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-