

of binomial nomenclature, and we are apparently as far from the end of it as we are from its beginning. The fifth cause of confusion is due to misidentification of old genera and misinterpretation of previous descriptions. Changes in specific names are caused by all these mistakes except the third.

No one seems to have a very clear conception of the enormous number of species of animals living in the world today. An actual count of the number of genera and species of Homoptera in the card catalogue of this order of insects in my laboratory shows that there are approximately 3,100 genera and 30,000 species recorded. Perhaps from these counts of the number of species of Homoptera we may be able to get a real estimate of the number of species of animals that have been described. From various counts and estimates, I believe that the Homoptera represent from 1/100 to 1/150 of the Animal Kingdom. This would give us an estimated total of 2,500,000 species of animals, already described, of which 1,500,000 are insects.

There is, of course, no such thing as stable nomenclature—certainly not until the last organism is fully described, illustrated, and catalogued. The discovery of any new species or new genus is apt to upset all our present notions about phylogeny or evolutionary principles. How poor our present knowledge is of even fairly well-known groups needs no demonstration. Certainly stable nomenclature is a will-o'-the-wisp, no more to be desired than a stable chemistry or physics, embryology or morphology. Anyone who thinks that we must still continue in nomenclature on the basis of the names that he learned 40 years ago is thoroughly unscientific.

My earnest plea is for support for taxonomy from all biologists—not alone for financial support but also for a sympathetic understanding of its problems, limitations, and mistakes, and above all for a realization that all taxonomists are making a sincere effort to advance their branch of biology for the assistance of all biologists.

A colleague recently called my attention to this advice by Mephisto to the Student:

Gebraucht der Zeit, sie geht so schnell von hinnen,
Doch Ordnung lehrt Euch Zeit gewinnen.

Freely translated so that he who runs may read:

Time flies so swiftly bye, use it,
Only systematics can teach you, do not abuse it.

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Dormant and Adventitious Buds

An attempt is made here to distinguish more precisely between dormant and adventitious buds. It is probable, however, that an accurate nomenclature on the entire subject of buds will be possible only in the distant future.

Stone and Stone (*Science*, 1943, 98, 62) state: "It would be profitable to restrict the use of the term *dormant* or *latent* to buds formed in the axils of leaves (including scales) on the young annual shoots" and adventitious buds to those that "arise outside the normal phyllotaxy." They mention, however, that "adventitious buds, once formed, may also remain dormant."

I propose to classify buds as trace and adventitious buds. The concept of the dormant bud as a structure with a trace to the pith, and the capacity to remain dormant, is not valid, because buds in roots become dormant.

The trace bud has a trace to the pith and develops in the elongating region of the shoot. Primary trace buds develop in the axils of leaves. Secondary trace buds arise in axils of scales of other trace buds. A primary trace bud can become the ancestor of many secondary trace buds, with its trace branching and extending to them.

An adventitious bud lacks a trace to the pith and can appear wherever elongation has ceased. Adventitious buds can be found in roots, shoots, leaves, hypocotyls, epicotyls, and callus. They also develop in axils of scales of other adventitious buds and are connected by branching bud traces. Adventitious buds can be mistaken for trace buds when the traces begin near the pith.

Any bud can develop into a shoot, either immediately or after a quiescent period. With the terms dormant and quiescent having the same meaning, quiescent adventitious buds are dormant buds, and the distinctions between them disappear. There are merely trace and adventitious buds.

These distinctions, now made, are hereby projected into tree culture. Root suckers come only from adventitious buds. Sprouts arise from both trace and adventitious buds. Coppice consists of trees whose boles come from trace and adventitious buds and arise as sprouts and root suckers. It is not to be expected that all shoots from a stump develop from buds of the same kind and that their traces begin in tissues of the same age. If all buds on a stump are trace buds, no shoots arise below the root collar.

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Aseptic Cultivation of Excised Plant Embryos

The cultivation *in vitro* of excised embryos of seed plants presents certain practical difficulties, some of which have been only partially overcome. One of these difficulties has to do with the growing of embryos in solid medium in such a way as to prevent contamination, at the same time reducing to a minimum the rate of drying of the medium and the number of transfers required to maintain the cultures in a healthy condition.

We are using an extremely simple device to accomplish these ends. When embryos of *Oenothera* are large enough to be transferred from liquid to solid medium, they are placed in shell vials (70 × 21 mm.) containing a suitable amount of medium, and another sterilized shell vial (60 × 25 mm.) is inverted over the first vial, thus serving as a lid. No cotton plug or other material is used. Sufficient gas exchange to maintain health is permitted between container and lid, since the edges and bottoms of the vials are not absolutely flat. The container and its lid fit tightly enough together, however, to reduce evaporation to a minimum, thus allowing transfers to be maintained for long periods. In no case have we transferred oftener than once a month, and in some cases the interval has been as long as three months. Cul-