preparations of nitrogen mustard has been assayed in Swiss-Webster mice with Ehrlich ascites tumors. In repeated experiments, in each of which 300 mice were used, all untreated tumor-bearing animals died within 16 days (average 13.5 days), while mice that had received HN2 at *p*H 2 all lived more than 20 days, with average survival of 27 days, and some remain alive, without ascites, beyond that time.

It appears, therefore, that extremely low *p*H, while reducing the toxic effects of the nitrogen mustard in mice, does not interfere with the antitumor activity of the drug (*8*).

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24 December 1959

Emphasis on Holotype (?)

Abstract. The description of new species should not be confined to physical description of a holotype. One specimen cannot include all characters or be typical of any taxon. The holotype serves only a nomenclatural function and might also be termed the name-bearer (nomenifer) to avoid confusion of "type specimen" with "typical specimen."

Shenefelt protests about vague, indefinite species descriptions, made ambiguous "deliberately," to cover a range of variation inherent in an abstract group concept (*1*). He says: "The purpose of a description is to convey a concept of the object under scrutiny as clearly as possible by means of words, pictures, or diagrams." He recommends that the holotype specimen be described relatively exactly and that the range of specific variation be discussed with reference to the holotype description. In this manner physical and abstract concepts would be differentiated more easily, and the functions of description would be served more effectively.

It is appropriate to protest about the quality of taxonomic descriptions in many fields of biology. Many taxonomic descriptions are poor for want of adequate concern about organization and content. Scientific authors seem to have difficulty in visualizing means of being helpful to readers. Shenefelt's emphasis on description of the physical holotype is not justified, however, from the standpoint of the basic objectives in taxonomy.

It has been emphasized repeatedly, for the benefit of plant taxonomists, at least, that the nomenclatural type (holotype) of a species is not to be confused or implicated in anyone's concept of what is "typical" for a taxon. A nomenclatural type is simply *the specimen*, or other element, with which a name is permanently associated. This element need not be "typical" in any sense; for organisms with a complicated life cycle, it is obvious that no single specimen could physically represent all the important characteristics, much less could it be taken to show many features near the mean of their range of variation. Consequently, an exact description of the holotype specimen leads us exactly nowhere in the process of discovering "modes," "means," or other "norms" typical of species.

Some approach to the problem of variation may be made by biometric analysis, and this information is pertinent for taxonomic description. However, descriptive matter is concerned *only* with more precise indication of the nature of the abstract group concept (species); this information has no bearing on, and never can have any essential relation to, selection or function of the nomenclatural holotype.

Often it has been noted that the term *type specimen,* in the sense of a nomenclatural type, is misleading because this "type" cannot be properly construed as being "typical." The terminology has been a source of misunderstanding, confusion, and misconception ever since the type "system" was introduced. The only function a nomenclatural type can serve is that of name-bearer. This function is perfectly mechancial in the technical manipulation of taxonomic nomenclature. Whatever may be said of its nomenclatural advantages, a discussion of the "type method" must always be phrased to avoid the misleading etymologic implications inherent in the term.

Perhaps if we were to speak of the name-bearer, or "nomenifer" method (L: *nomen*, name, + *ferre*, to bear), the proper implication would be more easily conveyed. Comprehension of the wholly arbitrary nature of the name-bearer specimen, however, is of the essence for understanding the meaning of "type method" in modern systematics. The term *type method,* usually properly used in the arbitrary sense, is now so entrenched in systematic literature that it would be most confusing to attempt to substitute any different term for it. However, if one wished especially to emphasize the name-bearing function, it might be permissible to insert the term *nomenifer* parenthetically, following the term *holotype* ["holotype (nomenifer)"] at the place where the type specimen is designated after a species description. Evidently, judged by frequent recurrence of the misconception, something of this nature sometimes is needed to signify that the type specimen is not necessarily typical in any particular.

The concept of the "typical" representative is frequently misused in biology. When the term is used, a question always can be raised regarding the nature of the measuring operation and the adequacy of sampling. If the term is used, it should be carefully qualified; commonly better meaning is conveyed by avoiding use of the term *typical* and stating definite facts, rather than by providing a "typical" interpretation. Pre-Darwinian "typology," with implications harking back to fixity of species and special creation, is frequently involved with a "typical" concept of "type." Emphasis on description of the holotype, rather than on the concept of a species population, does not seem likely to improve our means of classifying organisms or in understanding other essential aspects of biologic problems (*2*).

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Histochemical Distribution of Succinic Dehydrogenase in Bone and Cartilage

Abstract. Large amounts of succinic dehydrogenase have been demonstrated histochemically in osteoclasts and chondroclasts. The same enzyme was also found in the giant cell of giant cell tumors of bone. This distribution suggests a relation to bone and cartilage resorption.

Many histochemical studies of bone formation and resorption have appeared in recent years. These studies are of great interest, since processes take place in areas separated only by a few microns, and this makes the analysis of biochemical data of even very small samples very difficult.

It has been shown histochemically

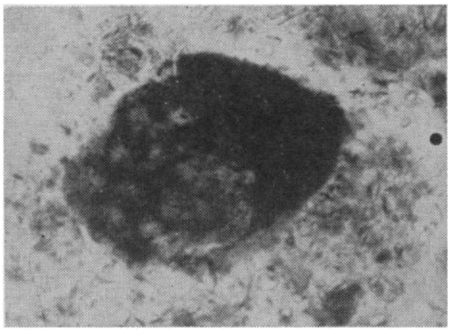

Fig. 1. Giant cell of a giant cell tumor of bone. The succinic dehydrogenase activity is localized especially in the cytoplasm (technique of Rosa and Velardo). (About × 347)

that osteoclasts and chondroclasts contain several enzymes the distribution of which follows a typical pattern. The distribution of alkaline phosphatase, acid phosphatase, esterases, aminopolipeptidase, beta-glucuronidase, and other enyzmes in bone tissues has been described by several authors (*1–4*). Tonna (*5*) has shown the distribution of succinic dehydrogenase in periosteum without describing in detail the cellular elements involved in the reaction.

We have studied the histochemical distribution of succinic dehydrogenase, using the technique of Rosa and Velardo (*6*). In this technique neotetrazolium chloride is used to show enzymatic activity in the presence of potassium cyanide. The study was made on endochondral and membranous growing areas of bone of 5-day-old C_3H/Ba rats, 5-day-old Wistar rats, and newborn human beings. Frozen sections (30 to 50 μ thick) without previous decalcification were used.

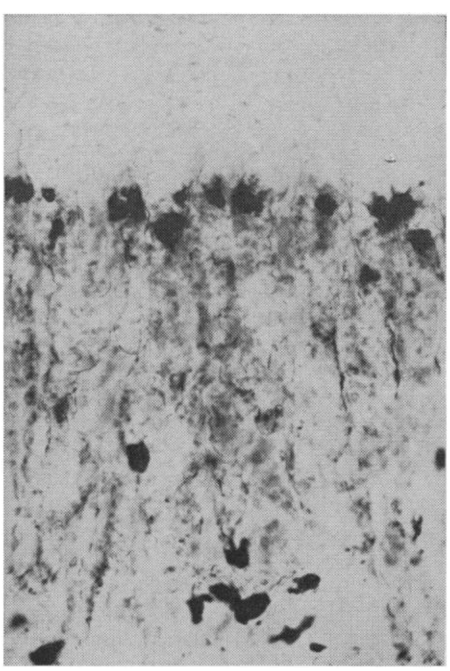

Fig. 2. Enchondral ossification of the growing zone of a human rib. The enzymatic activity is localized in the osteoclasts and chondroclasts (technique of Rosa and Velardo). (About × 104)

After incubation for a short period (5 to 15 minutes) an intense enzymatic reaction in the giant cells (osteoclasts and chondroclasts) involved in bone and cartilage resorption was apparent; the reaction was localized especially in the cytoplasm. After longer periods of incubation diformazan granules with a cytoplasmatic distribution appeared in almost all cartilaginous cells and in osteoblasts. The latter reaction was much weaker than that which took place in osteoclasts and chondroclasts. Still weaker was the reaction present in hypertrophic calcified cartilaginous cells. In three cases of giant cell tumors of bone, great enzymatic activity was observed in the giant cells characteristic of this tumor (see Figs. 1 and 2).

These results, together with the finding that other enzymes such as acid phosphatase (*2*), beta-glucuronidase (*4*), and aminopolipeptidase (*3*) were present in osteoclasts and chondroclasts, seem to confirm the hypothesis that these cells are not passive elements but cells with a high metabolic activity.

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10 November 1959

New Synthetic Lures for the Male Melon Fly

Abstract. Several *para*-substituted derivatives of 4-phenyl-2-butanone (I) have proved to be powerful attractants for the male melon fly (*Dacus cucurbitae*). These compounds, unlike anisylacetone, heretofore the best lure, attract even newly emerged flies. The most potent analog is 4-(*p*-acetoxyphenyl)-2-butanone (II), which also strongly attracts *Dacus ochrosiae* males.

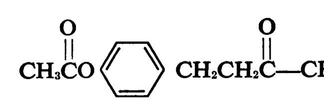
Many insects depend on odors to guide them to a vital need—food, mate, host plant or animal, or oviposition site. Some odors evoke so compelling a response that the insect appears to have little choice but to seek out the source. The odors of some synthetics exhibit this action and are specific in that they attract only one or a few closely related species. Such lures have proved invaluable when used in traps for detecting infestations of harmful insects. Control or eradication measures can then most efficiently be applied only where, and as long as, insects are caught.

The use of anisylacetone as a lure for the male melon fly (*Dacus cucurbitae* Coq.) was reported in *Science* several years ago (*1*). However, its potency is not great, and it does not attract flies until after they attain sexual maturity—that is, 7 or more days (usually 10 or 11 days under field conditions in Hawaii) after emergence from pupation. A lure that attracts sexually immature males has an important advantage in that it enables the early detection of infestations so that control or eradication measures may be instituted before the insects have a chance to mate (*2*).

Our search for better lures has centered mainly around compounds related to anisylacetone, more specifically around derivatives of 4-phenyl-2-butanone (I).

I

These efforts were rewarded by the finding of a number of compounds that are not only more powerful and persistent but, more important, are also attractive to newly emerged male melon flies. The best of these materials is 4-(*p*-acetoxyphenyl)-2-butanone (II).



II

It was made by condensing acetone with *p*-hydroxybenzaldehyde in an alkaline medium by a procedure similar to that described by Drake and Allen (*3*), hydrogenating the product at 1800 lb/in.^{2} and 70°C with nickel kieselguhr catalyst, or by condensing phenol with 4-hydroxy-2-butanone according to Maki *et al.* (*4*), and acetylating; bp 123° to 124°C/0.2mm; n_D^{25} 1.5059. Theory for $C_{12}H_{14}O_3$: C, 69.99; H, 6.84. Found C, 69.38; H, 7.13.

Surprisingly, the ortho and meta isomers of II were practically ineffective.

In field tests candidate lures were each exposed in 10 Steiner plastic traps (*5*) which contained a lindane-chlordane mixture to assist in killing flies. One application of 2 gm of lure was made in each trap except for the