I came upon the big rocks at a somewhat higher level, where the strata may be post-Pliocene, but I was so intrigued by the problem of their transportation that I failed to collect at their horizon. I did not notice any change of fauna, but then, I am not a paleontologist. The rocks are embedded in coquina or lie upon the adjacent slope. The exposed surfaces of one buried one measure more than 6 feet on a side and there is another on the slope that is 23 feet long by 12 feet high. They are of a heavy, black igneous rock, which forms the walls of a little canyon, a quarter of a mile distant. About 30 feet above the horizon of the big rocks is another layer of smaller ones. Two horizons of erratics! In the heights of the Andes, even in this latitude, there are traces of glaciation and farther south there are evidences of two strongly characterized glacial epochs.

Assuming that the parallel of two horizons of erratics and two glaciations is not fortuitous, I have speculated that the rocks do record the presence of ice on the coast during each of the glacial epochs; that the Humboldt current was chilled by the floes of spreading antarctic ice; and that in the latitude of 30°, where cold winds pushed under warmer air currents, there was heavy snowfall; snow accumulated in the shaded canyon in sufficient volume to form ice; and exceptional floods swept ice and rocks out to sea.

If that really was the case, the marine fauna of preglacial and interglacial time must have been killed off; it would, however, survive farther north and would have returned with post-glacial amelioration of conditions. We would expect, however, to find fine sediments and cold-water forms interbedded with the warm water deposits. If that evidence exists, it is obscure. Neither Darwin nor Steinmann detected it. I did not discover it, although I photographed the erratics and puzzled over their distribution. During the rise of the coast soft sediments might be entirely removed as they passed through the zone of that wave action whose power is shown by the strongly marked terraces. The record may have been washed away. Yet there should somewhere survive a pocket of glacial silt. One ought not to be surprised to find a subarctic foram in the cast of a subtropic Venus. A fuller account of my observations is published in "Earthquate Conditions in Chile," Carnegie Institution of Washington, Publication 136, together with Eric Jordan's discussion of the fossils.

BAILEY WILLIS

ISOLATION OF VIOLACEIN

DURING the spring and summer of 1936 the writer worked under the direction of Professor Fritz Kögl at the University of Utrecht, on the nature of the purple pigment elaborated by *Chromobacterium violaceum*. Samples of the crystalline pigment, violacein, were brought to this country by the writer, and have recently been made available to Dr. H. C. Lichstein, of the University of Wisconsin Medical School, who has investigated the toxicity of the pigment to a variety of pathogenic organisms. Since the substance appears to possess considerable antibiotic properties,[1] and since published procedures for its isolation[2] failed to yield a crystalline product,[1] it is considered desirable to make available the details of the isolation procedure used successfully by the writer at Utrecht. It is regrettable that it has not been possible to consult Professor Kögl prior to the publication of this note.

Sixty-five liters of a medium containing 5 g of peptone, 5 g of lactose and 3 g of Liebig's meat extract per liter, was distributed among 460 Erlenmeyer flasks of 750 cc capacity, and the flasks were sterilized by heating in the autoclave at 110° for 30 minutes. After inoculation with a heavily pigmented culture of the organism, the flasks were incubated at 22° for 14 days, and the cells then collected by centrifuging. The moist, purple bacterial mass (151 g) was rubbed up with 3 liters of acetone, transferred to a large bottle, and mechanically agitated for 30 minutes. The mixture was filtered with suction, and the cells were re-extracted as before with 1.5 liters of acetone. The combined acetone extracts were concentrated at reduced pressure from a 60° water bath to ca. 200 cc, allowed to stand at 5° overnight, and filtered. The nearly black, partly crystalline powder obtained was dried at 90° *in vacuo* over P_2O_5, and then weighed 906 mg.

The crude violacein prepared as above was placed in a Soxhlet apparatus and extracted for one hour with dry chloroform, and then for an additional hour with dry ether. The unextracted material remaining in the thimble was dissolved in 240 cc of boiling pyridine, filtered, the filtrate concentrated to ca. 150 cc and the hot solution diluted with 50 cc of boiling chloroform. The mixture was allowed to cool, and was then placed at 4° for several hours. The pigment was filtered with suction, washed with chloroform-pyridine (1:1), and with chloroform, and dried at 90° *in vacuo* over P_2O_5 for 2 to 3 hours. There was obtained 710 mg of pure violacein as a violet-black, micro-crystalline powder, consisting of thick needles and elongated rectangular crystals. The substance does not melt without decomposition.

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[1] H. C. Lichstein and V. vandeSand, *Jour. Infect. Dis.* (in press).
[2] W. C. Tobie, *Jour. Bact.*, 29: 223, 1935.