present may lead to the production of potentially dangerous pools. This is more likely to occur when the number of components of the pool is small (such as 4) and less likely to occur when the number of components is large (such as 16). It is suggested that the isoagglutinin titer of all pools be determined in order to exclude those possessing dangerously high titers of isoagglutinins.

HARRY A. DAVIS
GEORGE R. MENEELY
DEPARTMENTS OF SURGERY AND MEDICINE,
LOUISIANA STATE UNIVERSITY SCHOOL OF
MEDICINE, NEW ORLEANS

## A CAUTION ON THE USE OF MALEIC ANHYDRIDE AS A REAGENT FOR CONJUGATED DIOLEFINS

ALTHOUGH maleic anhydride is commonly used as a selective reagent for the conjugated diolefins in gasolines and other hydrocarbon mixtures from cracking, it is not generally known that certain dienes fail to respond.

Farmer and Warren[1] early showed that 4-methylpentadiene-1,3 fails to form the expected simple adduct with the anhydride. Since that time other observations reported in the literature indicate that dienes with doubly substituted carbon atoms in the terminal (1,4) positions of a conjugated system RRC = C – C = CRR either give polymeric adducts or, under antioxidation conditions, no appreciable reaction of any kind.

More recently the writer and his coworkers reported that the *cis* isomer of pentadiene-1,3 fails to show significant reaction with maleic anhydride.[2] Since pentadiene-1,3 (piperylene) is the first member in the homologous series of conjugated dienes to exhibit geometrical isomerism, there seems little doubt that analogous isomers of higher dienes will behave similarly, although this has not yet been proved. The writer has also observed in the case of piperylene that the *cis* isomer is much more prominent in mixtures from high temperature processes.

RICHARD F. ROBEY
ESSO LABORATORIES,
STANDARD OIL DEVELOPMENT COMPANY,
ELIZABETH, N. J.

[1] Farmer and Warren, *Jour. Chem. Soc.*, 3221, 1931.
[2] Robey, Morrell and Wiese, *Jour. Am. Chem. Soc.*, 63: 627, 1941.

## PYRIDOXIN AND COACERVATES IN PLANT CELLS

PYRIDOXIN may enter into the formation of characteristic aggregates in the vacuoles of senescent or poorly nourished cells which we have recently studied. Free-hand sections of the stems of stunted mustard plants grown without zinc under rigidly controlled conditions show, in the vacuoles of the cells, globular aggregates which have the characteristics of autocomplex "coacervates." A similar phenomenon has been described whereby the phenolic compounds originally distributed at random in the water phase of the vacuolar solution may be condensed into globular aggregates surrounded by lipoids.[1]

Pyridoxin-indophenol may be demonstrated by the Scudi reaction[2] when free-hand sections of tissues are immersed in an alkaline phosphate or, preferably, veronal buffer, in which 2–6 dichloro quinone chloroimide is suspended. Indophenol first forms where pyridoxin exists, within the coacervates; indophenol, being fat soluble, is then absorbed by the lipoid coating the coacervate which it stains blue. The reaction does not occur in a borate buffer where the phenolic group of pyridoxin is known to be masked by the formation of a complex.

We have found *per contra* that in the post-meristematic or the perivascular cells in the roots of mustard or of snapdragon plants grown in a nutrient solution containing zinc and other necessary elements pyridoxin is randomly diffused in the vascuolar solution. It appears to become "coacervated" in the older cells of plants which remain stunted. A healthy condition is probably dependent upon the presence of pyridoxin in the vacuole. Coacervates may therefore inactivate an important constituent of the cell system.

HOWARD S. REED
UNIVERSITY OF CALIFORNIA
JEAN DUFRENOY
LOUISIANA STATE UNIVERSITY

[1] Howard S. Reed and Jean Dufrenoy. *Am. Jour. Bot.*, 29: 544–551, 1942.
[2] J. V. Scudi, H. F. Koones and J. C. Kuesztesy, *Proc. Soc. Exp. Biol. and Med.*, 43: 118, 1940; J. V. Scudi, *Jour. Biol. Chem.*, 139: 707, 1941; O. D. Bird, J. M. Vandenbelt and A. D. Emmett, *Jour. Biol. Chem.*, 142: 317, 1942; J. V. Scudi, R. P. Birks and D. B. Hood, *Jour. Biol. Chem.*, 142: 323, 1942.

## X-RAY EVIDENCE FOR A THIRD POLYMORPHIC FORM OF SODIUM STEARATE

THE x-ray work of Thiessen and Stauff gave evidence that there are two distinct crystallographic forms of sodium stearate[1] called by them the α and β forms. The authors have discovered a third form[2] which may be called the γ form, in conformity with the notation of Thiessen and Stauff.

The new γ form was detected by noting that it had a unique long spacing. The several spacings assumed to be $d_{(001)}$, are as follows:

| Form | Spacing |
|---|---|
| α | 51.8Å |
| β | 46.6Å |
| γ | 44.6Å |

[1] *Zeit. Physik. Chemie* (A), 176: 397, 1936.
[2] A. de Bretteville, Jr., Thesis under Dr. J. W. McBain, "X-ray Diffraction Study of Oriented Soaps," Stanford University, 1942.

The $\gamma$ form is produced when sodium stearate is formed by the reaction between stearic acid (Eastman catalogue number 402) and sodium alcoholate, followed by drying the precipitate at 105° C.

The authors wish to thank R. D. Vold for preparing some of the soap samples used in this investigation.

ALEXANDER DE BRETTEVILLE, JR.
J. W. MCBAIN
STANFORD UNIVERSITY

### OCCURRENCES OF "RED WATER" NEAR SAN DIEGO[1]

SINCE 1917 the Scripps Institution of Oceanography has given considerable attention to the phenomenon of "red water" and to the conditions of its occurrence. Although the information available concerning it is not much greater in detail in 1942 than it was at the time of previous reports,[2] certain aspects of the conditions appear to be growing more distinct.

1942 was characterized by two periods of "red water," although neither was so conspicuous as in one or two former years. The responsible organisms (dinoflagellates) differed at the two periods in 1942 in contrast to the fact that in the other years only one organism attained "red water" prominence in the year in and near La Jolla Bay. *Prorocentrum micans* Ehr. contributed the color in May, but *Goniaulax polyedra* Stein was causative in September. The duration of noticeable discoloration of the sea in May was about one week, in September about three weeks. The largest abundance recorded in May was 500,000 cells per liter, but probably streaks and patches of more than a million per liter were present. In September the numbers in routine catches at the Scripps Institution pier yielded a maximum of 1,000,000 cells per liter, but special catches showed abundances up to about 2,000,000 cells per liter.

In both May and September the conspicuous populations appeared to drift into the bay from the west. In some other years the invasion was from the northwest. However, in all years the evidence available clearly indicates origins outside of the local area. In 1924 the discoloration caused by *Prorocentrum* was first discovered by the institution boat at about ten miles directly off shore and it was not for several days that the appearance was distinct in La Jolla Bay. Differences in direction and speed of approach to La Jolla, considered in connection with the fact that there is no recognizable "nursery area" in the region, indicate rather strongly that growth of these populations to "red water" prominence is dependent upon conditions affecting particular masses of water rather than upon conditions affecting particular localized geographic areas.

Perhaps the most striking evidence concerning occurrences of "red water" acquired by the Scripps Institution in twenty-five years is that indicating zonation of conspicuous abundances. Most of this has come to hand since the institution began intensive operations at sea in 1938. From these and from certain earlier observations off shore, it appears certain that high abundance in Southern California does not occur as much as twenty-five miles from shore (possibly not more than fifteen) and that it does not reach to a depth of more than thirty meters (except in very rare instances). By way of contrast, the planktonic diatoms, which usually thrive under conditions apparently favorable to the planktonic dinoflagellates, have shown large populations far from shore, a hundred miles and more.

Here, of course, we have introduced a nice complexity of problems for marine hydrographers and chemists, etc., no less than for marine biologists. How can we account for such definite zonation with water boundaries of one and not the other of two groups closely associated? Still more difficult, how can we account for the fact that within these zones the "red water" organisms may show little prominence for years and then "suddenly" become conspicuous almost over night? Larger and smaller movements of water masses have a very definite place in the results, as do air conditions also, and there must be a long series of chemical and biological influences to run parallel with these when enormous development of numbers occurs. Until we know more about a number of these things our explanations of occurrences of "red water" must remain rather hazy except for some interesting generalities.

W. E. ALLEN
SCRIPPS INSTITUTION OF OCEANOGRAPHY,
UNIVERSITY OF CALIFORNIA

[1] Contributions from the Scripps Institution of Oceanography, New Series, No. 180.

[2] W. E. Allen, SCIENCE, 78: 12–13, 1933; SCIENCE, 88: 55–56, 1938.

# SCIENTIFIC BOOKS

### GROWTH AND FORM

*Growth and Form.* By D'ARCY WENTWORTH THOMPSON. Pp. 1+1116. Cambridge University Press. New edition, 1942. $12.50.

THIS book, as the author writes in a "Prefatory Note," is a war effort. "I write this book in wartime, and its revision has employed me during another war. It gave me solace and occupation, when service was debarred me by my years. Few are left of the friends who helped me write it, but I do not forget the debt I owe them all." The general character of the work