Company, died on 31 October while attending meetings of the Society of Motion Picture Engineers in San Francisco.

John Hillyer White, 66, a metallurgist with the New York Laboratories of the Bell Telephone Company for 30 years, died on 30 October.

Albert Sherman Eastman, 64, head of the Chemistry Department, University of Delaware, for 20 years, died on 4 November.

Charles S. Myers, 73, British psychologist, died on 12 October. Dr. Myers was a member of an expedition in 1898 to study the vanishing culture of the natives of the Torres Straits region. Prof. H. J. Fleure states in *The Times,* London, that: "The idea of that expedition was inspired by a vision of the unity of the sciences studying mankind socially, psychologically, and physically in the past as well as in the present. . . . Myers came back to use his experience in studying his fellow citizens in Britain, and on this basis he built up his valuable work on the guidance of young people in the choice of occupation and on industrial psychology generally." A few days before Dr. Myers' death, the National Institute of Industrial Psychology, which he had founded and of which he had served as head, celebrated its 25th anniversary. Upon this occasion, Sir Stafford Cripps stated that occupational psychology has become "the very core of our problem of production."

Letters to the Editor

Progressive Evolution

Doubt has been expressed by Aldous Huxley as to whether progress has really been of any advantage to mankind. If it isn't good for us, we want none of it, but change is inevitable, and if we don't want progressive change, we are sure to get something else which may not be any better for us. So let us inquire what we mean by progress before we throw it into the discard. Human evolution, as Julian Huxley has emphasized, is actually going on at a greatly accelerated pace in our time. We have become "consciously evolutionary," but where do we think we are going?

Evolution implies change, which may be either progressive or regressive. Progressive organic evolution may be defined as change in the direction of increase in the range and variety of adjustments of the organism to its environment. This involves increase in the complexity of structure, ensuring sensitivity to a greater variety of environing energies and more refined sensory analysis, elaboration of more varied and efficient organs of response, and more complicated apparatus of central control (nervous, vascular, endocrine, etc.). In the case of the reproductive functions, increase in complexity is in general correlated with the preceding changes in adaptation to diverse modes of life.

These progressive evolutionary changes are primarily in the interest of the individual organism—its survival and enlargement of the range of its activities, with more varied needs and satisfactions. The adaptation of a species as a whole to some particular niche of the environment may or may not be progressive; in the case of many parasites, for instance, it is regressive.

In the human realm these biological factors are operative, but they are in large measure subordinated to psychological factors of different order. Human evolution is essentially social evolution, and increasingly so. Both survival and satisfaction depend upon an efficient social organization which can be intentionally controlled. Under present conditions in a high culture this control must be by voluntary consent of a majority of the people. Control enforced by tyrannical power is unstable, and it results always in regression. Progress in this realm demands cooperative association with voluntary renunciation of some personal and group advantage and sovereignty. Our needs and desires have grown out of bounds and can be satisfied only by working harmoniously with others for mutual benefits or in lawfully ordered competitive enterprises.

At the moment we seem to be in a back-eddy of reversion to bestial standards of selfish concern for personal, group, and national advantage in disregard of social welfare and stability. This can be changed if enough of us want to and are willing to pay the price. It is fortunate that under the surface of our present disorder there is, as there always has been, a strong human craving for decency, justice, and social stability based on individual responsibility for the welfare of the group, and the group has now been enlarged to include the whole world. This key to social progress has not been lost, and it is up to all of us to recognize it and use it.

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Addendum to "Cytoplasmic Diseases and Cancer"

Since the appearance of our report (*Science,* 1945, **102**, 591), articles written by Graffi (*Z. Krebsf.,* 1939, **49**, 477; 1940, **50**, 196, 501) came to our attention. In these articles Graffi developed a theory on the derivation of viruses from mitochondria (cf. Graffi's extensive and valuable literature review) and the possible role of mutated mitochondria in the causation of neoplastic diseases, which is almost identical with the views expressed by us. Graffi developed these theories on the basis of a study in which he demonstrated that certain fluorescent carcinogens, as benzopyrene, are absorbed specifically on

the mitochondria of animal cells. We came to the same theoretical conclusions as Graffi but from an entirely different approach, in that, in our studies, we were able to show that in plants modified mitochondria (plastids) induce diseases that are fundamentally like those induced by plant viruses. Also, on the basis of chemical and physiological observations, we were led to the concept that certain viruses have evolved from mitochondria or their constituents, implying that similarly modified mitochondria of animal origin can reasonably be expected to be disease causing and that these diseases might be represented by the neoplastic diseases. It is interesting to note that two entirely independent groups of research workers arrived at identical concepts although starting from different points. We regret that our oversight has prevented us from giving due credit to the considerations of Graffi, who terminates his article with the following sentence, which we translate:

"May it however once more especially be emphasized that at the present these trains of thought are still purely speculative and that they have already partially been expressed by other authors in one way or another. However, it might pay to follow them experimentally in one case or another."

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A Note on "Radioactive Hydrocarbons"

In a letter describing the synthesis of mesitylene from radiocarbon dioxide by A. V. Grosse and S. Weinhouse (*Science*, 1946, **104**, 402), an error in representation has been introduced which may be very misleading to those inexperienced in the use of isotopic materials in the synthesis of organic substances.

The two cyclic products obtained, namely, mesitylene and the corresponding trimethyl cyclohexane, must be labeled with Carbon 14 in all three positions in the ring on the carbons bearing the methyl groups. The mixing of inactive acetone with the carbonyl-labeled acetone in Step 4 merely accomplishes a dilution of the resulting activity.

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A Designation for Micronutrients

In a letter entitled "Quantification of Micronutrients" (*Science*, 1946, **104**, 303), Harold N. Simpson recommends that the micronutrients (vitamins and trace minerals) be reported in micrograms per gram.

I have found this designation to be undesirable for the following reasons: The technician making up rations does not ordinarily actually weigh in micrograms and must recalculate to some practical unit, usually milligrams. It is surprising how frequently an error can be made in this process. Furthermore, the term "microgram" is difficult to visualize as a definite quantity, but everyone knows approximately what a "milligram" looks like.

For this reason I have found the most suitable designation for micronutrients to be "milligrams per kilogram." Quantities so expressed can be stated interchangeably as "mg. per kilo." or as "ppm."

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Reprint Filing—Perennial Problem

L. R. Richardson recently described a system of filing reprints alphabetically by author (*Science*, 1946, **104**, 181). He uses manila envelopes for the reprints of each author, and a cross-reference by subject is maintained on index cards. Richardson also quoted Smith (*Guide to the literature of the zoological sciences.* Burgess Publishing Co., 1943), who advocated filing all reprints numerically as received. With this latter method a card index for both subject and author must be maintained—a distinct disadvantage to those not having secretarial help—and, as Richardson points out, it is an unnatural method. An objection to filing by author is that, unless the author's name is remembered, the subject index card must first be consulted. Considerable time is also involved in extracting from the file several papers on the same subject unless they happen to be by the same author.

Although the filing system to be described may not be suited to all subjects or to special cases, it has been found very satisfactory for the subject of pharmacology (including papers on the closely related biological sciences) and should be adaptable to many other fields. The reprints are filed by subject and are given code numbers analogous to the Dewey decimal system used by libraries. An author index is maintained on index cards. A few examples will be given to illustrate how the system is applied.

The subjects were first separated into several classes of code numbers. Numbers 00. to 09. include all papers dealing with drugs acting on the central nervous system; numbers 10. to 19., those dealing with the autonomic nervous system; 20. to 29., those dealing with circulation; and so on to 90. to 99., which is a miscellaneous classification.

Within the classes individual subjects were assigned code numbers. For example, number 00. represents analeptics and convulsants; number 01., centrally acting nonopiate analgesics; 02., the general anesthetics; and so on.

Occasionally it was found that the use of subgroups was necessary. For example, the subject of vitamins was assigned to the 60.–69. class. Group 61. contains general papers on vitamin B, while number 61.1. is for papers on thiamine; 61.2., papers on riboflavin; 61.3., papers on pyridoxine; etc.

Individual reprints under each subject are numbered serially as received. The code and serial numbers are combined and placed in the upper right-hand corner in red ink; thus, for example, 02.1, 02.2, 02.3, etc., or, as with subgroups, 61.1.1, 61.1.2, 61.1.3, etc.

The same numbers are also placed on the author index cards, which contain only the author's name, the title