tunities for drawing unsoundly extensive conclusions from non-extensive observations or from sporadic records of observations. For example, even though daily observations in La Jolla Bay for nearly twenty years have failed to reveal so many as ten occurrences of "red water," it is not scientifically safe, or permissible, to conclude that the number of occurrences in the Gulf of Catalina in that time have been restricted to that limit or anywhere near it. Even a question so simple as that of frequency of occurrence of a natural phenomenon like "red water" in a geographic region requires an indefinite number of positive records for a reliable answer.

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PARADICHLORBENZENE AS A CONTROL FOR BLUE MOLD DISEASE OF TOBACCO

BLUE mold (downy mildew) *Peronospora tabacina* Adam., has in recent years become a serious problem for tobacco growers in the United States. In 1935, a gas treatment for this disease was reported.[1] Extensive tests with the benzol-gas method in this country have shown that it is highly effective but probably too cumbersome and expensive to be generally practical under our conditions. Evaporating pans are scattered through the bed to be treated and must be filled nightly. These are inconvenient and likely to be overturned. Seeking a material that would be simpler to use, tests were initiated with paradichlorbenzene. Under greenhouse conditions, paradichlorbenzene vapors gave effective blue mold control and 1 ounce by weight of the crystals was equal in effectiveness to 5 fluid ounces of benzol. Plant bed studies were begun this spring, and experiments have now been completed by J. G. Gaines at the Coastal Plain Experiment Station, Tifton, Georgia, and W. M. Lunn at the Pee Dee Experiment Station, Florence, South Carolina. Paradichlorbenzene was used at the rate of 1 ounce to 4 or 5 square yards of bed area. Adequate control of blue mold was obtained, the results being fully equal to those secured in adjoining plots with standard benzol treatments. In these tests the full amount of paradichlorbenzene required for the area to be treated was weighed out and scattered on boards to evaporate. In one experiment a narrow shelf running inside and near the top of the sidewalls of a bed 9 feet wide gave adequate blue mold protection throughout the bed. Treated beds were enclosed nightly with the usual muslin sheeting to hold in the fumes. Obviously, more extensive tests under a wide variety of conditions must be conducted before final conclusions can be drawn. It does appear, however, that paradichlorbenzene as a substitute for liquid benzol may be a distinct advance toward making the gas treatment for blue mold disease simpler to use and hence more practical.

[1] H. R. Angell, A. V. Hill and J. M. Allen, *Jour. Coun. Sci. and Indust. Research, Aust.*, 8: 203–213, 1935.

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TRANSMISSIBLE LYSINS IN WATER EXTRACTS OF SEEDS

LYSINS transmissible in series are generally recognized to be wide-spread in nature. They are found in decaying organic matter, such as manure, septic tanks, decaying vegetables, infected plants, degenerating nodules of legumes, sewage disposal beds, runoff water in creeks and rivers, and various other sources. So far as we are aware, however, water extracts of viable seeds have never been reported as a source of such substances.

The presence of a lytic factor for *Aplanobacter stewartii* (E. F. Smith) McCulloch was first detected in an investigation of the nature of the resistance of field corn to the bacterial wilt disease. Water extracts of the grain tested against the bacterial wilt organism revealed that there was a close correlation between the resistance of the variety to the wilt and the presence of a lytic factor in the seed. Resistant varieties of field and sweet corn generally contained the lytic factor; whereas susceptible varieties of sweet, flint and pop corn did not.

The investigation was further extended to include seeds of cereals and grasses. Tests were made of the seed of nineteen different species. Two strains of *Apl. stewartii* were used as test organisms, and very strong transmissible lytic factors were found to be present in water extracts of rye, oats, foxtail, winter wheat, redtop and timothy. Weaker lysins with respect to the test organisms were detected in alfalfa, red and alsike clover, but none in soybeans.

In order to determine the probable identity of the lysins in seeds with a bacteriophage isolated from a fire blight canker, the following points of comparison were considered: (1) transmission in series with increase in titer; (2) formation of plaques; (3) loss of pigment of the test organism in the secondary growth following initial lysis and inhibition; (4) thermoinactivation temperature; (5) effect of dilution; (6) effect of certain organic reagents, such as acetone, ether, chloroform and alcohol; (7) adaptation of the seed lysin to organisms upon which at first the lytic factor had little or no effect.

Basing our conclusions upon these seven points of comparison, we can entertain little doubt but that the lysin of seed extracts is the same as the lytic factor found in fire blight canker. The slight variations noted were considered of little importance. The lysin in

some seeds was found to have a higher initial titer against one strain of *Apl. stewartii* than against another. In other cases, the same degree of lysis was demonstrated against both strains. In a few instances the extract contained a lysin effective against one strain only.

The lytic substance from seeds was usually not effective in as high a dilution as the lysin from fire blight canker. The latter had been in association with its test organism much longer than the former.

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GRAZING IN RELATION TO THE CONTROL OF LEAFY SPURGE

EXPERIMENTS conducted the past summer (1937) at this station have demonstrated that sheep will eat leafy spurge (*Euphorbia virgata* Wldst. and Kit.), and keep it under control. Two one acre plots were enclosed with woven wire and on July 2 four ewes and five lambs were confined on each plot. A similar lot of sheep was allowed to run at large in the pasture. The sheep used were of western origin and had been grazing a spurge infested pasture since early spring. The animals were weighed at the beginning of the experiment and at frequent intervals during the summer. Shelter, water and salt were provided. One plot was mowed and raked and the other left unmowed. The plots were in a pasture, the vegetation of which consisted chiefly of a mixture of spurge and bluegrass in a fairly uniform stand. Accurate counts indicated that there were on an average 370 stalks of spurge ranging from 12 to 30 inches tall and mostly in blossom or forming seeds and 298 small clumps of blue grass per square meter.

On August 2 the sheep on the mowed plot were removed because of lack of forage. Weights taken on this lot indicated that the ewes had lost an average of 14.1 pounds (a not unusual loss of weight in ewes with lambs) and the lambs gained an average of 13.0 pounds.

On August 12 the sheep in the unmowed plot were given access to both plots until September 24. On this latter date the ewes had lost an average of 17.5 pounds and the lambs had gained an average of 28.5 pounds.

The sheep given the run of the regular pasture showed a gain of ¼ pound per ewe and 26.25 pounds per lamb on September 24.

The experiment terminated on September 24 and at this time the spurge stalks were almost completely stripped of leaves, flowers and seeds. Practically no new growth of the weed was evident. The blue grass was also eaten off close to the ground.

The results reported above are at variance with these reported by other workers. Bakke,[1] in Iowa, reports little success with this method of control for spurge and states that according to Esser[2] this weed is poisonous to animals. In our trials the sheep ate the weed quite readily and in no case were any harmful effects noted.

Studies will be continued this summer in order to secure data on survival and the effect of grazing on root reserves. Further studies on the carrying capacity of the spurge will also be made.

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SCIENTIFIC BOOKS

ORGANIC CHEMISTRY

Organic Chemistry—An Advanced Treatise. HENRY GILMAN, editor-in-chief, assisted by ROGER ADAMS, HOMER ADKINS, HANS T. CLARKE, CARL S. MARVEL and FRANK C. WHITMORE. 2 volumes, lvi + 1890 pp. John Wiley and Sons, New York, 1938. $15.00. (Sold separately, $7.50 per volume.)

TEXT-BOOKS often fall into a stereotyped pattern which persists for many years until some new author creates a new mold which in its turn becomes a model for later books. The traditional "organic chemistries" have for years been molded along quite similar lines. The present volumes are a sharp break from this tradition, and in that respect alone are almost unique in the text-book field.

These volumes comprise in reality a series of twenty-two short monographs bound together. There is no essential interrelationship between most of the individual chapters. One chapter does not logically lead to another, but each is an entity in itself. This is necessitated by the fact that each chapter is written by a specialist, or by a small group of specialists, competent to speak with authority in that special field.

The work may be divided into three major subdivisions dealing respectively with the theory and nature of reactions in organic chemistry, the relationships between physical properties and the structural constitution of organic molecules, and a series of chapters dealing with some of the more important naturally occurring organic compounds. In the case of this latter group of chapters, the approach is largely from the standpoint of the organic chemistry which is involved so that these chapters tend to sup-

[1] A. L. Bakke, Ia. Ag. Exp. Sta. Res. *Bull.* 222, 1937.
[2] P. Esser, "Braunschweig." 1910.