inflexions, is wonderfully fluid and surely does not need to be subjected to such twists in order to accommodate new terms or to reexpress old ones.

Another problem which is causing increasing concern—to printers as well as to editors—is the frequent and indiscriminate use of abbreviations in the form of a single capital letter, or a group of capitals, to represent the name of a substance, or perhaps even an adjective or adverb. The printer is concerned because a page of text sprinkled with capital letters is not pleasing in appearance; and, like other craftsmen, he feels that his efforts are being frustrated. It may be argued that this is of no concern to the scientist; but surely his work is worthy of good presentation, and there is satisfaction and even advantage in recording the results of research in an elegant style.

So far as the use of abbreviations themselves is concerned, the subject was discussed some time ago in these columns. As was pointed out then, a little consideration will show that abbreviations can often be replaced by pronouns without loss of clarity or accuracy. No one writing for the general reader would willingly use the same noun several times in a single sentence; yet when abbreviations or symbols are adopted, there seems to be no hesitation in repeating them—often as many times as possible. Biochemists are great offenders in this respect, and their excuse must be that many of the substances they use have unwieldy names. Similarly, organic chemists are hampered by a cumbersome nomenclature, which however admirable from the point of view of describing a substance, invites the use of abbreviations; indeed, the industrial organic chemist has found it necessary to invent names or use specific symbols like DDT for the sake of the users of his products. But a sense of proportion must be maintained in devising and using specialized terms; thus it seems pointless to write *p*-ClHgBA for *p*-chloromercurobenzoate, and positively dangerous to use H for histidine. The habit—for it is little else—of introducing abbreviations is now spreading through physical chemistry to physics and to mathematics; indeed, to all sciences. Thus E has been used for *enzyme,* with the derived symbols ES for *enzyme substrate* and ESI for *enzyme substrate inhibitor,* and M.O. for *molecular orbital*; and what is the physicist to think when he finds a plentiful sprinkling of the term MIT on a page, only to find on careful reading that it is an abbreviation for monoiodotyrosine and not the Massachusetts Institute of Technology? Then, again, can the use of ARG for *autoradiograph* be justified? Mathematical signs occasionally appear in a line of text, especially the sign for *is equal to.* These examples are taken from manuscripts submitted to *Nature,* and many others might readily be quoted.

It may be claimed that, if an author writes out the name or term, followed by his chosen abbreviation, on the first occasion of its use, or includes a list of the abbreviations he proposes to use, then he is justified in employing his abbreviations throughout the remainder of that particular piece of writing. But is every scientific communication to have its own glossary? Consider the confusion—and additional space required—which would occur in a journal such as *Nature,* in which two dozen or so specialized communications appear every week. The fact is that these abbreviations are, in the main, laboratory and notebook shorthand, or even slang, very valuable in their proper place, but nevertheless a new language, which at present does not seem suited for the considered statement offered for discussion and appraisement by other workers.

The use of abbreviations, especially initial letters, is now becoming so fashionable among scientists that one suspects authors sometimes go out of their way to use them; for example, SV for *seminal vesicle.* With the increased sliding growth among the various disciplines of science, resulting in such departments of research as biochemistry and biophysics, this fashion may, if not checked, defeat its own ends and produce a veritable "Tower of Babel." Indeed, the time does not seem far away when high-school pupils will have to learn a new table of symbols apart from those atomic.

A further problem, which may not occur to most writers, has to be faced in the preparation of an index. Abbreviations or initials sometimes occur alphabetically in quite a different position from that which would be occupied by a full term, thus causing confusion during reference.

New Look in Soviet Genetics

American geneticists have been aware for nearly 2 years of a change in the attitude toward their science in the Soviet Union, and particularly of the declining influence exerted by T. D. Lysenko and his colleagues on Russian biology. Until recently, most of us were skeptical over the development of any genuine change in attitude that would permit our science to develop as it did in the Soviet Union before 1936. Recent events, however, are showing that the change is a real one, and that Mendelian genetics is apparently reviving there. A report from the editors of "*Drosophila* Information Service" indicates that two outstanding geneticists, M. S. Navashin and N. P. Dubinin, are again coming into prominence and are organizing genetics laboratories in Leningrad and Moscow, respectively.

An additional indication is given by a recent review of the book *Hybrid Corn,* which is an illustrated, 360-page collection of articles translated into Russian by M. L. Belgovsky, Y. I. Lashkevich, and V. V. Khvostova. The book was published in Moscow in 1955 by Foreign Literature Publishers. The review, of which a partial translation follows, appeared in the November–December 1955 issue of *Botanicheskii Zhurnal,* the Soviet counterpart of the *American Journal of Botany.* The reviewer, D. V. Lebedev, is unknown to me. I am very grateful to my colleague, I. M. Lerner, for assistance with the translation.

"Speaking at the conference of genetics and breeding called in October 1939 by the editors of the journal 'Under the banner of Marxism,' and giving a survey of the contemporary situation of world science in these fields of knowledge, Academician N. I. Vavilov dwelt particularly on the use of heterosis in corn breeding. Producing the official data on the areas occupied by hybrids of inbred lines in the U.S.A. in 1938–1939, and on the increase in yield which resulted from the entrance of these hybrids into production, he evaluated hybrid corn as the most valuable practical achievement of genetics. N. I. Vavilov asserted that 'on the basis of genetic investigations which had been carried out by theoretical workers, not practical men or breeders, the theory of inbreeding was worked out on corn material, a theory now widely used in practice.' (Vavilov, 1939: 129). In his lecture he cited a letter from American corn specialists, who wrote that the breeding of this important food and fodder crop, which had marked time in the course of a whole century, as a result of this new work moved forward all at once at an extraordinary rate.

"The time that has elapsed since this address of N. I. Vavilov has demonstrated completely the basic correctness of the high value that he ascribed to the theoretical and practical knowledge of hybrid corn.

"The decisions of the January Plenum of the Central Committee of the Communist Party of the Soviet Union established the task of the wide application of new breeding methods for corn, and the complete transformation of this crop in the course of a few years to sowing hybrid seeds. There is no doubt that one of the conditions for completing the task which has been set is the very rapid use of all the experiments of foreign science, an acquaintance with those works which have been and are being carried on

abroad. The anthology *Hybrid Corn* gives in Russian translation some of the most important investigations and reviews of work which have appeared in recent years."

There follows an extensive review, with uniformly favorable comments, of articles by Mangelsdorf, Shull, Hayes, Ritchie, Wellhausen, Sprague, and others, most of which are well known to American plant geneticists.

"Even from such a very short summary it is clear how extensive and interesting material is represented in the work being reviewed. The editor successfully chose the articles for translation and made very appropriate use of the relatively small space available to him in the book.

"In conclusion, however, two remarks must be addressed to the publishers of the book.

"We have spoken several times about the fine work of the editor of the anthology, but have not mentioned his name. The name of the editor—Corresponding Member of the Academy of Science of the U.S.S.R. N. P. Dubinin—for some reason is concealed from the reader by the publishers. This seems to us completely unpermissible. The editor carried out a large and necessary task, and the reader has the right to know whom he should thank for it.

"The second remark is the following. In a short preface 'From the publishers,' among other things, the following is said: 'Each of these articles contains much valuable factual material; at the same time, since the authors of all of the articles hold to the viewpoint of the chromosome theory of heredity, this material must consequently be used critically.' This sentence calls for legitimate perplexity.

"The publishers, presenting to the reader a book founded entirely, as they themselves recognize, on the basis of the 'chromosomal theory of heredity' [we put this expression in quotation marks, because it is far more correct to say: on the basis of the doctrine of the 'material (or cytological) basis of heredity'], warn that this theory is mistaken. But if it is discarded, then nothing remains in the book. There does not remain the method of inbreeding, which establishes pure lines, hybrids of which should by 1960 occupy the entire 28 million hectares in the U.S.S.R. sown to corn. There does not remain the marking of the parental lines with marker genes, without which pure (homozygous) lines cannot be produced in a restricted period of time. There does not remain the cytoplasmic male sterility, which gives to the country the possibility of saving millions of work days from the labor of removing the tassels. There does not remain the method of selecting gametes, significantly easing and simplifying the breeder's work.

"In fact the only thing which should be discarded in the book is the sentence of the publishers that was quoted.

"We must hope that the publishers of foreign literature in the future will regularly acquaint Soviet readers with all of the more interesting work on hybrid corn and on other problems of contemporary genetics and in this way further the completion of the tasks that have been assigned to our science."

This statement, written solely for Soviet plant scientists, is clear indication of a scientific revolution already in progress that may restore genetics to its rightful position in a great and scientifically progressive nation and that will make future contact between American and Soviet geneticists far easier. Let us hope that it will continue.

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22 March 1956

The resignation of T. D. Lysenko as head of the All-Union Academy of Agricultural Science was announced in Moscow on 9 Apr. 1956.

International Geophysical Year Symbol

The Special Committee for the International Geophysical Year (CSAGI) has adopted two symbols in connection with the IGY, shown in Figs. 1 and 2 (kindly provided by D. C. Martin, assistant secretary of the Royal Society).

Figure 1 presents the symbol to be used on CSAGI and other IGY publications, under rules issued by the general secretary on behalf of CSAGI, where no inscription is needed because the pertinent information will already be present on title pages and covers. This symbol attempts to suggest the scope of IGY. For example, the earth is partly light, partly dark—suggesting solar-terrestrial relationships; a satellite and its orbit indicate IGY interests in the physics of the high atmosphere; and the orientation of the earth, showing the South Pole, not only implies the conduct of an unprecedented IGY research effort in that region but may suggest IGY coverage of other regions ordinarily not the subject of extensive geophysical study.

Fig. 1

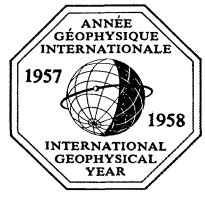

Fig. 2

The second symbol (Fig. 2) is proposed for use on instruments, equipment, and so forth, where the French or English language is appropriate; other national committees will translate the inscription.

HUGH ODISHAW, *Executive Secretary, U.S. National Committee-IGY, National Academy of Sciences, Washington, D.C.*

3 April 1956

Library Searches with Punched-Card Machines

The following example illustrates the problem to be discussed. A chemist asks his librarian to list published articles that contain data on compressibility of sodium chloride solutions. With the conventional card index, the librarian must look under *solutions, compressibility,* and *sodium chloride*; and relevant articles may also have been indexed under still other subjects. The search is laborious and may miss important items.

With machine methods (*1*), a different procedure is possible. Each article is represented by a punched card. This *abstract card* contains, in coded form, the identification number of the article, author and journal information, and 10 or 15 key words, or *attributes.* The attributes identify subjects to which the article is related. The abstract cards need not be kept in any special order: a machine can search the whole file rapidly and automatically select relevant cards.

For coding attributes, two methods are possible: each attribute may be punched in a separate small field on the card (*2*), or codes for various attributes may be superposed in one large field. We chose the latter method. Its advantage is that many attributes may be entered on a single card. Its disadvantage is that the coding is irreversible. For instance, if each attribute is coded as a pattern of four holes, then a given set of eight holes can result from the coding of any one of $8!/4!4! = 70$ pairs of attributes. This disadvantage is not serious if only a small fraction of the theoretically possible number of codes is used, and if these are chosen at random. A search will then seldom produce more than a few spurious cards; and it will never miss any relevant ones.

Random coding has been exploited with Zato cards and with McBee Keysort cards (*3*). To apply it to IBM cards, we prepared a set of *master cards* containing four-hole codes. The codes were punched in the field consisting of digit positions 0 to 9 in columns 1 to 40 of