has turned to a full-sized swarm. Not only are there subscript numerals to the extent of six or more, but there are filtrate factors, X factors and even cousins of the B swarm that fly around in the world of bacteriology under such names as "Y."

Not alone can B claim the honor for hatching a full-sized swarm, but D is a close rival. The last news indicated that there were about eight D's, and finally, lest we forget, such infants as H and K. When last heard from there were three H's christened by three fond parents. Each of these discoverers seemed quite innocent of the labors of his fellow workers because so far as any one knows these H factors have nothing in common except a name. And in the spirit of true nationalism and in total innocence of the H brood one of the new German books upon vitamins has devoted a whole section to H, including its use in therapy, chemistry and physiology.

Thus far a considerable fraction of nutrition students have not shied at the specter of the vitamin alphabet, because they have worn blinkers to avoid seeing many vitamins beyond the popular ones and those in their own "frog pond." If you inquire about the vitamin requirements of bacteria in the ordinary nutrition laboratory you will probably get a questioning look because Knight's extensive bulletin on "Bacterial Nutrition" remains unknown. If you ask about the nutrition of planaria or insects you will probably be told that it is rather indecent for the nutrition specialist to consider the vitamin needs of such species. Thus far the rat remains the respectable species in the nutrition world, although the lowly chicken is starting to share this popularity. The pigeon, the dog, the guinea pig and the cow are worthy of a little consideration, while a nutrition worker would have to stoop pretty low if he touched a flea or an earthworm. Even an amateurish science built upon the rat and the chicken is going to become too complex before many more years if the nutritionist persists in retaining his vitamin alphabet. But when the nutrition student finally awakens to the need of including all life, both in the plant and animal world, in his science, even he will realize the present method of lettering vitamins must be dropped.

Therefore in the interests of building a broader science of nutrition, is it not better to abandon or at least to change the alphabet to a minor position? As a substitute I suggest a system of numbers to be issued by some such central agency as the League of Nations. When a new vitamin is to be postulated, the discoverer will need only to address a postcard to the central agency. Thus if a specific growth factor is discovered for moose by some nutrition student working in northern Ontario, he will only need address a request to the central agency. By return mail he will be assigned some number such as 1,572 and this will be recorded thenceforth. As specific properties of this number are developed, they also can be recorded and finally the chemical formula can follow the number. This will make it possible for the student of invertebrates to compare his findings with those of the bacteriologist and these in turn correlated with findings upon higher species. Thus a broader science of nutrition becomes possible with the removal of much of the present confusion.

Furthermore, a system of numbers partly solves the problem of the "lost vitamins." In the vast forest of modern literature are some vitamins wandering around under such titles as "Evidence that a third factor exists" or "Some evidence of the existence of a further factor necessary for growth of the rat." Usually the evidence for the existence of such vitamins is just as concrete as it is for "vitamin Q," but such discoveries are in danger of blooming unseen under the underbrush, while the perpetrator of "vitamin Q" finds his discovery listed in the indices of the abstract journals and discussed in the reviews.

Finally, it must always be recognized that the biologist working with animals is the one who will discover the new vitamins and establish techniques for their assay. This work must precede the isolation by the organic chemist. This order of work is inherent and means that there will be a growing accumulation of vitamins awaiting the attention of the chemist as the years pass and the biologist includes more species in his nutrition studies. After the chemist has done his work the biologist must inevitably return to the problems of comparative nutrition and the elimination of numbers that represent the same factor.

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LEGUMINAL AND AGROSTAL

WILL "leguminal" and "agrostal" serve for much needed words? Similar to the old Roman phrase, "horribili victu mirabili dictu," the polyglot language we speak is more or less a miraculous lingo in its misappropriation of terminology. When that great family Leguminosae, with its 600 genera and 1,200 species, steps out from behind the systematic botanists' corral and long before they reach the farm the common name is shortened to "legumes." The small cereals and the great are all grasses, and yet there remain those of the meadow, pasture, range, and those living by their autonomous efforts which are not cereals.

Major plant divisions all end in "phyta," ecological classes in "phytes" and the plant families with the suffix "aceae." We recognize cereal for grain grasses and ruderal for certain weed populations; would two additional words ending in "al" be permissible? The adoption of a new slang expression is accomplished

easily, but a change in everyday use of terms describing things vital to man's welfare may be far more difficult.

"The tree is known by its fruit" forms, Biblically, the chapter slogan in a well-known book on symbiosis by Fred, Baldwin and McCoy in which they expend considerable effort to justify the use of the term "leguminous plant." Other exact writers have done similarly, until it appears generally as the common usage only by meticulous portrayers of the Leguminosae.

The terms "tree plant," "bacteria plant" and "legume plant" are not used extensively. Since "legume" is derived from the Latin "legumen" and is the correct name for the fruit or carpel only, *leguminal* is not a far call nor a supernatural one. Already we have "legumin," a vegetable casein, and "leguminous," referring to plants which produce legumes. The new word is no longer nor is it more difficult to pronounce. These many, very valuable plants which have become so well known and called by the same name which by all rights of priority and correct usage belongs to their fruit only certainly deserve greater respect and a more suitable name.

The two new words would complete a set of four very usable terms in forage or "herbage" (British) activity—leguminal, agrostal, cereal, ruderal. We would then propose definitions as follows: Plants producing legumes; grasses other than cereals; grain producing grasses; range and meadow weeds. Leguminosae and Gramineae are the two greatest plant families both in numbers as well as in value to man. Does it not appear a linguistic weakness to confuse important and valuable plant material of such immense proportion further—need the issue be beclouded longer?

Graminal includes all grasses, as does Poaceae, but "agrostal" has not yet been assigned. An agrostologist is a grass specialist; then special grasses, other than cereals, might be *agrostal* in character. "Herbal" is an anciently used qualifying word relating to all plants, just as "herbage" is the name for forage of varying classification botanically.

W. B. GERNERT

OKLAHOMA EXPERIMENT STATION

REID ON CELTIS

IN a short paper[1] describing the endocarps of a new species of Celtis from the Eocene of Réals in Hérault, France, the author states: "These endocarps mark the first known appearance of Celtis in Europe. It has been recorded from the Fort-Union (Eocene) Beds of America."

[1] E. M. Reid, *Bull. Soc. Et. Sci. Nat. Béziers,* 40: 1–8, 1936.

Fossil leaves attributed to Celtis, of which more than a dozen species have been described from many horizons in the European Tertiary, have long been known, some as early as 1850. If one chooses to ignore leaf records there are still several recorded occurrences of fruits. I have two specimens of endocarps labeled as having come from the middle Eocene at Pierrerne, Hérault, which are not dissimilar from the new species described by Reid and also much like *Celtis hyperionis* Unger described from the Miocene of Steinheim. Fruits have also been recorded from several Pleistocene localities in Europe.

If we return to America and ignore the leaf records of Celtis which range in age from the late Cretaceous to the Pleistocene, there are about ten different species based upon endocarps and found at Eocene, Oligocene, Miocene, Pliocene and Pleistocene horizons. Eastern Asia has furnished both leaves and fruits of Tertiary species of Celtis. In 1924 I described a characteristic endocarp from the middle Eocene of Colombia, South America, and leaves are common in the mid-Tertiary of Patagonia.

Mrs. Reid certainly stands out as one of the world leaders in her knowledge of carpological fossil material, and it is a great pity that she does not think it worth while to acquire some slight acquaintance with the literature of paleobotany.

EDWARD W. BERRY

THE USE OF YEAST OR OTHER FUNGI FOR VITAMIN B_1 TESTS

THE suggestion originally made by the writer[1] in 1919, and almost simultaneously by Bachmann,[2] that a fungus organism (yeast) could be used in testing for "vitamin B" has been revived in recent years by suggested quantitative tests for vitamin B_1, using yeast[3] and Phycomyces.[4]

It was shown in the writer's laboratory in 1930[5] that the crystalline vitamin B_1 of Jansen and Donath had a tremendous influence on the growth of certain yeasts, and hundreds of unpublished and published[6] experiments in our laboratory have since confirmed this observation. However, at that time (1930), it was also shown that *another fraction not possessing high vitamin B_1 activity was twice as potent as the purified vitamin* so far as yeast growth stimulation was concerned. In

[1] R. J. Williams, *Jour. Biol. Chem.,* 38: 465, 1919.
[2] F. M. Bachmann, *Jour. Biol. Chem.,* 39: 235, 1919.
[3] A. Schultz, L. Atkin and C. N. Frey, *Jour. Amer. Chem. Soc.,* 59: 948, 1937.
[4] W. H. Schopfer and A. Jung, Ve Congrès International Technique et Chimique des Industries Agricoles. Schéveningue. 1937. Extrait des *Comptes Rendus,* p. 22.
[5] R. J. Williams and R. R. Roehm, *Jour. Biol. Chem.,* 87: 581, 1930.
[6] R. J. Williams and D. H. Saunders, *Biochem. Jour.,* 28: 1887, 1934.