Tipsy Mimosas, Tamed Crabapples

Biology

Following are further reports on papers in the biological sciences read at the New York meeting of the American Association for the Advancement of Science.

A plant that gets tipsy on fumes of common grain alcohol but which has so remarkable a "head" that wood alcohol fumes have practically no effect on it, was introduced to botanical visitors to the American Association meeting by Dr. Raymond H. Wallace of Columbia University. It is our old friend the sensitive plant, which suddenly folds up its leaves and hangs them down beside its stem when it is touched or shaken. Dr. Wallace has been subjecting large numbers of sensitive plants to various kinds of gases and fumes commonly used as anesthetics on human beings and animals. In the course of his researches he tried grain alcohol fumes. Instead of making the plant duller and less responsive to a touch, as ether does, the alcohol pepped it up and made it livelier than ever. And grain alcohol was the only alcohol that would cause this response. Toward wood alcohol the sensitive plant was not at all sensitive. Moreover, ether was the only animal anesthetic that had any effect on the plant. This gas made it "dopy," so that it could be struck or shaken violently without folding its leaves; or, if it were etherized when "asleep," it would not unfold them again. Chloroform and other anesthetics had no effect on it.

Another queer effect of all the alcohols, including grain, wood, and several of the so-called higher alcohols. was to make the leaves "flop" suddenly without being touched. After a certain period of collapse they would slowly lift themselves again, and once more, without apparent reason, go "flop." Dr. Walllace said that plants have repeated this drunken performance as often as three times during a long exposure to alcohol fumes.

Taming the Wild Crabapple

The taming of the shrewish wild American crabapple, which in the native state has fruits so puckery that none but the hardy palates of small boys can tolerate them, into a whole series of desirable apples for table, cooking and ornamental shrub use, is the horticultural feat which has been accomplished by Dr. N. E. Hansen of South Dakota State College. He made a marriage for this pomological hard-boiled virgin with the more civilized European cultivated apple; but before this was possible he had to untangle the too-complicated European pedigree until it was as simple as that of the native apple—"reducing it to a homozygous condition," in the language of the geneticists.

The offspring of this union have turned out well in several instances. One of the new varieties is an all-red apple. It has red flowers, followed by fruit that is red-skinned and red-fleshed to the core. It makes very good jelly and preserves, Dr. Hansen reported, and scored a great hit when exhibited for the first time last fall. All of the hybrids are very early bearing trees, producing their first crops when only two years old, and bearing fruit on wood of the previous year's growth instead of on two-year-old twigs. The trees can be grown to any desired height—some of the varieties are more like large bushes than trees—which makes for more economical spraying.

The whole foundation of Dr. Hansen's plant-breeding creed is the necessity for getting back to strains of simple "homozygous" pedigree before starting any new crosses. Most of our domestic fruit stocks have been cultivated so long and hybridized so often that their family trees are all mixed up, and no one can predict what a given crossing will produce. This simplification of plant pedigree before beginning to breed has been done on corn with great success, he points out, and the success there obtained can be duplicated with other plants.

Beetle Meets Match in Geranium

"They sells you fixed bay'nits which rots out your guts." So Kipling, in one of his hard-boiled soldier poems, warns the young recruit against the lure of the lighted windows of the dram-seller's huts. The Japanese beetle, dreaded scourge of gardeners in the eastern states, finds a similar lure and a like destruction in the common geranium, favorite houseplant of gentle old ladies.

This paradox of entomology was discovered by Charles H. Ballou of the U. S. Department of Agriculture. This alien insect, whose jaws can chew up anything that grows out of the ground and whose digestive tract has hitherto proved equal to the task of converting any kind of vegetable, fruit or weed into more beetle, meets its Waterloo when it eats the leaves or flowers of ordinary geraniums. And it has a perverse fondness for geraniums, too, for it is known to fly for several hundred yards to find baits which have been scented with geraniol, the basis of geranium odor.

After a meal of geranium leaves or petals, the beetles become paralyzed. The paralysis begins with the hind legs and progresses forward. About 35 per cent. of all paralyzed insects die within 24 hours. Those that recover do so within four days. A dissection of killed bettles shows that the geranium poison destroys a part of the digestive tract within 24 hours, and all soft contents of the body cavity are disintegrated within 48 hours.

Mr. Ballou stated that the flowers appear to be both more attractive and more poisonous to the beetles than the leaves, and that this effect is heightened when the feeding takes place on plants exposed to sunlight.

Trout Efficient Food Makers

"Measurements of the food requirements in calories to produce a given increase in body weight show that the trout is as efficient a converter of energy as the best of the higher vertebrates."

In this compact declaration, three students of the ways of the favorite of fishermen set up the claim of the trout to consideration as an economic converter of raw material into good meat, on a par with cattle, sheep and pigs. The men are C. M. McCay, W. E. Dilley and M. F. Crowell, of Cornell University and the Connecticut State Hatchery.

They have been feeding things to trout that no trout ever ate in nature, and the trout have been thriving on them. Dried skim milk, which is not exactly the most marketable stuff in the world, goes very well with the young fish, if supplemented with a little raw liver. They will live on the milk alone for several months, but finally die, apparently for lack of a vitamin which is supplied in the liver. But on the mixed milk-and-liver diet they thrive better than they do on liver alone. Trout are able to make use of grain as food also, the experimenters stated.

A double-walled flower-pot automatically irrigating the plant growing in the inner pot with (*Turn to next page*)

Biology at A. A. A. S. Meeting—*Continued*

water contained in the space between the two walls, was the device described by Dr. J. Dean Wilson of the Ohio Agricultural Experiment Station, Wooster, Ohio. The inner pot is made of porus material, somewhat like the conventional flower-pot of commerce. The outer one is waterproof, and the two are united at the top by means of a flanged rim. An extended series of tests has demonstrated the practicability of his device, Dr. Wilson stated.

Bees' Breath Measured

The breath of a bee may seem a queer thing for serious scientific investigation, but it has practical significance at two seasons of the year. In winter it may be an index to the health of the sleeping hive, and in summer, when flower nectar is being condensed into honey, it may be worth knowing as a check on this living sweet-factory. For these reasons, as well as just for the satisfaction of finding out something new, Prof. G. H. Vansell of the University of California has been looking into the subject.

Prof. Vansell has not yet attempted to analyze the respiratory activities of a single bee, but he has for many months kept track of the carbon dioxide and water vapor given off in the communal breath of an entire hive, under both winter and summer conditions. He led the air coming from the hive through a tube into bulbs filled with absorbent chemicals. By weighing these, after allowing for the natural carbon dioxide and water content of the outside air, he has been able to get an hourly analysis of the breath of the hive.

In winter, when the colony was reduced in numbers and the bees quiescent, the average hourly water loss from the hive was 36 millionths of an ounce. In summer, when the colony was larger, and the workers were actively at work condensing nectar into honey, the quantity of water given off was nearly 25 times as great. The carbon dioxide outgo from the hive did not show nearly so great a difference. The average hourly rate in winter was 620 millionths of an ounce, and this rate was not even doubled when summer came.

One anomaly was noted by Prof. Vansell. At times the wintering cluster of bees gave off respiratory air that contained less water than the outside atmosphere. This would appear to indicate that either the bees or their stores of food were at such times absorbing water from the air.

A 22-Generation Memory

That "the Elephant never forgets" is a favorite tradition of the circus lot and the zoo. But the big pachyderm's record has been badly scotched by a lowly animal that lives in the water, whose great-grandchildren of the twenty-second generation remember a complex instinct possessed by their ancestor but which their more immediate forebears have never had an opportunity of exercising.

Before the meeting of the American Society of Zoologists Prof. W. A. Kepner presented the results of experiments which he and J. W. Nuttycombe, now of the University of Tennessee, performed on a tiny, almost microscopic, animal known as *Microstomum*. This creature is one of the many in the lower realms of nature that is armed with stinging cells in its body wall, partly for protection against its enemies and partly to assist in the capture of its prey. In the fierce economy of the lesser world of the waters, this animal feeds on a similar but smaller form, the hydra, which is also armed with stinging cells. It apparently does not like hydra very much, for it will not eat it except when its supply of stinging-cells is low. Then it swallows hydra readily enough, and appropriates the ready-made cells.

The two experimenters grew a strain of *Microstomum* for 22 generations, without ever giving them an opportunity to meet and feed on hydras. Yet at the end of that time the animals went through the same performance their ancestors had been used to: swallowed the hydra, turned over the stinging cells to certain wandering cells of their own bodies, and eventually set them in order among their own stinging cells. In another case, a sixteenth-generation *Microstomum* had its upper and lower ends cut off. The middle third of the body regenerated new ends, and the "revised" animal went through the long-disused performance as though it had been used to it all its life.

Whoever likes pineapple can blame an almost invisible little worm for part of the scarcity of his favorite tropical fruit. A nematode worm, belonging to the same general group that raised so much trouble with imported flower bulbs in this country a few years ago, gets into the roots of the pineapple plants and chokes them, according to Dr. G. H. Godfrey, Hawaiian researcher. The nematodes multiply and migrate just under the skin of the root until it is entirely killed and the feeding surface of the plant thereby greatly reduced. The problem of dealing with the pest is made more difficult by the fact that the same worm feeds on tomatoes, soybeans, cowpeas and many weeds, so that even if the pineapple fields in a given region were cleared the worms would not die of starvation but would merely live over until the next pineapple crop appeared.

Benzoate Depends On Acidity

Benzoate of soda, widely used as a food preservative and often the subject of bitter controversy, depends for its effectiveness on the acidity or alkalinity of the foodstuff to which it is added to prevent spoilage. Prof. W. V. Cruess of the Univversity of California reported a series of experiments he made, showing that the conventional one-tenth of one per cent. is not always sufficient, and that sometimes it is more than enough.

In media that were somewhat acid, represented on the chemist's scale as "pH 2 to 3.5," less than six hundredths of one per cent. of sodium benzoate sufficed to prevent the growth of moulds, yeasts, and acid-tolerant bacteria. Around the neutral point, however, as well as over into the slightly alkaline side of the balance, concentrations in excess of one and one-half per cent. were necessary to inhibit growth.

Science News-Letter, January 19, 1929