on mixing, although branch lines of the two clones conjugated readily when grown in another medium.

Fertilizer medium (1) is inexpensively and easily prepared, (2) will support the growth of a variety of fresh-water algae, (3) produces large quantities of organisms in a short period of time, and (4) yields cultures relatively free of bacterial growth.

The author is indebted to the Smith-Douglass Company, Inc., Norfolk, Virginia, for the various fertilizers used in his experiments.

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Misuse of the Linnaean System of Nomenclature

In a recent paper by E. E. Dickerman on "The morphology and life cycle of *Proterometra sagittaria* n.sp., (*Trans. Amer. Soc.*, 1946, **65**, 37), the larval form of a trematode is described and assigned a binary name of the Linnaean system (*Cercaria sagittaria* Dickerman), while the adult is described and given another Linnaean name (*Proterometra sagittaria* Dickerman). I must apologize to Dr. Dickerman for thus singling him out among others, but I have risked offense to this author in order to cite a recent and specific example of a practice in systematics that is so obviously in error that it cannot rate the approval of anyone interested in correct procedures in taxonomy. That is, two binomials of the Linnaean system (which go so far as to indicate that the larva and adult belong to different genera) are applied to the same animal, which is certainly contrary to approved taxonomic rules and practices.

Historically, of course, the practice stems from the fact that relationships between certain larval forms and the corresponding adult stages were not even suspected, the larvae and the adults being regarded as totally unrelated animals. In the present instance, however, this extenuating circumstance does not prevail. Furthermore, since there is no justification for applying different binary names of the Linnaean system to age classes of the same species (E. T. Schenk and J. H. McMasters, *Procedure in taxonomy.* Stanford Univ. Press, 1935. Art. 26, p. 33), and since the rule of priority is one of the cornerstones of the Linnaean system, it follows that the name first used in designating a species is the correct one to apply to all its developmental stages. Therefore, the correct name of the trematode described by Dickerman must be *Cercaria sagittaria* Dickerman, and not *Proterometra sagittaria* Dickerman, since the former name appears on page 37 of his paper, while that of the latter is on page 39. This is clearly not Dickerman's intention, since he uses *Proterometra sagittaria* in the title of his publication.

The absurdity of giving different Linnaean binary names to developmental stages of the same animal becomes increasingly apparent if extension of the practice to all animals be assumed. Thus, the tadpoles of frogs and toads, different in morphology and in habitat from the adults, might well be given Linnaean names distinct from those designating the adult stage of development. Even the early fetal stages of man, bearing little resemblance to the adult, and certainly in a habitat foreign to fully developed man, might no longer be classed within the genus *Homo*. Such examples could be multiplied indefinitely; in fact, no animal species would be exempt from a *series* of Linnaean binomials applied to various developmental stages, if this practice be extended to its logical conclusion.

The comments of G. G. Simpson (*Bull. Amer. Mus. nat. Hist.*, 1945, **85**, 24) on the use of the Linnaean system are appropriate to the present discussion, for he says that "nomenclature is the grammar and vocabulary of zoology. Neither nomenclature nor grammar is an end in itself, but they are not less important on that account. The comparison can be extended to point out that literate men do not make mistakes in grammar and literate zoologists do not make mistakes in nomenclature. . . ."

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Synthetic Hydrophilic Colloids as Soil Amendments

In Technical Bulletin 189 of Michigan State College, attention is directed to the reduced rate of loss of water by surface evaporation and by transpiration, from greenhouse soils, when such soils are fortified with a suspension of a proprietary methyl cellulose. The results reported were striking. If applicable to Hawaiian soils, in the field, considerable economy in sugar-cane irrigation might be possible.

The important water economies mentioned in this report have not appeared with local soils. When local soils and local soils treated with a suspension of the colloid (the methyl cellulose used was secured from the Dow Chemical Company and is sold under the trade name of "Methocel") are exposed to evaporation, the natural soils lose water at a slightly faster rate, it is true. But the difference is only slightly greater than is required for statistical significance. There seems to be no point in attempting to overcome the great difficulties involved in using this material under field conditions with soils similar to those common in Hawaii.

The results reported in the bulletin cited are more nearly approached when silica sand (testing grade) is used in place of local soil. It would appear that the observed effects were due to a modification of surface and structural characteristics of the soil material and not to the hydrophilic character of the added colloid *per se.*

No significant difference in the rate of evaporation from pure water and from 1-per cent suspensions of methyl cellulose with viscosities of the 25, 400, and 4,000 centipoise grades was noted, when exposed to a constant environment, until the colloid had dried to a horn-like film.

The moisture equivalents of soils and of sands increased progressively with additions of the colloidal suspension. But unit mass of the colloid was much more effective in increasing the water-holding capacities for the sands than the soils.

The permanent wilting percentage of a specific, local natural soil was 23.8 ± 0.04 per cent. When treated with a 1-per cent suspension of the colloid, the permanent wilting percentage was 23.6 ± 0.04 per cent. Although this difference may be significant, it is so small that it must be ignored if observations on field soils are contemplated.

In spite of its important technical properties, methyl cellulose seems to be of limited use in modifying the water relationships for soils similar to those in Hawaii. For pot tests of soils rich in silica sand or "greenhouse" soils the material may be of considerable value. The fact remains, however, that the high viscosity of dilute suspensions precludes its use in an extensive agriculture, as is suggested in the reference cited.

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Penicillin Action on the Germination of Seeds

In a previous work we have demonstrated that sulfanilamide inhibits the germination of seeds (*J. biol. Chem.*, 1944, 152, 3, 665–667) and that this drug acts on seeds in the same way as on some germs. It would be reasonable to expect penicillin to act similarly. In order to make evident this possibility, we proceeded as is shown in the following table:

Influence of Penicillin on the Germination of Seeds

No.	Penicillin (Oxford Units) per cc.	Germination of seeds	
		24 hours	48 hours
1	1,000	–	–
2	500	–	–
3	100	–	–
4	50	–	–
5	10	–	–
6	5	–	++
7	1	+	+++
8	0.5	++	++++
9	0.1	+++	++++
10	..	++++	++++

Penicillin was diluted to a total volume of 10 cc., and each dilution was placed in small glasses (diameter, 4.5 cm.). In each glass 50 French lettuce seeds (*Lactuca sativa* L. var. *capitata* Roz.) were placed, and the whole was kept at room temperature. The germination of these seeds in water is very rapid, and it is possible to read it after 18 hours from the beginning of the experiment. This observation is made with the eye brought to a level with the surface of the liquid, since the lengthened seeds float and, when they germinate, the radicles grow downward.

Readings taken 24 hours later show a visible difference between the testimony and the sample having received but 0.1 Oxford Unit, thus proving seed sensibility toward penicillin during the germination. After 48 hours seeds ungerminated until then begin to germinate. This may be explained by the fact that penicillin is progressively destroyed at room temperature.

In order to demonstrate that pencillin acts as a phytostatic, as a bacteriostatic does in the case of bacteria, we substituted the solution of penicillin for water after 48 hours in Experiments 1–5, and normal growth of seeds was then observed.

Adding penicillin to seeds not under the effect of the drug and which had begun to germinate was without effect unless a great quantity of penicillin was added (more than 1,000 Oxford Units/cc.).

We have tried to employ a test based on the above experiments to the quantitative determination of penicillin, but so far we have had no encouraging results except for approximative estimation.

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A Substitute for Microfilm Readers

Many laboratories do not yet have convenient access to microfilm readers. Such literature, however, can be viewed by use of a binocular dissecting scope, using a 10 x ocular and a 0.7 x objective. This serves especially well for short references after the whole article has been studied once with a full-sized reader in the college library. Prolonged periods of reading using the binocular would probably prove as difficult as with some of the small-sized monocular viewers now on sale.

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An Improved Slide Rule for the Addition of Squares

The writer once constructed a pair of scales similar to the C scale of the slide rule described by Dr. Morrell (*Science*, 1946, 103, 113) and has often used them in a course on the art of computing, as an aid in teaching the concept of a functional scale, preparatory to the treatment of the logarithmic slide rule and of nomography in general. On reading Dr. Morrell's note it was consequently evident that the number of operations necessary to solve the given equation, $d = (x^2 + y^2 + z^2)^{\frac{1}{2}}$, can be markedly reduced by using such a pair of scales.

In the procedure indicated by Dr. Morrell (p. 114), only the B scale and the cursor are actually used; the A scale is referred to descriptively, and the others not at all. The operations involve three settings of the cursor, two settings and a third motion of the slider, and the final reading. If we have a pair of scales, the zero of the slider can be first set at the value of x on the fixed scale and the cursor at y on the slider, which will be at $(x^2 + y^2)^{\frac{1}{2}}$ of the fixed scale. Then, bringing the zero of the slider to the hair line of the cursor, we have the value of d on the fixed scale opposite that of z on the slider. This involves two settings of the slider and a final reading, as before, but the third motion of the slider is eliminated and there is but a single setting of the cursor, unless a second setting be used as an aid to interpolation of the final reading.

As Dr. Morrell's A and D scales are identical except for the decimal point, both are not really necessary, and one of them could be replaced by a fixed duplicate of one of his movable scales. Were the writer to need an instrument for the problem described, the disposition would probably be: A and B like Dr. Morrell's C; C and D like his B; and a fifth scale, of equal parts, replacing his A and D, on the slider between B and C.

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