J. Wistar, who endowed The Wistar Institute in 1893, was noted for his ability to predict the future. On July 14, 1902, in a long testamentary letter addressed to the Board of Managers and filed for the information of those who were to follow him, he stated that The Wistar Institute should 'build its new buildings during one of these periodical times of depression when the cost of building construction drops 50 per cent. or more.' On July 14, 1932, just thirty years later, the officers of the institute signed contracts for the new building anticipated by General Wistar and which will be built during the next few months. The work of demolishing the old police station property begins to-day, July 15. Plans for the new construction work have been in the course of preparation for some months past. The new addition and its equipment, especially the equipment for the Wistar Institute Press, will give the institute a very complete and modern outfit for the publication of biological research journals. The new building will also house Dr. Helen Dean King's special colony of inbred albino rats and the cage-bred Norway rats from which numerous mutations have emerged."

THE name of the California National Forest, in the State of California, has been changed, by executive order of the President, to Mendocino National Forest, to avoid the confusion growing out of the State and a national forest therein having the same name. Mendocino is the oldest non-Indian name in the entire California coast region; Cabrillo, Spanish explorer, named a prominent cape Mendocino, in 1543, in honor of his patron, Antonio de Mendoza, Governor of New Spain, now Mexico.

AT the annual meeting on July 8 of the trustees of the Beit Fellowships for Scientific Research, tenable at the Imperial College, South Kensington, which were founded and endowed in 1913 by the late Sir Otto Beit, new fellowships of the value of £240 a year, beginning September, 1932, were awarded to Mr. Robert Milner Shackleton, B.Sc. (Liverpool), formerly of Sidcot School, Somerset, 1921–26; of the University of Liverpool, 1927–31; and Imperial College, 1931 to date, for research on the geology of the area about Moel Hebog. Mr. Eric Gwynne Jones, B.Sc. (Lond.), formerly of the People's College, Nottingham, 1918–22; High Pavement School, Nottingham, 1922–27; University College, Nottingham, 1927–31, and the Einstein Institute, Astrophysics Observatory, Potsdam, 1931–32, for research on hyperfine structure of spectral lines. Mr. Reuben Louis Rosenberg, B.A., M.A. (University of Capetown), formerly of the University of Capetown, 1926–29, and the University of Berlin, 1930 to date, for theoretical investigations in topics connected with quantum-mechanics. Mr. Oliver Brentwood Westcott, B.Sc. (Lond.), Ph.D., formerly of Hele's School, Exeter, 1921–27, and University College, Exeter, 1927 to date, for research on the electro-deposition of tin with a view to the establishment of the precise conditions under which crystalline deposits may be obtained and to avoid the unsatisfactory spongy deposits which result from present processes. In addition, the fellowships awarded a year ago to Mr. W. H. Wheeler, B.A., D.I.C., for research in chemical technology, and Mr. J. I. Armstrong, M.Sc., for the plant physiology research were extended for a second year.

DISCUSSION

PALEOZOIC GLACIATION IN ALASKA

IN a recent paper on "Glaciation in Alaska"[1] Dr. S. R. Capps gives an interesting general review of the wide-spread glaciation of late Pleistocene age, and also notes evidences of pre-Wisconsin glaciation. To this he adds some comments on the ancient rocks, reported to be of glacial origin, which have been observed by geologists in various parts of Alaska. In discussing the Paleozoic glacial beds he lists eight localities from which they have been described and alludes to the ideas of Cairnes, Kirk and Blackwelder. One case reported by Kirk from Prince of Wales Island on the south coast of Alaska he characterizes as being "fairly well established." All the others he classifies as either "questionable or doubtful."

As I have examined several of these ancient and supposedly glacial formations of Alaska, I may be permitted to say that I think the probability that some of them are really of glacial origin is much stronger than Capps appears to believe. I am constrained to comment on the subject also because the author has made references to "unpublished notes by Blackwelder." These so-called notes are in fact a complete manuscript report of 180 pages containing a full account of my reconnaissance survey of 1915 from Eagle to Circle on the Yukon, thence west to the White Mountains and finally down Beaver and Birch Creeks to Beaver Station in the Yukon Flats. The report is accompanied by detailed maps, diagrams, stratigraphic tables, photographs, lists of fossils and as full interpretations of the data as seemed justifiable. This manuscript was intended for publication and, although it has never reached that stage, the maps, photographs, information and opinions which it contained are gradually making their

[1] Stephen R. Capps, "Glaciation in Alaska," U. S. Geol. Survey Prof. Paper 170-A, pp. 1–8. 1931.

way into print through the medium of papers written by other members of the Geological Survey who have had access to it. As such excerpts have usually been neither literal nor complete quotations they have not always represented my own views accurately, and so it seems advisable now to clear up some misapprehensions, at least so far as the old tillities are concerned.

Although Capps does not discuss the criteria by which ancient glacial deposits may be identified, he implies his opinion regarding some of them, and it may be assumed that an accomplished geologist who has spent many years in Alaska is well qualified to make such identifications.

Glacial deposits in general are of two kinds—that which is made directly by glaciers and those made in associated waters. The former is well known as till, and the latter comprise stream gravel and sand, delta deposits, varved lake clays, marine boulder clays and others. Each of these types of deposit is distinctive, but till is perhaps the most peculiar of them all.

Till, which upon induration becomes tillite, may be confused with only a few other deposits[2] if it is clearly exposed and has not suffered strong metamorphism. It is characterized by lack of stratification and assortment of its constituent particles, by the presence of scattered boulders, some of which may be soled or faceted and covered with scratches or polish. The only non-glacial deposits likely to be confused with it are landslides, mudflows and certain residual soils. The last of these exhibit advanced chemical decay in both boulders and matrix and generally but little variety of lithologic contents. Landslide and mudflow deposits are more difficult to distinguish from till, but they are rarely extensive individually, seldom show striated pebbles, practically never contain soled pebbles (unless inherited) and their associated stratified deposits are usually unlike those of the glacial series.

When the field geologist finds a coarse bouldery rock well exposed in a cliff he may at first entertain several hypotheses regarding its origin. It may be suspected of being a pyroclastic mudflow, but this explanation is soon eliminated if he finds many boulders of quartzite, granite and limestone, but none of lava.

He may suppose it to be an ordinary mudflow from a mountain canyon, but mudflows are rarely more than 10 to 15 feet thick and they are usually interbedded in series with torrential gravel and sand deposits as components of an alluvial fan.

He may suspect it of being a landslide. Even this still more probable hypothesis he will be inclined to discard if he finds a number of peculiar faceted stones some of which are well polished or covered with parallel scratches. He must of course be able to distinguish from glacial markings the slickensides caused by faulting.

His final conclusion that it is of glacial origin is still further strengthened by finding wisps or lenses of stream-gravel embedded here and there in the till, or by its association with varved clay and silt beds in which pebbles and boulders are scattered. Such assemblages as these have strengthened the identification of the tillites at Squantum in Massachusetts, in southern Ontario, the Transvaal, the Indian Plateau, South Australia and many other parts of the world. Only the somewhat rare good fortune of finding a grooved "pavement" beneath the tillite could add a final touch of confirmation to testimony already grown sufficient.

Applying these criteria to the Alaskan cases cited by Capps, we may examine several of the latter and judge whether his skepticism is warranted.

In a series of cliffs along Beaver Creek, just above the mouth of Victoria Creek, there are hundreds of feet of splendid exposures of a massive gray bouldery slate. This locality is between the White Mountains and the Yukon Flats. The boulders are without order, and the slate shows no hint of stratification. It contains many scattered blocks and pebbles of gray and black slates, with white and gray quartzites, graywacke, black chert, quartz, dolomite and granite, ranging in size up to a diameter of 40 inches. The whole mass has been so heavily compressed that the softer stones have been mashed into lenses, but the quartzites, comprising nearly all the large boulders, are unaffected. Many of them are sub-angular and some resemble glacial forms, but the advance of metamorphism in the slate has caused the matrix to adhere so tightly to all the boulders that none of the original surfaces were visible, and hence none could be examined for striations. Although the boulder bed appears to be at least 100 feet thick, it has been so intensely folded that it was impracticable to work out the structure in the short time available in 1915. In one of the cliffs the boulder bed is closely associated with evenly laminated light and dark gray slate suggestive of seasonal deposition in a lake.

In regard to these strata on Beaver Creek, Capps[3] quotes Mertie, apparently with approval, as doubting "the validity of Blackwelder's conclusion as to their glacial origin." The word "conclusion" in this sentence is misleading and unwarranted, for my report states merely that the slate "is suspected of being glacial in origin." In view of the fact that the Beaver Creek locality shows a bed of wholly structureless boulder clay (now metamorphosed into slate), associ-

[2] Deposits of uncertain origin but resembling till may be called "tilloid."

[3] *Op. cit.*, p. 8.

ated with laminated slates and containing widely scattered erratic blocks of considerable variety, there is surely ample reason for suspecting glacial origin. I think the conditions on Beaver Creek not only justify much more than a mere suspicion of glacial origin, but entitle that hypothesis to strong preference, although not as yet to full acceptance.

In the canyon of the Yukon River, between Eagle and Circle, there are two outcrops of tilloid conglomerates, only one of which is mentioned by Capps. The one omitted is on the south bank six and one half miles west of the mouth of Nation River. There a massive bed of boulder clay 80 feet thick was deposited in the midst of a series of black shales and dolomites, presumably of marine origin. The gray clay is now a hard argillite sprinkled with pebbles and subangular boulders of various rocks. During the very cursory examination that we made no striae were found. The material closely resembles till in general appearance, but I do not urge the acceptance of that theory of origin. The place should be examined more thoroughly by others.

The locality cited by Capps is on the west bank of the Yukon River, eight miles north of Woodchopper Creek, and south of Circle. There a long cliff gives an almost perfect exposure of a layer of bouldery slate more than 100 feet thick. The rock is a dull gray argillite in which slaty cleavage is only moderately developed. The microscope shows the matrix to consist of a heterogeneous mixture of minerals derived from clay with angular fragments of such rocks and minerals as quartz, dolomite, chert and feldspar. Through this matrix, which is indistinguishable from that of many well-known tillities, there are sprinkled at random subangular pebbles and boulders of dolomite, chert, quartzite and several kinds of slate, ranging up to at least 30 inches in diameter. These erratics are wholly without arrangement, and the matrix shows no sign of stratification. Recrystallization of the matrix has caused it to adhere so tightly to the surfaces of the pebbles that in the course of an hour's careful search among hundreds of them only four were found that revealed even patches of the original abraded surface. However, each of these four pebbles of fine-grained dolomite show typical glacial polish and fine parallel striae, that have fully satisfied all the glacialists to whom I have shown them. Many of the erratics the surface of which could not be examined nevertheless were soled or faceted, and some even revealed the so-called flatiron shape which is peculiar to glacial abrasion.

Whether Capps or Mertie have ever examined this cliff with adequate care is not stated in their reports and they give no reason for the expressed opinion that they doubt the glacial origin of the deposit. To me it seems that the facts in the case leave very little ground for uncertainty. The glacial origin of the deposit appears to be no more questionable than that of the generally accepted tillites at Nan-tou in China, at Squantum in Massachusetts, in the Salt Range of India, or in the Cobalt district of Ontario. The evidence is essentially alike in all these cases.

On general grounds there would seem to be no reason for not expecting to find glacial deposits of many ages in Alaska. Had the geologist described desert or tropical deposits, a skeptical attitude would be more justified than in reference to glacial beds in a subarctic region. Finally, the author's caution regarding the Paleozoic tillities in Alaska is rather out of harmony with his confident attitude toward a certain early Pleistocene deposit which he himself found in the Alaska range. This he describes[4] as "a deposit of deeply oxidized and weathered material that in composition, lack of assortment and shape of included boulders and blocks seems certainly to represent a glacial moraine. The included boulders and rock fragments, however, are all so weathered and decomposed that their original surfaces have been lost. No striae were found, but few of the rocks were firm enough to retain striae. I believe this deposit to be a remnant of an ancient glacial moraine." It is reasonable to ask whether the evidence in this case is even as good as in the Paleozoic deposits which he regards as doubtful, especially the one in the locality below Woodchopper Creek.

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IS AMMONIUM HYDROXIDE TOXIC TO COTTON PLANTS?

IN an article in the June 17 number of SCIENCE, Mr. Tiedjens has taken exception to conclusions given by us in an article on "Free Ammonia Injury with Concentrated Fertilizers."[1] The many misinterpretations of our claims and the weakness of some of the evidence he presents in contradiction of our conclusions force us to point out some of the major discrepancies.

In a previous article,[2] Tiedjens and Robbins contended that we could not have had any considerable concentration of free ammonia formed by the ammonification of cottonseed meal, as other investigators found that ammonification was a gradual process while nitrification was rapid. Our published data showed the reverse was actually the fact.

Tiedjens has said that our interpretation "would

[4] *Op. cit.*, p. 7.

[1] L. G. Willis and W. H. Rankin, *Ind. and Eng. Chem.*, 22: 1405–12, 1930.

[2] V. A. Tiedjens and W. R. Robbins, *N. J. Agr. Exp. Sta. Bul.*, 526, 1931.