the basis of our own? How likely are we to judge it correctly if, under these circumstances, we insist on judging?

As for experiments on behavior relating particularly to mimicry and warning color, there appears to be only one series that was at all adequate. They were the tests made by Reighard[3] on coral reef and other small fishes and their neighboring predators. Professor Carpenter does not mention these experiments. They turned out to be against the warning color theory, and upset a number of preconceived ideas of how these fishes behave and why they do so. Nor does he mention the stomach contents of birds (McAtee[4]), which are one of the consequences of animal behavior. These go to show that many animals held to be protected, whether through imitation or otherwise, are not very immune to capture after all. It will require a good many casual observations and brief tests to overthrow a thorough, analytical and objective group of experiments and a mass of concrete facts on feeding habits. That is why such tests should cease to be casual and brief. Nothing less complete than the Reighard experiments will suffice, and students of mimicry are urged to make their tests of behavior as full and inquisitorial. The only alternative is to refrain from drawing conclusions.

"Few critics seem to be aware of the great extent of the phenomenon." Were its extent twice as great, its problems would not be solved. What mimicry needs is not a broader foundation, but a deeper one. Those who have made known the large number of instances of it are in the best position to furnish this depth. It is to be hoped they will direct their chief energies to that end.

A. FRANKLIN SHULL

DEPARTMENT OF ZOOLOGY
UNIVERSITY OF MICHIGAN

HETEROTHALLISM IN VENTURIA INAEQUALIS

IN October, 1935, conidia from cultures obtained by isolating each of the eight spores of an ascus of *Venturia inaequalis* were used to inoculate the leaves of potted Fameuse apple trees that had been held in cold storage and recently forced out in the greenhouse. Conidia from each isolate were used alone and mixed in every possible two-isolate combination. Infection resulted from every inoculation, whereas uninoculated trees remained free from it. Leaves from the experimental trees were overwintered and examined microscopically for perithecia of *V. inaequalis*. None of the uninoculated leaves or those inoculated with conidia from any single isolate of the fungus bore perithecia. The results from the two-isolate inoculations showed that the eight isolates fell into two groups of four each. All the 16 possible combinations between these two groups yielded perithecia that bore ascospores. None of the 8 combinations in which conidia from an isolate were mixed with those from another within the same group yielded perithecia that bore ascospores, except in three cases, in each of which the fertile ascocarps were borne in a strictly localized area. These seemingly aberrant cases are thought to have been due to contamination. Cleared-leaf studies showed that perithecial initials were formed abundantly when single isolates or non-fertile mixtures were used, but they usually attained less than one half the diameter of the normal, mature perithecium. The experiment is being repeated with modifications and supplemented by pure-culture studies. The available evidence seems to justify the conclusion that *V. inaequalis* is heterothallic, each isolate being hermaphroditic and self-sterile.

G. W. KEITT
D. H. PALMITER

UNIVERSITY OF WISCONSIN

[3] J. E. Reighard, Carnegie Inst. Wash. Pub. 103: 257–325, 1908.

[4] W. L. McAtee, Smiths. Inst. Misc. Coll. 85(7), 1932. Also *Quart. Rev. Biol.*, 8: 209–213, 1933.

AN ANALOGUE OF PLATEAU'S SPHERULE

IF a falling stream of water is examined with a stroboscope at the point where it breaks up into drops, a tiny droplet may be seen formed apparently from the "tails" between successive drops. This droplet is generally known as Plateau's spherule, after the inventor of the stroboscope.

While emptying two flasks with special constricted necks, I was very much interested to observe a similar phenomenon which may be seen quite easily without the aid of stroboscopic vision. The necks of the flasks were so narrow (4.0 mm i.d.) that air entered in discrete bubbles. Between successive bubbles, tiny bubblets of air were formed which could be observed rising slowly through the solution.

The phenomenon was first observed while emptying a saturated solution of barium nitrate in 33 per cent. nitric acid from the flasks. When the flasks were filled with pure water for calibration, no spherules of air were seen on emptying. Apparently, the formation of the tiny bubbles from the thread of air, left as a large bubble breaks off, depends upon a suitable relationship between surface tension, mobility and density of the liquid, for a given type of neck. With concentrated 70 per cent. nitric acid the effect is not as good as with 40 per cent. acid although occasional bubblets may be seen. Fifteen per cent. alcohol is as good as the 40 per cent. nitric acid, and the effect may also be seen quite well with 95 per cent. alcohol. With ethyl ether the formation of the spehrules was also observed. In this liquid there were frequently three

or four of the spherules between the successive bubbles of entering air.

CHARLES H. GREENE

RADCLIFFE COLLEGE

SEASIDE SHRUBS: WIND FORMS VS. SPRAY FORMS

ON the basis of recent observations on the lower Cape Fear Peninsula, we have found that the so-called "wind-form" shrubs owe their form not to the wind *per se* but to the sea spray carried by high winds. Marked injury of all the young shoots exposed on the southeast side of the shrub masses (wax myrtle, yaupon and live oak) was observed following a high southeast wind which persisted for a period of nineteen hours and reached a maximum well above thirty miles per hour. We found this injury only on shrubs located near the strand; those equally exposed to the same wind velocity but at a greater distance from the ocean showed no injury whatever. And the degree of form modification was strictly correlated with the amount of injury found. Relatively low temperatures and cloudy weather prevailed during the time of this wind. Abundant soil moisture was also present, so that the drying effect of the April wind may be ruled out as an important factor.

Injured shoots and slightly protected uninjured ones were washed in distilled water and the water tested for chlorides, using silver nitrate solution. A marked contrast was found in the concentration of chlorides on the surface of exposed shoots *vs.* nearby ones slightly protected.

Immature shoots of a number of woody plants were hand sprayed with sea water and a pattern of injury obtained similar to the injury recently observed on the seaside shrubs.

Plant ecologists have generally attributed the strongly modified form of the seaside woody plants to wind alone. Our observations definitely indicate that the principal factor in producing these "wind forms" is the killing action of sea water carried as fine spray. The young, tender, exposed shoots are so severely injured by the spray that only the protected laterals and leeward terminals develop, resulting in the characteristic, compact, repressed, sloping form.

These peculiarly shaped seaside shrub masses should be called "spray forms" rather than "wind forms."

B. W. WELLS

I. V. SHUNK

NORTH CAROLINA STATE COLLEGE

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

MINUTES OF THE EXECUTIVE COMMITTEE

THE spring meeting of the executive committee of the association was held in the Hotel Commodore in New York City on April 17 and 18. All members of the executive committee were present with the exception of the Pacific Coast representative, who was duly excused. The minutes of the Atlantic City meetings as approved by mail were presented for record.

In response to an inquiry from affiliated state academies it was voted to reaffirm previous action regarding academy research grants to the effect that these are primarily for specific research projects according to the plan approved and transmitted to all academies and not for meeting the costs of printing the publications of any academy.

Itemized statements regarding the finances of the offices of the permanent secretary and the treasurer, in regard to the present status of membership and of means to be taken to extend the membership of the association were laid before the committee and after general discussion approved.

In order to clear up confusion and possible misunderstanding it was voted that section secretaries who prepare the programs and attend the Denver meeting to take charge of the work of the sections are to be reimbursed for travel and expense in accordance with the by-laws.

Correspondence from Mr. Charles S. Baker, legal counsel, was presented. The permanent secretary reported (1) the receipt of an official ruling from the Massachusetts Department of Public Welfare to the effect that under the law the American Association for the Advancement of Science was not required to file returns; and (2) that affidavits by our officers and power of attorney as requested by the legal counsel had been prepared and sent Mr. Baker for use in discussing the taxation of the American Association for the Advancement of Science before the Bureau of Internal Revenue.

Various requests were presented that the travel expenses of certain speakers at the Denver meeting be paid from association funds. The committee expressed its regret that no funds were available to meet these requests.

An extended report was made by the permanent secretary on Occasional Publication No. 4, which is to contain the papers read at the cancer symposium organized by the Section on Medical Sciences for the Atlantic City meeting.

On recommendations of the respective sections fel-