its application call for totally different disciplines of mind is responsible for much of the scientist's resentment in such instances. He has a sense of property in his creative mental work, but the law has not yet found a way to recognize this. If it does, then I venture to suggest that scientists will be bigger and better men and that the time lag in the application of science to industry, agriculture, and professional practices will diminish.

D. R. Rexworthy

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April 20, 1954.

D. R. Rexworthy's letter suggests an increasing social responsibility of the "ivory tower" scientist. I obliquely refer to this in a discussion of the scientific administrator on page 766 in the article of reference and directly in the previous article on the ONR Physics Branch Program [*Science* **118**, 227 (1953)].

UNESCO is at present considering the legal aspects of the problem [*UNESCO Copyright Bull.* **6**, No. 2 (1953)], and the American position seems to follow the older policy adopted in response to League of Nations inquiries in 1928. Rexworthy apparently approves of the UNESCO action to consider protection of "scientific property." I do not state my position since it would be only a value judgment.

All the arguments, pro and con, concerning invention and the patent system could quite nicely be applied to the analogous problem of discovery and legal protection of scientific "property." This is as far as I am willing to go, as I indicated in the concluding paragraph of the paper on scientific property.

Lawson M. McKenzie

Washington 25, D.C.

April 26, 1954.

Need for a Standardized International Glossary of Terms in Botany

The formulation of the international rules of botanical nomenclature has been a landmark in the development of systematic botany and has cleared a lot of confusion from that field. There is, however, an equally great need of unanimity and exactitude in the definitions of descriptive terms in systematics and other branches of the subject. After all, what subject can claim to be a science without even having a precise terminology?

At present, various authors define a particular term in widely divergent ways and sometimes even give almost contrary definitions. The confusion prevailing in the terminology of inflorescences and placentations has already been discussed in detail by Rickett (*1*) and Puri (*2*), respectively. Rickett (*3*) has recently drawn attention, in what appears to be the first of a series of detailed articles on the topic, to the existence of a similar situation with regard to many other descriptive technical terms. But such confusions are not limited to these topics alone. Examples can be quoted from various fields and in any number. A few glaring random samples are cited in the following paragraphs.

The term *spike* is used for the strobilus of *Selaginella,* the fertile segment in *Ophioglossum* and other Ophioglossaceae and also for inflorescences of angiosperms. The misuse of the term *panicle* is too well known to be discussed here.

The term *bract* refers to such diverse objects as the sterile lobe of a sporophyll in Sphenophyllales, the sterile structures forming a whorl between the sporophylls in Equisetales, the scale subtending the so-called "ovuliferous scale" in the conifers [Florin (*4*) suggests an altogether different terminology for these structures], the leaves surrounding the fertile structures in the strobili of the Bennettitales, the leaflike structures around the perianth in *Nigella* [which are referred to as an "involucre of 5 leaves" by Willis (*5,* p. 450) and an "involucre of bracts" by Rendle (*6,* p. 141)]. Johnson (*7,* p. 705) defines a bract as a "much reduced leaf, as in an inflorescence or rhizome," while Willis (*5,* p. 92) regards it as "the leaf in whose axil a flower arises."

The term *flower* itself is much abused, being restricted by some to the fructifications of angiosperms and widely applied by others to those of the gymnosperms, for example, to Bennettitales, Cordaitales, Coniferales, Gnetales, and even to the strobili of pteridophytes like *Selaginella* (*8*).

The same type or even the same sepaloid, petaloid, differentiated or undifferentiated structures are called, at different places, *perianth, sepals,* or *petals* by the same or different authors. Most authors restrict the term *syngenesious* to such anthers as those of the Compositae and call the anthers of *Solanum connivant* (*7,* p. 531; *9,* p. 694) or *connate*; others call even those of *Solanum syngenesious* (*10,* p. 360). Similarly the staminal tube in some Malvaceae, for instance, *Hibiscus,* is refererd to as *adnate* or *joined* or *attached* to the petals (*9,* p. 592; *5,* p. 406; *6,* p. 249), although Rendle (*6*) at the same time records that the staminal tube is "considered to have arisen by the multiplication of five epipetalous members." Identical types of perigynous flowers are designated as having *half-inferior, sub-inferior* (*9,* p. 79) or *intermediate* (*5,* p. 477) ovaries by some, while others call such ovaries *superior* (7, pp. 63, 296; *11,* p. 179; *10,* p. 249).

There is also no uniformity in the use of symbols in floral formulas. Most authors denote perianth, calyx, corolla, androeceum, and gynoeceum by the letters P, K, C, A, and G, respectively. But Swingle (*12*) and Pool (*13*) use the symbols Ca, Co, S, and P for calyx, corolla, androeceum, and gynoeceum, respectively. These latter authors also use a different method of denoting the number of these parts, their cohesion or adnation, or their superior or inferior character in relation to the ovary, and so on. Many authors indicate by a plus (+) sign at one time an additional whorl, and at other times bundles in the same whorl.

The need for the precise definition of some other technical terms that denote the amount of quality of structures and the delimitation of the boundaries covered by each such term is equally great. Thus the terms *gamo-* or *poly- sepalous* or *petalous* are used to convey different amounts of fusion and freedom of sepals and petals; and *granular, punctate, tuberculate, verrucose, papillate, mammillate, muricate, echinate, spinose, hispid, hirsute, pilose, tomentose,* and so on, are used to denote different degrees of granulation, sculpturing, or hairiness by different authors. Accordingly, the reader is often uable to grasp the exact meaning of these terms, and there is a lot of scope for personal judgments and errors.

It cannot be denied that a certain amount of plasticity in the usage and meaning of technical terms is often necessary in a descriptive science; but at the same time it is equally important to know precisely what amount of variation each one of our terms covers. However, many of the present divergences in our terminology are unintentional, or are based on differing old views that are no longer valid, or are due to the lack of an authoritative glossary. This naturally leads to confusion and very often lands both students and teachers in difficulty.

It seems that anomalies such as the ones enumerated here have been encountered by many other botanists and have led to the formation of a section of terminology in the forthcoming International Botanical Congress. A committee should be formed for drafting an international glossary at this Paris congress; it should go through the whole problem and also frame rules for the formulation of new terms. A list of synonyms could also be drawn by this committee. It may be mentioned that wood anatomists long ago took the lead and compiled international glossaries of their technical terms (14).

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April 29, 1954.

Stable Colloidal Sulfur Solutions

In the course of an investigation on the microdetermination of mercaptans by their reduction of colloidal sulfur to hydrogen sulfide (*1*), the need arose for the preparation of a more stable and concentrated solution than is afforded by pouring a hot, saturated alcoholic solution of sulfur into water. It was found that any of the "Carbowaxes" (*2*), as well as propylene glycol, dissolve sulfur quite readily and produce stable colloidal solutions when poured into water. For example, a solution of sulfur may be prepared by dissolving 1.5 g of sulfur in 40 ml of Carbowax 200 at 110°C and adding it to 60 ml of cold water.

The colloidal solutions so prepared are free of electrolytes and hydrogen sulfide. The use of these solutions in determining microgram quantities of ethyl thioglycollate is being reported elsewhere (*3*).

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References and Notes

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May 13, 1954.

Transplantability of Tumors

It has been reported by R. H. Foulkes [*Science* **119**, 124 (Jan. 22, 1954)] that benign tumors are incapable of further growth by transplantation. In an article on "The study of benign neoplasms of the rat's breast" [*Am. J. Cancer* **22**, 497 (1934)], I reported that six rats with spontaneous benign tumors yielded transplantable tumors from 4 to 53 generations. These tumors were under observation for some 15 yr at the Institute for Cancer Research, Columbia University. The variable morphology in different sex and age groups was described. The influence of hormones as growth stimulators or inhibitors was studied.

Other reports of experiments and results were as follows: *Am. J. Cancer* **27**, 450 (1936), **33**, 423 (1938), **39**, 172 (1940), **40**, 343 (1940); *Cancer Research* **2**, 25 (1942), **3**, 65 (1943); *Cancer* **2**, 329 (1949). The literature contains many other references on transplantability of benign mammary rat tumors: Willis, *Pathology of Tumors* (1948); Oberling *et al., Pathology; Year Book of Pathology and Immunology* (1941), and so on.

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March 5, 1954.

My overlooking the early and thorough study of Heiman was indeed a regrettable error. Malignancy and transplantability of tumors are still considered by many as almost synonymous. Publication of my brief note as confirmatory of the studies of Heiman and