at the State Fish Hatchery and at the biological laboratory on Presque Isle, at Erie, Pennsylvania. There has now been organized the "University of Pittsburgh Lake Laboratory," as a department of the graduate school of the university, with Dr. O. E. Jennings, head of the department of botany, as director, and with Dr. S. H. Williams, professor of zoology, as associate director. Most of the activities of the laboratory will be devoted to classes and to investigation during the summer months, but some year-round investigations, such as that of Mr. Gottschall on the phyto-plankton organisms, will also be undertaken. The varied and rich life of Presque Isle peninsula and of the adjacent bay and lake waters offers attractive opportunities for study and investigation.

WE learn from *The Collecting Net* that Dr. William C. Harrington, formerly of the International Fisheries Commission, has joined the staff of the U. S. Bureau of Fisheries at Woods Hole, Massachusetts, to investigate the problem of the changes in the abundance of haddock with special reference to possible depletion.

THE fertilizer department of the Anaconda Copper Mining Company has given $5,000 to the Montana Agricultural Experiment Station for a study of the value of commercial fertilizer. Mr. I. J. Nygard is in charge of research.

THE State Institute of Public Health of Oslo was formally opened on August 16, Dr. Bally representing the Rockefeller Institute. The institute includes three buildings equipped with the most modern apparatus for the speedy and exhaustive treatment of illness, and with laboratories for research and for dealing with the spread of disease. The whole block of buildings cost about £195,000, of which the state contributed approximately £83,000. With a donation of £61,000 from the Rockefeller Institute, it has been possible to complete the institute. Dr. Wefring, the medical director of the institute, in his opening address referred to the gift, and warmly thanked Dr. Bally not only for the support given by the Rockefeller Institute to the Swedish Institute, but also for the aid he had personally rendered in completing the work. The Tuberculosis Congress was officially closed recently, and a great part of the members are now making a tour of the country.

BY the will of Mrs. Julia Brill Patchett, of Merion, Pennsylvania, the University of Pennsylvania becomes the ultimate beneficiary of a fund of $300,000.

ORGANIZATION of an administrative council for the Eastman Dental Clinic Foundation, to be established with a $1,000,000 gift made last year by Mr. George Eastman, of Rochester, has been completed and the inauguration of the foundation for active work was set provisionally for 1932. Balbino Giuliano, minister of education, presided at a meeting of the council which brought praise of the American philanthropist as a great benefactor to humanity. The council includes Professor Amedeo Perna, *president;* Dr. Ugo Frascarelli, director general of the ministry of education; Dr. Gaetano Basile, supervisor of public health; Professor Giovanni Perez, director of the institute of pathological surgery at the University of Rome; Dr. Mario Romanalli, an official of the ministry of finance, and Dr. Enrico Vallerina, of the ministry of education. Professor Aldo Foscheni, architect, is a consulting member.

CONCERN is felt for the future of the Royal Botanic Society because the lease of the gardens in Regent's Park expires in April, 1932. According to the London *Times,* the opinion is expressed that the society may find it impossible to continue. Mr. Henry W. Woodford, the secretary, stated recently that there was no alternative site in London and, although Mr. Lansbury, the first commissioner of works, has said that no doubt provision would be made for carrying on horticultural research work, there was no indication of the way in which it could be done.

THE Alabama Polytechnic Institute and the Bureau of Standards are about to begin a cooperative research on starch at the newly opened chemical laboratories of the institute at Auburn, Ala. This investigation will have to do primarily with the starches found in crops in the South. A study will be made of the uses of starch in the manufacture of textiles, and the properties required in starch for each use. Further, it is planned to determine whether starch from one source is superior to that from another for given purposes, and if specific starches may be modified so as better to adapt them for particular uses.

DISCUSSION

CHEMICAL ACTIVATION OF QUARTZ SURFACES

IT is well known that certain classes of filters operate not by straining but by selective adsorption on exposed surfaces. A yellow gasoline is readily filtered water white with fuller's earth, the yellow coloring matter and other unsaturated hydrocarbons being adsorbed in preference to the paraffins by the acid,

open-bonded silicates. Animal and vegetable oils, fats and juices containing hydroxyl groups are freed from color by charcoal or weakly basic silicates.

An adsorption filter of the silicate or hydrous oxide (Fe, Al) type normally has terminal H and OH in place and in that condition will adsorb bases for which its attraction is stronger than for these groups. Heating to about 200° C. drives off most of the H and OH as water and leaves the filter capable of adsorbing even weak free bases.[1] Certain pure quartz oil sands are known (Tensleep, Oregon Basin, Wyoming) having a thick brown adsorbed coating which can not be washed off. Oxidation with chromic acid leaves a pure white quartz crystal. The coating is about 0.7 micron thick. It will readsorb on soaking the cleaned sand over night in the heavy crude from that field.

These Tensleep quartz grains must then have been chemically activated by natural processes. What these processes are is well worth knowing from either a geological or commercial standpoint. A laboratory study soon showed that the activation of even crystalline quartz is neither difficult nor complicated. A sea sand may be given the adsorbing properties of the Tensleep very readily.

The plan was to attack the surface of the quartz with a strong alkali, forming a layer of alkali silicate over the surface, replace the base by hydrogen by means of an acid treatment, then drive off the H and OH by heating, leaving open bonds. KOH solutions would doubtless serve for the first step but are too slow. A bath of fused sodium or potassium carbonate (at 850° C.) is too violent, but fused potassium hydroxide (at 350° C.) worked very well, and did not crack even crystals of considerable size. A minute or two was sufficient time. Boiling in HCl, followed by thorough washing and drying completed the activation. The test was to soak in heavy crude over night. Fine sand and clay was tested by percolation through two inches of sand in a tube.

Since the object of the chemical treatment is to open up the SiO_2 bonds over the surface, it should be possible to dispense with the initial alkali treatment. Quartz or sea sand given a brief bath of hydrofluoric acid were found to be activated just as well as when given the alkali and HCl treatment.

It is hoped that these simple experiments may throw additional light on the still obscure mechanism of surface reactions and selective adsorption. Activated surfaces of pure quartz are excellent filters per unit area and their filtering action is pure chemical.

P. G. NUTTING

U. S. GEOLOGICAL SURVEY

[1] P. G. Nutting, *Economic Geology*, May, 1926, and November, 1928.

A CELESTIAL SEARCHLIGHT

A NARROW beam of light, suggestive of a searchlight beam, stretched across the sky from west to east, approximately through the zenith, the evening of August 21, 1930. The point of observation was 3.5 miles north of the center of Littleton, New Hampshire, and the time, 9:50 to 10:15 P. M., E. S. T. For the first 15 minutes the beam appeared brightly over the western horizon, which was 20° above a horizontal, passed through the zenith and faded in cirro-stratus clouds about 20° above the eastern horizon. During the last ten minutes the beam was distinctly south of the zenith and during the last five faded rapidly and broadened till it was scarcely noticeable. Rough angular measurements showed that the beam was about 5° wide and that it was moving southward about 10° in 10 minutes. Vega was the center of the beam about 9:57 P. M.; at the northern margin at 10:00, and from more than 5° at 10:07 to 10° from it at 10:10 P. M. There was a general auroral glow in the northern sky during this beam phenomenon, and at 10 there was a temporary appearance of an auroral streamer in the N x E. The color of the lights was the usual auroral pale greenish yellow.

A beam of the same sort was observed by the writer two or three years ago at Silver Lake, New Hampshire. It seems that these beams may be narrow auroral arches that lose their arch-like appearance and become like straight beams when overhead.

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A SURFACE TENSION EFFECT

DURING the course of a microscopic investigation of certain oil products, great difficulty was experienced in deciding whether or not certain small spherical appearances were air bubbles. The optical behavior of these particles (diffraction rings, refractive shadows, etc.) closely resembled the appearance of air bubbles but were not quite identical. For use in direct comparison, air bubbles of about the same size were made by violent agitation of Nujol with air. A small portion of this Nujol containing bubbles ranging from 3 μ to about 5 μ was mounted under a standard cover-glass (.18 mm thick) and studied by different illuminations with a 6 mm objective and 20× eyepiece.

While one of the smaller of these bubbles was being studied it disappeared between observations. After looking for it in some other portion of the field and not finding it, it was considered probable that its disappearance was the culmination of surface tension action. Another small bubble was picked out and carefully watched. At a diameter of about 5 μ its shrinkage became rapid enough to be measurable