more than three centuries, the time of occupation of the middle latitudes of the North American continent by European peoples, of the magnitude of the local play of the seismic force. It is evident that the intervals between epochs of great destructive force in the same locality are to be measured in centuries and fractions of a century. Until science shall have discovered the signs of the return of these alarming and often disastrous earthquakes, we can only bear in mind that as we recede in the steady march of time from the epoch of one of these events we draw nearer, step by step, to the next one in the series.

Also in the Harvard Seismographic Station Fourth Annual Report for the year, 1 August, 1911–31 July, 1912 Professor Woodworth states as follows:

> The importance of engineers and architects taking into account the liability of earthquake shock strong enough to damage buildings in this district is amply shown by the history of earthquakes at Plymouth, Newburyport and Boston in the 17th and 18th centuries. There can be little doubt that the recurrence of such shocks as were felt in Boston in 1755 would produce much damage. While the Atlantic coast of the continent is relatively immune from earthquakes, the case of Charleston in 1886 enforces attention upon the necessity of recognizing the risk of destructive shocks upon this coast at long intervals perhaps of a few centuries only. Sane precaution demands the avoidance of the mistake made at San Francisco of placing a public reservoir upon a fault zone of recent movement, and of the folly of cheap mortar and rubly masonry which together were factors of first importance in the loss of life and property in Charleston in 1886, and in Messina in 1908. We may not be able to avoid building our houses and public edifices upon ground liable to destructive shocks, but we have abundant information as to how these structures should be built in order to reduce the risks of demolition to a minimum.

In many long conferences with me Professor Woodworth frequently expressed the opinions quoted above and went into detail about the great disaster which might befall the less stable sections of the city in an earthquake such as Boston has experienced in the past. To my personal knowledge he held these views up to the time of his final illness.

I feel that on such an important matter his opinions should be correctly stated.

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A PLEA FOR THE RETENTION OF THE TERM "BIOS"

IN the nomenclature of the vitamins suggested by Funk[1] it is proposed to change the name "bios" to vitamin D. Several reasons why the original name for the "substance indispensable for the development of yeast" should be retained occur to one concerned primarily with the "bios problem."

First: The substance which affects the multiplication of yeast cells was reported by Wildiers in 1901, ten years before the vitamins were recognized. The designation suggested at that time was "bios," with the further suggestion that it should be used until the substance could be identified chemically.

Second: No advance towards the chemical identification of "bios" has been made by its classification with the vitamins.

Third: It is questionable whether "bios" is a vitamin in the generally accepted sense of that term.

Fourth: The literature of "bios" has grown to considerable proportions since 1901. A recent review[2] listed 144 papers by more than 80 authors. It is evident that "bios" has a well-established literature of its own which would appear under that subject heading and not under vitamin D.

In view of these facts it would seem most unfortunate and confusing to rename the "bios" of Wildiers until its identity shall have been established.

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A FEW SUGGESTIONS REGARDING REPRINTS

EVERY one must have been perplexed by the difficulty of storing reprints so that they may be readily available. Current specimens range from vest-pocket to large portfolio size, even excluding monographs, which must be omitted from my criticisms for self-evident reasons. This wide range in size makes it difficult to make proper provision for their storage, not only in private but also in public libraries. This can not be accomplished without much loss of space, and one often is distressed by the wear an important reprint has received, largely due to improper storage.

One could, to be sure, classify reprints according to size, but that is inconvenient for other reasons and equally objectionable from the standpoint of space. Some publishers and institutions have already adopted a uniform size, but much remains to be desired for the great variation in size confronts one not only in the storing but also in the binding, even if done in temporary holders, and in the mailing of reprints.

Not infrequently the name, date and volume of the publication from which the reprint is taken are not indicated on it by the publisher. Besides depriving the journal in question of proper credit for the article this omission makes ready reference impossible. Rarely, publishers also use an inferior

[1] SCIENCE, (62), 157, 1925.

[2] Tanner, F. W., *Chemical Review* (1), 397, 1925.

grade of paper for reprints, without consulting the author, in consequence of which illustrations may suffer very seriously in the reproduction.

I am not sufficiently familiar with paper to be able to suggest the most economical size of reprint from that standpoint, but I hope that publishers of scientific literature will some day be able to adopt more uniform sizes, for in this case standardization not only will effect economy in time and materials but it will also greatly extend the life of reprints. I am certain that others than myself will be duly grateful for this change.

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SCIENTIFIC RESEARCH IN THE UNITED STATES

A GROUP of distinguished scientific men and publicists, under the auspices of the National Academy of Sciences, has formed itself into a board of trustees of a National Research Endowment, and plans to raise a large fund for the encouragement of research in pure science. We are all in agreement in regard to the fundamental place of research in our civilization and the need of every effort to facilitate the work of those qualified to contribute to the advancement of science. I venture, however, to question the wisdom and the truth of the implication of the first declaration made by the board, as printed in last week's issue of SCIENCE, which reads:

> The Trustees of the National Research Endowment, recognizing that human progress depends in large degree upon research in pure science, declare their conviction:
>
> (1) That the United States, which already occupies a leading position in industrial research, should rank with the most enlightened nations in the advancement of pure science.

This follows the reecnt statement by Secretary Hoover, who is chairman of the new board, to the effect that the United States is behind most European nations in its contributions to pure science. It appears to a psychologist to be better policy to tell people from whom money is wanted of what we have accomplished, rather than to complain that we are behind other nations, even if this were true. What evidence is there for its truth?

While a nation such as Holland is contributing more to science in proportion to its population and wealth than the United States, Great Britain or Germany, these three nations are far in advance of any others in their total productivity. It is my general impression, which may or may not have more validity than the assumption of Secretary Hoover and the distinguished board of the National Research Endowment, that the United States is in advance of Great Britain and Germany in the biological and geological sciences and in astronomy, behind them in physics, chemistry and physiology, about on even terms with them in mathematics and the medical sciences.

In the case of psychology some evidence can be adduced. Counting up the reviews in the first twenty-five volumes of the *Zeitschrift für Psychologie*, I found that the United States led all nations in the number of contributions to experimental psychology, selected by the Germans as most worthy of review, exceeding Great Britain in a ratio of ten to one. "Who's Who in Science," published in Great Britain in 1913, attributed 84 of the world's leading psychologists to the United States, as compared with 31 to Germany, 27 to England and 13 to France. Since then the number of psychological workers of the United States has about doubled; the number in Germany and Great Britain has remained nearly stationary. The work in France and Italy has regressed. If it is said that we may do more work, but that it is not outstanding in character, then I ask for the name of a foreign psychologist comparable in genius to William James. There is none except Francis Galton, who is not usually regarded as a psychologist.

I venture also to question the validity of the distinction made by the trustees of the National Research Endowment between "industrial research" and "the advancement of pure science." Research in the industrial laboratories may make fundamental contributions to constructive science; a university doctorate dissertation may be nearly as trivial as the score in a game of golf.

We ought certainly to obtain scientific information on these subjects; it would be desirable to spend a minute part of the fifty million dollars that the board proposes to collect in determining whether the first statements that it makes are correct.

J. MCKEEN CATTELL

QUOTATIONS

THE TORCH OF PURE SCIENCE

MR. HOOVER touched an important truth when he told our mechanical engineers recently that pure science receives shamefully meager support compared with applied science, and that the National Academy of Sciences could not undertake a better crusade than its present effort to raise money to restore the balance. We spend large federal appropriations for research in agriculture and technology. We establish rich foundations, like the Rockefeller Institute, for practical inquiry. Business is endowing laboratories, like those of the General Electric and the du Ponts, of unprecedented size. Our university scientists are expected, in the intervals of grading papers, to pro-