapters deal with the constitution of the sun and its atmosphere, the analysis of its light and the subject of solar energy, especially the fraction of that energy received by the earth. Several times in the descriptions of phenomena on the sun, phrases are used which might give to readers without astronomical knowledge the impression that the sun was at least in part liquid. The words "Vast oceans of molten metal," on page 71, form such a phrase which can hardly be considered appropriate when applied to a body like the sun, which is known to be purely gaseous.

Even in a popular book of this length, it would seem that a fuller treatment of the source of the sun's heat would have been of interest to any reader. No reference is made to the latest theory, now generally accepted by astronomers, that the sun's energy is due to the radiation of its mass. A more detailed description of the sun's surface would have increased the value of the book for the majority of readers. The subject of sun-spots is rather neglected. A brief and superficial description of sun-spots is given in