hundred and fifty high-school students of science were in attendance, with fifteen science clubs represented. Eleven student papers were presented. There was an attendance of a hundred and ten at the dinner in the evening, at which Dr. Richard M. Sutton, of Haverford College, was the speaker. The Western Regional meeting was held on March 4, under the auspices of the Biology Club of Peabody High School, Pittsburgh, Pa. Thirteen clubs were represented by two hundred and twenty-five boys and girls. The attendance at the dinner was a hundred and forty. Dr. L. K. Darbaker, of the University of Pittsburgh, president of the Pennsylvania Academy of Science, and Dr. Karl F. Oerlein, Teachers College, California, Pa., general chairman of the Pennsylvania Junior Academy of Science, spoke at the morning session. Fourteen student papers were presented.

YALE UNIVERSITY has received from the Rockefeller Foundation a grant-in-aid of $189,000 toward the continued support of the Yale Laboratories of Primate Biology for the five-year period July 1, 1939, to June 30, 1944, and also the sum of $35,000 for the construction of an additional laboratory building at the Anthropoid Station at Orange Park, Florida. Under the reorganization of the laboratories, following the ten-year period for which the project was originally financed, the director, Dr. Robert M. Yerkes, will be responsible to an administrative committee, serving as a board of control. The following have been appointed members of this committee: Drs. Carl G. Hartman, research associate in embryology, Carnegie Institution, the Johns Hopkins School of Medicine, *chairman;* Edgar Allen, professor of anatomy, Yale School of Medicine; Leonard Carmichael, president of Tufts College; William H. Taliaferro, dean of the Division of Biological Sciences, University of Chicago; Robert M. Yerkes, professor of psychobiology, Yale School of Medicine, *secretary,* and, as member *ex-officio,* Stanhope Bayne-Jones, dean of the Yale School of Medicine.

CANDIDATES for the Jacksonian professorship of natural philosophy at the University of Cambridge, which is vacant owing to the resignation of Professor E. V. Appleton, of St. John's College, to accept the secretaryship of the Scientific and Industrial Research Council, should communicate with the vice-chancellor of the university before April 11. The professorship is assigned to experimental atomic physics and will be associated with the Cavendish Laboratory.

IT is stated in *Nature* that a large plaster-of-Paris model of the main new buildings of the Academy of Sciences of the U.S.S.R. is now on view at the Academy's premises in Bolshaya Kuluzhskaya Ulitsa in Moscow. The buildings were designed by A. V. Shchusev. The site for the buildings most favored is on the Frunze Embankment of the Moscow River. The new buildings of the academy, according to the plans, consist of five blocks with a volume of 880,000 cubic meters. In the center of the architectural ensemble is the main block for the presidium of the academy. The hall is large enough to seat 2,000 persons. There are also four smaller auditoriums. Near the main hall are rooms for the demonstration of films and for broadcasting; also a post and telegraphic office and an information bureau. A block has been set aside for the library and storage premises for fifteen million volumes. On either side of the block for the presidium are buildings to accommodate two museums, one of which will be the Natural History Museum.

DISCUSSION

NUCLEAR AND CYTOPLASMIC EFFECTS OF ULTRA-VIOLET LIGHT

THE bactericidal and photolethal effects of ultraviolet light have been known for a long time,[1] but the mode of action of the radiations is still obscure, although many interesting clues have been uncovered. Among the most interesting is the fact that the reciprocal of the curve of bactericidal action at different wave-lengths is suggestive of the absorption curve of the nucleoproteins, a fact which led Gates[2] to propose that the seat of action of ultra-violet light may be in the nucleoproteins of the cell.

If the lethal effect of ultra-violet light is indeed correlated chiefly with the effects upon nuclear constituents, then one might suppose that the isolated nucleus should be far more sensitive to the radiations than a nucleus surrounded by cytoplasm. Sperm are almost naked nuclei; they should serve as convenient material for just such a test. Therefore in one series of experiments the sperm of the sea urchin *Strongylocentrotus purpuratus* were irradiated, then used to inseminate unirradiated eggs; in another series of experiments the eggs were irradiated 30 minutes after insemination. In both cases, following the smaller dosages, division was retarded; following larger dosages, it was irregular; and if the dosage was large enough, abnormal. The results will be reported in detail later. In these studies known intensities of 2654A, a wave-length near the region of maximal absorption by the nucleoproteins[3] was used; the apparatus was essentially like that previously described.[4]

The point of greatest interest in these data, how-

[1] Duggar, "Biological Effects of Radiation," Vol. II, Ch. 36, 1936.
[2] Gates, SCIENCE, 68: 479, 1928.
[3] Heyroth and Loofbourow, *Bull. Basic Science Res.*, 5: 13, 1933.
[4] Giese and Leighton, *Jour. Gen. Physiol.*, 5: 535, 1935.

ever, is the fact that the amount of energy required to produce a given amount of retardation when the sperm was irradiated then used to inseminate an unirradiated egg was quite different from that required when the egg itself was irradiated. Thus in typical experiments a dosage of 50 ergs per mm² of incident energy given the sperm produced pronounced retardation, the first three divisions of the eggs inseminated with such sperm occurring two hours after the controls. A dosage of only 100 ergs given the sperm causes a delay of about 3 hours. A dosage as low as 300 ergs, given the sperm, causes irregular and abnormal development of the eggs inseminated with such sperm. On the other hand, a dosage of 50 ergs per mm² given the eggs caused only barely perceptible delay in division and a dosage of 816 ergs per mm² caused a retardation of the first three divisions of only about 1½ hours. The eggs will tolerate even 3,000 ergs per mm², cleaving slowly to form embryos.

These results indicate clearly the greater susceptibility of the sperm and therefore of naked nuclei to ultra-violet radiations. The nuclear material is present in the egg, but the radiations must pass through a thick layer of cytoplasm before reaching the nucleus. The greater resistance of the egg may be dependent upon the protection afforded by the cytoplasm to the nucleus. The radiations are unquestionably destructive to the cytoplasm[5] as well, but cytoplasmic injury is apparently less effective in retarding cell division than is injury to the sperm nucleus.

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A SPECIES OF AZOTOBACTER TOLERANT TO HIGH ACIDITY

ONE of the prominent characteristics of the aerobic, nonsymbiotic nitrogen-fixing bacteria, known as Azotobacter, is their sensitiveness to acid reactions. There is quite general agreement that pH 5.8 to 6.0 is the acid limit for growth in the absence of fixed nitrogen.[1] As stated by Burk and associates,[2] "The limit of fixation at pH 6.0 has been universally observed by all investigators." Even though Azotobacter has occasionally been recovered from mineral soils as acid as pH 4.5 and was reported as having been found in peat of pH 3.6,[3] there is no evidence that any of the isolated species of Azotobacter are able to develop upon nitrogen-free media which are more acid than the above-mentioned limit. Burk and associates[2,4] reported that the respiratory mechanism of Azotobacter is irreversibly destroyed by prolonged exposure to reactions below pH 5.0.

It is therefore of interest that there is a species of Azotobacter which grows and fixes nitrogen in very acid media. This organism was isolated from acid soils (pH 4.9 to 5.2) of India by P. K. De and has been cultivated in laboratory media for several years.[5] It develops well in nitrogen-free liquid media and upon agar slants from the acid limit which appears to be close to pH 3.0 up to at least pH 9.0. The organism develops well in nitrogen-free media similar to those commonly used for the well-known species of Azotobacter. Sucrose and glucose are readily utilized. During incubation for several weeks in a medium with an initial pH 3.1 and containing 1.5 gm of glucose, 9 mgm of nitrogen were fixed. Where the initial pH was 3.0, 3 mgm of nitrogen were fixed. Nitrogen fixation was greater between pH 3.8 and 8.0.

The acidity of the medium increases somewhat during development of the organism; the change in pH is greater in the alkaline and neutral media than in media which are close to the limiting acid reaction. During growth in media containing nitrate nitrogen the pH rises slightly, whereas in the presence of ammoniacal nitrogen the pH dropped from pH 6.5 to 3.5; this can be ascribed to the assimilation of the ammonium and nitrate nitrogen.

The unusual tolerance of the new organism to extreme acidity clearly distinguishes it from any of the previously described species of Azotobacter and indeed from practically all known bacteria. It appears to be at least as acid-tolerant as the anaerobic, nitrogen-fixing bacteria.[6] In fact, there are only exceptional species of bacteria which are able to develop at more acid reactions. Whether or not the acid-tolerant Azotobacter is widely distributed in soils or will develop in soils over as wide a range of reaction as in artificial media remains to be ascertained.

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HIPPOBOSCID FLIES FROM NORTH AMERICAN DOVES

G. R. COATNEY'S note in SCIENCE for September 16, 1938, on the possible carrier of dove Haemoproteus, may be supplemented with the following information.

Microlynchia pusilla (Speiser) is probably the most widely spread hippoboscid fly of doves. It is a strictly

[5] Giese, *Biol. Bull.*, 75: 238, 1938.

[1] S. A. Waksman, "Principles of Soil Microbiology," 2nd ed. Williams and Wilkins Company, Baltimore, 1932. P. L. Gainey, Proc. and Papers of First Int. Congr. of Soil Sci., Washington, D. C. 3: 107–117, 1928.

[2] D. Burk, H. Lineweaver and C. K. Horner, *Jour. Bact.*, 27: 325–340, 1934.

[3] J. K. Wilson and B. D. Wilson, N. Y. (Cornell) Agr. Exp. Station, Memoir 148, 1933.

[4] D. Burk, Ergebnisse der Enzymforschung, v. 3: 23–56, 1934. D. Burk and H. Lineweaver, *Jour. Phys. Chem.*, 38: 35–46, 1934. D. Burk, C. K. Horner, and H. Lineweaver, *Jour. Cell. and Comp. Phys.*, 1: 435–449, 1932.

[5] A description of this organism will soon appear in *Soil Science*. In this report the organism is described as a new species of Azotobacter.

[6] W. H. Willis, Iowa Agr. Exper. Sta., *Res. Bul.*, 173, 1934.