UNIVERSITY AND EDUCATIONAL NEWS

FIRMS in Manchester have offered to the College of Technology, Manchester, the sum of £3,000, spread over a period of five years, towards the cost of establishing a new department of industrial management.

ACCORDING to the *Journal of the American Medical Association* the conflict that has been going on in the University of Cordoba has grown more acute. The rector and several of the members of the faculties have presented their resignations. The head of the national government has appointed the minister of public instruction to take charge of the matter personally, and reorganize the staff of the university. At the request of the minister of public instruction, the medical faculty of the university of Buenos Aires did not appoint a new dean at the close of the term of office of Dr. Bazterrica, and this post is filled provisionally by the member of the university council who has been longest in office, Dr. E. Canton, until the reorganization of the university statutes has been sanctioned.

DR. WITHROW MORSE has been appointed professor of physiological chemistry in the medical school of the University of West Virginia, Morgantown.

DR. EUGENE L. PORTER, instructor in physiology at the Medical School of the University of Pennsylvania, has accepted the position of assistant professor of physiology at the Western Reserve University Medical school.

OWING to the death of Professor R. E. Sheldon and the resignation of several members of the staff, the department of anatomy, University of Pittsburgh has been reorganized. The present members of the instructing staff are Professor Robert Retzer, associate professor C. C. Macklin and Assistant Professor Harley N. Gould.

DISCUSSION AND CORRESPONDENCE

CORRELATION OF THE HYDROGEN-ION EXPONENT AND OCCURRENCE OF BACTERIA IN SOIL

IN an interesting note in SCIENCE (Vol. 48, pp. 139–140), followed by a fuller account in the *Journal of Agricultural Research* (Vol. 14, No. 7, pp. 265–271, 1918), Mr. P. L. Gainey has recently described experiments showing that the occurrence of *Azotobacter* in soils is controlled, apparently to a major extent, by the hydrogen-ion concentration, the limiting hydrogen-ion exponent being about 6.0. Previously to this, Christensen in Denmark had described some experiments on this general subject,[1] besides those reviewed by Gainey.

Christensen mentions having applied the *Azotobacter* test and the litmus paper test together to about 40,000 soil specimens. He found a general correlation between acidity to litmus and absence of *Azotobacter*. He also found a close correlation between the *Azotobacter* test and a para-nitrophenol test: "In the case of soils showing a neutral reaction for litmus, there is a distinct difference between the two groups,—with and without *Azotobacter* vegetation,—for the former colors the liquid (para-nitrophenol) somewhat more yellow than the latter." In applying para-nitrophenol, a solution of it was mixed with the soil, and the soil particles allowed to settle out over night.

There is considerable objection against mixing the indicator with the soil mass, and especially in the case of a one-colored indicator like para-nitrophenol, for any loss of indicator due to absorption by the soil mass would not be distinguishable from an actual color discharge due to acidity. The procedure of Christensen has been checked only by means of the litmus paper and the *Azotobacter* test itself. If the absorption of indicator is not serious, the results of Christensen can be interpreted in terms of hydrogen-ion exponent and are then in accord with the results of Gainey, for the turning point of para-nitrophenol is about 6.

The procedure used by Gainey, on the other hand, is the one used by the writer in 1916, tested by means of electrometric measurements of the soil suspension, and found to give at least approximately correct results.[2]

[1] *Soil Science*, Vol. 4, pp. 115–178, 1917.

[2] *Jour. Wash. Acad. Sci.*, Vol. 6, pp. 7–16, 1916.

The procedure involves the use of brilliant two-colored indicators, such as those recommended by Clark and Lubs, applied to soil extracts obtained without filtration by the use of a centrifuge.

In work being published elsewhere, L. A. Hurst and the writer have compared the electrometric method with the improved colorimetric method as described by Clark and Lubs[3] and have found a very close agreement in the results of the two methods applied to soils. We have found it advisable for soil work to use the phenol-sulfon-phthalein indicators in water solution as the monosodium salts, and to use (pure) methyl red, without neutralization, in alcoholic solution.

In previous papers from this laboratory the suggestion has been made that the occurrence of the common potato scab may be limited by the hydrogen-ion concentration of the soil.[4] In the work mentioned above this seems to have been demonstrated.

There have been located now two points of interest on the scale of hydrogen-ion exponents for soils: (about) 6.0, the acid limit for *Azotobacter,* and (about) 5.2, the acid limit for the potato-scab organism. In addition to these organisms, other important soil organisms have been studied in their relation to hydrogen-ion exponent in culture media.[5] In general, such pure culture studies should be supplemented with soil studies, for a number of reasons, one of which is that strains of unusual resistance to acidity might be missed in the study of a limited number of strains in pure culture.

From the considerable quantity of work done some years ago in culture media, it was to be expected that limits of hydrogen-ion concentration should be discoverable for the growth and survival of microorganisms in soil, providing only that the soil has a definite and significant hydrogen-ion concentration. That the soil has definite and biologically significant hydrogen-ion concentration has been demonstrated by the work of this laboratory. The expectation may be different with regard to the growth of crops, since (1) very little work involving real control of hydrogen-ion concentration has been done on this subject,[6] and (2) the welfare of crops may depend in some cases on the success of *Azotobacter,* of legume bacteria, or of other microorganisms less resistant to acidity than the plant itself. We do not yet know whether, for instance, a point can be located, in acid soils not altogether infertile, beyond which acidity the growth of red clover is always more or less unsatisfactory; we have seen, however, some indications that such a point may exist at about the exponent 5.

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[3] *Jour. Bact.,* Vol. 2, Nos. 1, 2, 3, 1917.

[4] Gillespie and Hurst, *Soil Science,* Vol. 4, pp. 313–319, 1917, and Gillespie, *Phytopathology,* Vol. 8, pp. 257–269, 1918.

[5] *E. g.,* E. B. Fred, *Abstracts of Bacteriology,* Vol. 2, pp. 10–11, 1918.

[6] See Hoagland, *Soil Science,* Vol. 3, pp. 547–560, 1917, who studied the barley plant.

THE NEED OF ANOTHER PHILANTHROPIST BY ORGANIC CHEMISTS

Wanted, available sets of the greatest of all reference books in organic chemistry, Beilstein's "Handbuch der Organischen Chemie," for the immediate use of organic chemists in the numerous governmental and industrial laboratories. Why? Because these chemists have been laboring under a serious handicap for the past four years, especially in the preparation of war chemicals and explosives, medicinals, and dyestuffs. How can this pressing need be met? In a timely editorial in the September number of *The Journal of Industrial and Engineering Chemistry* Dr. Charles H. Herty has shown that photographic methods are available for the reproduction of this valuable work at a comparatively low cost. Who is to finance the preparation of the zinc etchings? There is probably some man of wealth who can appreciate the present need of the organic chemist and come to the rescue. The need is urgent. It should be met and met immediately.

The first appeal[1] for financial assistance in

[1] Science, N. S., Vol. XLVII., pp. 225–228 and pp. 590–591.