SEYMOUR W. FERRIS, chief chemist of the Atlantic Refining Company, has been appointed chairman of a general committee to direct arrangements for the one hundred and second meeting of the American Chemical Society, which, under the auspices of the Philadelphia Section, will be held at Atlantic City, N. J., from September 8 to 12. More than 5,000 chemists, chemical engineers, industrialists, educators and representatives of allied fields, including state and federal services, will participate in the events. The effort of the chemical industry to speed defense will be stressed at the convention in which eighteen divisions of the society will participate and which is expected to be one of the largest in the history of the society. There will be seventy-eight sessions, at which research in practically every aspect of pure and applied chemistry will be reported. Seventeen special symposia will deal with subjects such as fuels, food, petroleum, phosphates, rubber, medicinals, unit processes in industry and biological problems related to national defense.

THE Government is looking for mineralogists especially qualified in the economic aspects of the mineral industries to carry on professional research in the fields of minerals, coal and petroleum as mineral resources which are of the utmost importance to National Defense. Civil-service examinations for these positions are now open. The salaries range from $2,600 to $5,600 a year. Applications will be rated as received at the Commission's Washington Office, but those interested are urged to file their applications at once. Applicants will not have to take a written test, but they are required to submit a list of whatever writings they have done in the field, and, if possible, to submit a copy of at least one research project. Particulars and application forms may be obtained from any first- or second-class post office or from the Civil Service Commission, Washington, D. C.

THE University of Miami, Coral Gables, Fla, plans to offer this year two courses in marine zoology, lasting from June 23 to July 19, running concurrently. One course, designed for students with elementary training only, will be principally concerned with the invertebrate fauna of the tropical region, from the viewpoints of anatomy, physiology, habits and ecology. Advanced students will survey the problems and methods of marine research, and will be encouraged to follow up a problem in conjunction with the work of the courses.

DISCUSSION

A GROWTH-DEPRESSANT SUBSTANCE FROM YEAST

AT various times Fernbach,[1] Hayduck[2] and Gilles[3] have presented evidence that yeast contains substances toxic for yeast and for some bacteria and molds. In a previous communication[4] dealing with fractions from yeast which antagonize the toxic action of germicides for *Aspergillus niger* and *Penicillium glabrum* we pointed out that growth-inhibitory substances were also indicated to be present. Preliminary experiments show that these materials can be concentrated.

One liter of a concentrated alcoholic extract of 20 pounds of bakers' yeast, prepared as described previously,[5] was fractionally precipitated with three portions of acetone (10 l., 3 l. and 3 l., respectively), concentrating the solution between each acetone addition. The final acetone-soluble portion (Fraction 5 F) was approximately fifty times as active as the original extract in depressing the growth of both *A. niger* and *P. glabrum* when added to the culture medium in concentrations of from 0.05 to 1.0 per cent. This fraction was dried at 50° C. to a dark oil, extracted twice overnight with acetone, and adsorbed on Norit charcoal from which it was eluted with 85 per cent. acetone. This fraction (5 H) possessed over twice the inhibitory activity of 5 F for *A. niger* but was no more potent for *P. glabrum*. The materials have also been prepared by direct acetone extraction of the yeast, followed by the above treatments.

Fractions corresponding to 5 F have also been tested for their effect on the growth of *Escherichia coli* and *Staphylococcus aureus*. Complete killing of none of the organisms has been obtained, but the rate of growth is greatly depressed by addition of about 2 per cent. or greater of the fractions; lower concentrations cause an increase in colony size.

Of considerable interest is the fact that in the case of both molds and bacteria the type of growth is altered. For the molds grown on a modified Czapek's medium containing the depressant this change consists of the production of thick gnarled mycelia, and the lack of conidia and pigment formation. The form of colony of *E. coli* on nutrient agar containing the depressant is changed from smooth to rough to grainy with increasing concentrations. Microscopically this change is associated with a great increase in the length of the *E. coli* cell and the development of tangled filamentous structures. Reversion to normal, highly motile forms occurs when the cultures are returned to media free of the depressant. The relationship be-

[1] A. Fernbach, *Compt. rend.*, 149: 437, 1909; *Ann. brass. distill.*, 12: 361.
[2] F. Hayduck, *Wochschr. Brau.*, 26: 177, 189, 677.
[3] E. Gilles, *Bull. mens. soc. Linnéenne Lyon*, 8: 126, 1939.
[4] E. S. Cook and C. W. Kreke, *Nature*, 146: 668, 1940.
[5] E. S. Cook, C. W. Kreke and L. G. Nutini, *Studies Inst. Divi Thomae*, 2: 23, 1938.

tween the morphological and biochemical changes and the possible effect on virulence are being studied.

The concentrates at present available are manifestly crude, but the active material (or materials) is non-volatile, readily soluble in water, 95 per cent. alcohol and acetone containing a trace of water, and is stable at 100° C. at pH 7.3. The concentrates are acid and contain nitrogen but no sulfur. They give a positive biuret reaction, but it appears likely that the protein is present as an impurity.

These experiments are being extended and will be reported in detail later.

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DIETARY REPAIR OF EXPERIMENTAL CARIES[1]

EXPERIMENTAL caries was produced by feeding rats a coarse-corn, caries-producing diet[2] for 100 days. Animals sacrificed at the end of this period showed evidence of carious disintegration in the molar teeth. By examination under binocular microscope, using a fine explorer to test the cavity formation, soft areas of exposed dentin could be noticed. Upon histological examination the lesions showed deep penetration with the cavity base in close proximity to the pulp chamber and with little evidence of secondary dentin formation. One group of rats which had been on the caries-producing diet during the same period (100 days) were continued for an additional 2 months, during which time they received the stock diet of this laboratory (finely ground fox chow) that has been shown to be adequate in every respect. After the two months on this diet, the rats were sacrificed and the molar teeth examined.

Unexpectedly, the caries process had not only stopped but under binocular examination the exposed dentin was found hard and polished. Histological study of these teeth showed an unusual picture. The dentin had a sclerotic appearance and beneath every place where the outer part of the tooth had been subject to attack a new thick layer of secondary dentin had been laid down, which reestablished a safe distance between the external tooth surface and the pulp. In some cases this protective layer had attained the thickness of the original dentin.

This experimental approach, which permits histological evaluation of the reparative processes associated with carious disintegration, should offer a new field of investigation of the dietary and other factors involved in the control of dental caries. If such defensive processes can be promoted and the acute caries penetration prevented, it should be possible to save many teeth from severe destruction and its consequences.

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RATE OF SURFACE RETREAT OF SEA CLIFFS BASED ON DATED INSCRIPTIONS[1]

SINCE the time of cave man, people have responded more or less to an urge to draw pictures or cut inscriptions on walls. Although this habit is often objectionable, some use can be made of it geologically in estimating the rate of rock surface weathering and erosion.

Near La Jolla, California, the sea cliffs are largely composed of Cretaceous and Eocene rock. Much of this material is sandstone, consisting of medium to coarse-grained quartz and feldspar, moderately to firmly cemented by $CaCO_3$ when fresh, but friable when weathered. Along four miles of this coast a great number of roughly carved names or initials were found on the sandstone during August, 1940. Even though fewer than 10 per cent. were accompanied by the date on which the carving was made, a total of 163 dated inscriptions were located. Since beach vacationists have come to La Jolla for many years, an interesting frequency curve for such dated signatures can be made (Fig. 1). Enough data are available so that the effect of a few deeply cut carvings, of falsification and of errors in reading partly obliterated dates is minimized.

Most of the freshly cut letters are a sixteenth to a quarter of an inch deep. Within a few months after being cut, definite signs of solution and wearing away of the edges appear, until in about a year there remain no sharp edges whatever. In two or three years the lines usually become only broad shallow grooves in the rock surface and in four or five years they are partly obliterated and can be read only with difficulty. In several instances, where the grooves for old carvings had been almost completely destroyed, the lines are partly shown by rows of barnacles which had lived in the grooves probably because a water film was held there longer than on the flat rock surface.

Destruction of the carvings seems to take place largely through solution of the $CaCO_3$ cement in the rock. The loosened grains may be detached by the formation of salt crystals developed by the evaporation of spray or at some localities they may be carried away

[1] This work was carried out with a grant from the Carnegie Corporation of New York.

[2] C. A. Hoppert, P. A. Webber and T. L. Canniff, SCIENCE, 74: 77, July 17, 1931.

[1] Contributions from the Scripps Institution of Oceanography, New Series, No. 138.