group. Such a substance, however, is present in non-crystalline fractions, which display a distinct absorption band at 260 mμ superimposed upon the absorption of carotenoids and other accompanying substances.

Sargassum collected at its site of origin is relatively free from closely associated foreign organisms, even protozoa, and the "leaves" are clear and intact. However, a fairly large colony of free-swimming shrimps and fishes is present. Much of the weed finds its way into the Gulf Stream, and during its northward passage becomes heavily infested with invertebrates. Samples taken north of Hatteras present a complex picture of plant and animal commensalism: the stems are covered with masses of the long-necked barnacle (*Lepas*) and immense numbers of mollusks with their eggs. Several types of shrimps and fishes abound. The "leaves" are now extensively damaged and often completely missing.

Little imagination is needed to visualize the progressive transfer of the vitamin from the plant to the small animals, thence to the larger predatory fishes which follow the floating colonies. Such a process, combined with the drift of the Gulf Stream, may well contribute to the wide but unequal distribution of vitamin D in marine fish oils. Of interest in this connection is the report[9] that the cod livers taken from the White Sea and Bear Island region are consistently lower in vitamin D than those taken off Iceland in waters which are more accessible to the Gulf Stream.

The occurrence in plants of a vitamin D, in common with other vitamins, must now be recognized. The frequent association of vitamins A and D in fish liver oils is on these grounds easily understandable.

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[9] Lovern, *Chem. Ind.*, 56: 75, 1937.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE USE OF BROMINE IN THE STERILIZATION OF FRUITS AND SEEDS

STERILE seedlings may be grown from seeds treated with any one of a number of substances. Calcium hypochlorite, as used by Wilson,[1] is perhaps the most popular of these, though mercuric chloride also has many advocates. An appreciable amount of time is needed for the mixing and filtering of bleaching powder, and the strength of the resulting solution is dependent on the age and condition of the powder. Mercuric chloride may cling to the seed coats and later injure the seedlings. A satisfactory sterilizing medium has been found in bromine, which I have used for more than two years with great success.

The best results have been gained with bromine water, which is diluted to 1/10 its original strength and poured over the seeds in a container, which is then tightly stoppered. Of course, care must be taken not to breathe the poisonous fumes of the bromine water. When the seed container is opened after sterilization, the weak solution does not fume sufficiently to be troublesome. Other dilutions may be used, but I have found it convenient to vary the length of time of sterilization rather than change the concentration of the sterilizing substance. The tolerance of seeds varies; oats are injured by exposures of more than one half hour, but corn, cabbage, radish and sunflower withstand an hour or more of treatment.

Bromine water has been used also in sterilizing fruits from which embryos were removed for growth in culture[2] and the chances of securing sterile embryos increased considerably thereby. In the tomato, immature ovules, even, may be removed from fruits and treated for one half hour without injury to the young embryos.

Fragments of stems and roots, treated in this manner, have been grown in sterile culture. Even leaves and flower buds have proved sterile in culture after bromine treatment, though it is not always possible to secure sterilization without fatal injury to these delicate structures.

No rinsing is required after bromine treatment, but the structures are placed at once on sterile filter paper, in liquid or on agar, as required. The bromine soon disappears, leaving no trace to injure later growth.

Bromine water will keep for long periods if stored in the dark. Shaking up the excess bromine in the water a few minutes before use insures a bromine content of satisfactory uniformity.

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[1] J. K. Wilson, *Amer. Jour. Bot.*, 2: 420–425, 1915.

[2] C. D. La Rue, *Proc. Nat. Acad. Sci.*, 22: 201–209, 1936; *Bull. Torr. Bot. Club*, 63: 365–382, 1936.

TO KEEP CULTURE-MEDIA FROM DRYING OUT

ONE of the problems of the small clinical laboratory and only a lesser problem in other laboratories is that of keeping culture-media ready for use, particularly Loeffler's medium, blood-agar slants and blood-agar plates. For this purpose and for preservation of stock cultures we have found a material called parafilm (made by the Marathon Paper Mills Co., Rothschild, Wisconsin) so useful that we wish to bring it to the attention of others. A square of this film pressed down on the mouth of a culture tube, the cotton plug having first been pushed in, keeps the slant from drying out for weeks at incubator temperature and indefinitely at room temperature. It is equally efficient in keeping the volume of a broth tube or flask unchanged. The advantage over wax or paraffin is that the seal is readily stripped off and the cotton plug remains perfectly manageable. An inch-wide strip carried around the cover of a Petri dish and pressed down on the bottom of the dish allows prolonged incubation of a plate culture. Poured plates thus sealed are stacked for storage with waxed paper between to keep them from sticking together. The security of the seal may be seen in the following experiment: (1) 10 cc of alcohol in a graduated centrifuge tube lost nothing in volume in four days, during which time the same quantity in a cotton-stoppered tube, both in the 37° incubator, went down to 7 cc; (2) a tube of water at 54° kept the level unchanged for nine days, during which time the control went down an inch.

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DECLIVITY MAPS

GEOGRAPHERS are not alone in finding maps to indicate the degree of slope for a given land surface extremely useful. These maps are not common; and hence many researchers have gone to the field for this information. This procedure is unnecessary when large scale topographic maps with a small contour interval are available. Therefore, this brief paper deals with a method of gathering the essentials requisite for the construction of declivity maps from topographic maps.

The two essential data used in determining slope information are included in topographic maps. If one is to inspect below the diagrammatic, vertical section of a hill, prepared to illustrate certain features in the construction of a topographic map, it is obvious that the requisite information for the declivity map is available.

If one wishes to determine the slope of the land between A and C, it may be calculated by solving for angle BCA, whose tangent is calculated by the distance AB as 50 feet (contour interval) and BC as 75 feet (by measure). In like manner the angles of DEC, GFH and IHJ may be ascertained. It follows then that these angles are the respective slope angles along the line XX′. To secure slopes elsewhere on the map, one has only to measure the distance between contours and substitute this formation with the contour interval, as indicated in the above method.

Place the computed angles mid-way between the contours where the slope has been determined. When

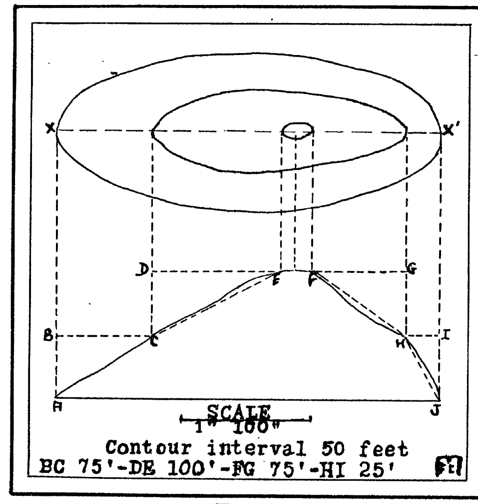

FIG. 1

the slope information has been recorded, generalize this information by the conventional isopleths, so familiar to geographers.

The number of observations will be governed by the degree of detail necessary for a given problem. Like all isoplethic maps, generally speaking, the greater the number of observations used for the map, the more faithful the map is to the truth.

It is suggested that a table be prepared with slope angles indicated as equivalents of the data discussed. The number of items necessary for a table will be governed, of course, by the degree of detail desired.

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BOOKS RECEIVED

DICKINSON, H. W. *Matthew Boulton.* Pp. xiv + 218. 15 plates. Cambridge University Press, Macmillan. $4.50.

DOUGLAS, C. G. and J. G. PRIESTLEY. *Human Physiology, A Practical Course.* Second edition. Pp. xi + 229. 32 figures. Oxford University Press. $4.25.

ERLANGER, JOSEPH and HERBERT S. GASSER. *Electrical Signs of Nervous Activity.* Eldridge Reeves Johnson Foundation Lectures, 1936. Pp. x + 221. 113 figures. University of Pennsylvania Press. $3.50.

GAVETT, G. IRVING. *A First Course in Statistical Method.* Second edition. Pp. ix + 400. 74 figures. McGraw-Hill. $3.50.

HAYNES, WILLIAMS, Editor. *The Chemical Who's Who;* Volume II: 1937. Pp. 543. The Haynes and George Co., New Haven. $6.00.

HIRST, A. W. *Electricity and Magnetism.* Pp. xv + 388. Illustrated. Prentice-Hall. $4.50.

HOGBEN, LANCELOT. *Mathematics for the Million.* Pp. xii + 647. 197 figures. Norton. $3.75.

LINCOLN, FRANCIS C., WALTER G. MISER and JOSEPH B. CUMMINGS. *The Mining Industry of South Dakota.* Bulletin No. 17, Department of Mining, February, 1937. Pp. 201. 40 figures. South Dakota School of Mines, Rapid City.

MANSFIELD, WILLIAM. *Materia Medica, Toxicology and Pharmacognosy.* Pp. 707. 202 plates. Mosby. $6.75.