shrews or ground squirrels. Foxes *Alopex lagopus* (Linnaeus) harbored mature cestodes of the genus *Echinococcus*. Of six hosts autopsied, four were infected with this parasite. The general appearance of the cestodes suggested that they may be *E. granulosus*; however, confirmation of this must await further study, both microscopic and experimental.

Observations on the incidence of echinococcosis in field mice on St. Lawrence Island suggest that the infection becomes well established in its hosts long before macroscopic diagnosis is possible, and that for a true incidence of infection the livers of such hosts must be sectioned and studied histologically. Such a study of 198 livers collected on St. Lawrence Island is now in progress. Dog and fox feces from infected animals are being studied under tundra conditions as to their viability. Immunity and pathological effects on hosts are being made. It is hoped that a more comprehensive report on host-parasite relationships can be given at a later date from the series of experimental infections now in progress with the St. Lawrence Island form of *Echinococcus*.

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Abbreviation of Bacterial Generic Names

Probably because they have become accustomed to writing on small surfaces, such as test tubes and ¾-in. labels, bacteriologists often use some form of "laboratory shorthand," and when writing scientific papers continue this practice. Thus the convention seems to have grown up that in the binomial of a bacterial name, the first, or generic, name should be abbreviated. Fifty years ago this was of little consequence, because all rod-shaped bacteria were placed in the genus *Bacillus,* and the abbreviation *B.* was universally adopted. However, in the last forty years there has been a gradual, but ever-increasing, revolt against the *Bacillus* system of classification and nomenclature and a greater splitting of bacteria into different genera. As new names were coined, bacteriologists abbreviated them, usually into the form using the initial letter, thus *Corynebacterium* became *C.,* and this system worked well in papers dealing with bacteria of only one genus or of several genera beginning with different letters.

Authors of textbooks had a more difficult problem, because it was obviously desirable that an abbreviation used in one chapter should have the same meaning when it was used in another chapter. Ford, in his *Textbook of Bacteriology* (1927), usually spelled out the generic name, although in the descriptive sections the *B.* form was used occasionally. The nine-volume *System of Bacteriology,* published in 1929–31 for the Medical Research Council, avoided all taxonomic issues, and used the *Bacillus* system of nomenclature. Topley and Wilson, however, in their textbook made a serious attempt to have distinctive abbreviations for generic names, abbreviations that are fairly widely, but not universally, used by scientific journals in England. The extension of such a system outside the medical field seemed to be a logical step, and the problem was to see whether an extension was possible.

Distinctive abbreviations. The index of edition 6 of Bergey's *Manual of Determinative Bacteriology* was used as a source of generic names, but names used for viruses (pp. 1127–1286) were excluded. A few names proposed since 1948 have been added, but the additions do not materially affect the results. Ideally the abbreviations should be distinct from similar abbreviations used in algology, mycology, and protozoology (for example, *E. coli* might be used for *Escherichia coli* or for *Entamoeba coli*), but the problem has been kept as simple as possible by restricting it to bacterial generic names.

The first few letters make a convenient short form, as *Staph.* for *Staphylococcus,* but they are not always without ambiguity; for example, *Strep.* or *Strepto.* might be used for *Streptobacillus, Streptobacterium, Streptococcus, Streptomyces,* or *Streptothrix,* and *Str.* could be used for all these and for *Streptus.* There are 28 prefixes common to three genera, 17 common to four genera, four common to five genera, seven common to six genera, and 24 common to seven or more genera; the maximum is the prefix *Thio-,* which is common to 27 genera.

So far the analysis has shown that both initial letters and prefixes make ambiguous abbreviations, but we have ignored the specific epithet, which would, in certain cases, make the generic abbreviation clear. Thus *S. typhi* or *S. typhosa* would be clear because, *up to now,* the specific epithets *typhi* or *typhosa* have not been proposed for a species of any other bacterial genus with a name beginning in *S.* However, it would be foolish to suppose that no author will ever propose a new binomial of the form *S. . . . typhi* or *S. . . . typhosa.* In a similar manner *E. coli* has a definite meaning to a bacteriologist but, because of *Entamoeba coli,* is ambiguous to a clinical pathologist or to a physician.

It would be possible to use different letter combinations as short code designations for generic names, but there are so many disadvantages that the scheme would not work in practice. It would be essential to set up an international code-letter registration board so that the same code letters would be used for only one genus. Each editor and every reader would need a key to the code letters, or the generic names and codes would have to be an essential part of each paper.

Questionnaire to editors. Most journals have definite policies on abbreviations for weights and other measures, and some have approved short forms for generic names. I was asked by one editor if it would be possible to have an agreed list of abbreviations for bac-

terial generic names used in conjunction with a specific epithet. To ascertain whether this desire was general, I addressed a letter to the editors of 77 English-language journals and asked each to complete a questionnaire and to amplify his answers when necessary. The editors of *Nature* kindly published a note inviting others interested in the problem to write to me. Replies have been received from the editors of 65 journals. The questions asked them and their answers follow.

1) Do you insist that the generic name be written in full when it is first used? Yes, 57; no, 6.
2) May generic names subsequently be abbreviated? Yes, 62.
3) When abbreviations are allowed, which form is used? Single letter, 29; author's choice, 15; set of approved abbreviations, 18.
4) Do you issue a set of instructions to authors? Yes, 33.
5) Do you encourage the use of common names where these are unambiguous? Yes, 28; no, 16.
6) Are you in favor of attempting to standardize abbreviations? Yes, 52; no, 4; doubtful, 3. In favor of standardizing at the international level, 34; first in the English language, 27.

Analysis of the replies failed to show any significant difference in the views of editors in different countries; nor was there much difference between journals devoted to medical or nonmedical sciences. Generally, medical journals give more freedom of choice about abbreviations to authors, but about half of them issue instructions or suggestions that authors are supposed to follow. Several American medical journals use generic abbreviations given in Dorland's *Medical Dictionary*.

Possible solutions. Many editors sent helpful letters with their replies to the questionnaire, and several stressed the fact that clarity is more important than space-saving. Four solutions are presented for consideration, three of these being in current use:

1) The generic name is written out in full the first time that it is used in each paragraph. The initial letter (without a second letter) is used as an abbreviation on the second occasion that the genus is mentioned in the same paragraph, provided that no other genus with the same inital letter has been mentioned between the first and second naming of the genus in question, in which case the name is again given in full (*Biological Reviews*).

2) The same principle as 1 is applied to each page instead of to each paragraph. But, wherever it would not be obvious which genus is indicated, the generic name is spelled out. (*Annals of the New York Academy of Sciences.*)

3) The same principle applied to each paper; that is, the full name when first mentioned (i) in the title, (ii) in the paper, and (iii) in the summary, with subsequent use of a single (initial) letter for the generic name. Where this would be ambiguous, the name would be written out. (This is the current practice of the editors of 29 journals who replied to the questionnaire.)

4) Do not use abbreviations of generic names, except when a list of species of the same genus is involved, in which case an initial letter abbreviation would be used. This suggestion takes as an analogy the practice of spelling out the long names of organic chemicals, any one of which may occur more than once in a sentence.

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Conversion of Kynurenine into 3-Hydroxykynurenine in Man

Our finding that hydroxykynurenine is responsible for the diazo-reaction has been confirmed by Dalgliesh and Tekman (*1*), but the route of the formation of 3-hydroxykynurenine from tryptophan in man is yet unknown.

Dalgliesh and Tekman (*1*) suggested that an alternative pathway from tryptophan to hydroxykynurenine might have been involved, possibly via 7-hydroxytryptophan. However, 7-hydroxytryptophan has been synthesized by Ek and Witkop (*2*) and shown not to be attacked by the enzyme system converting tryptophan into kynurenine. This result was confirmed by us by adding liver or kidney homogenate of mice to 7-hydroxytryptophan, which was kindly supplied by B. Witkop.

We have now made the following experiments. When 0.5 to 2.0 g of tryptophan was administered to the urochromogen-reaction-positive but diazo-negative patients suffering from tuberculosis, their urine turned strongly diazo-positive and, on paper chromatogram, the spots of kynurenine and 3-hydroxykynurenine dectectable with diazo reagents became larger and stronger. This fact seemed to indicate that tryptophan is converted into 3-hydroxykynurenine via kynurenine. So we administered kynurenine to the urochromogen-positive but diazo-negative patient suffering from pulmonary tuberculosis and saw that the diazo-reaction of the urine turned strongly positive. On detection by paper chromatogram, the spot of 3-hydroxykynurenine enlarged and became stronger.

The preparation of urine for paper chromatographic detection was done by the procedure already described (*3*). The urochrom fraction thus prepared was precipitated with Hopkins-Cole's reagent. The precipitate was treated with hydrogen sulfide, and the filtrate was concentrated to a sirup under diminished pressure with exclusion of oxygen. This fraction containing 3-hydroxykynurenine was purified by paper chromatography, and identification was effected by comparing with the pure sample of 3-hydroxykynurenine on paper chromatogram using several solvent systems as developer. The results are summarized in Table 1.