Denmark had the highest standard of living in Europe and she had almost no raw materials but had no trouble in getting what she needed through the normal processes of trade. Some say that science must be held responsible, since it has made possible the development of the instruments of destruction and created the conditions that bring on these clashes. They say that man's moral development has not kept pace with his scientific progress. Therefore call a halt to science till morals catch up.

That is how one group talks. Are they right or are they wrong? If they are right, then all institutions of higher learning in the world are wrong in the whole of their objectives, for they consider it their main job to increase and disseminate knowledge, which is only another word for science. They look upon this as mankind's greatest need.

But there is another group that turns the foregoing statement around and asserts, not that science is responsible for war, but that war is responsible for science—that science is the progeny of war, that war has stimulated all the great inventions. Now, it has in fact stimulated some of them, but a reputable writer has recently gone so far as to make the statement that in view of the conditions brought about by modern science a man's life was safer a few hundred years ago than it is to-day.

That is an interesting and an arresting statement which one might possibly think was true if he had somehow been kept in ignorance of the *statistical fact* that the average span of life for all of us to-day is about sixty years, whereas only 150 years ago it was about thirty years.

Again, I have seen it asserted that war begat science because it was the discovery of gunpowder that first taught man that he could get enormous power out of chemical combinations. That assertion also might make a convert of one who was completely ignorant of the following whole series of historic facts: (1) That gunpowder was invented and first used only for peaceful purposes about 850 A.D. by the most peaceful people on earth; (2) that there is no record that it was in any way applied to warfare until 600 years at least after its invention; (3) that the wide application of chemical forces to the relief of human muscles for doing the world's work is a phenomenon of essentially the past 150 years; (4) that that application first began on a serious scale about 1800 A.D., 1,000 years after the invention of gunpowder, with the appearance of Watt's steam engine; (5) that the industrial revolution neither did nor could come about until after the discovery and development in the two centuries between 1600 A.D. and 1800 A.D. of the principles of Galilean-Newtonian mechanics, of which it was itself an outgrowth; and these had nothing whatever to do with war; (6) that I estimate that more than 99 per cent. of the world's development and application of science up to 1914 was actually made, not in the midst of wars, but in the hundred years from 1814 to 1914—in that very century that was so unusually free from major wars that it is generally known as the century of the "Pax Britannica"—a peace made possible because of the beneficent policing of the world by the British fleet; (7) that there is not the slightest *historic* warrant, taking history as a whole, for calling science and technology the offspring of war; (8) that the opposite assertion is a perfect illustration of the fundamental error of getting the cart exactly before the horse.

ROBERT A. MILLIKAN

THE "SCIENCE MOBILIZATION BILL"

THE introduction of this bill, S.702,[1] is a significant event. Senator Kilgore is to be congratulated for appreciating the practical values of science and for being a pioneer in a highly important field of political action. However, only a narrow body of opinion was influential in the preparation of the bill. It professes to advance "the full development and application of the Nation's scientific and technical resources." These have been created by the joint efforts of research workers, educators, inventors, engineers, manufacturers, mechanics, etc. Senator Kilgore and Representative Wright Patman, sponsor of the same bill in the House, H.R. 2100, have courteously circularized members of some of these groups requesting comments.

Opinion of experts is strongly against the bill. Professor William S. Carpenter, chairman of the department of politics in Princeton University, may be quoted: "It is a bill which should be opposed by every scientist and every student of government." Leading objections may be summarized under three heads:

(1) In times past, existing Federal agencies which are carrying on excellent scientific and technical work have been hampered by insufficient funds. Congress ought to consider giving more adequate support to them before undertaking the commitments of S.702—which are in some measure competitive with existing bureaus.

(2) It is the free man's tradition that every proposed law should be examined as to its potential misuse. Clauses in the bill can establish a new "pork barrel" for the benefit of localities rather than of science, subject to arbitrary Executive disposition. Where a Congressman could have no more than a river dredged or a post office built, the proposed new Office of Scientific and Technical Mobilization

[1] SCIENCE, May 7, 1943, pp. 407–412.

might strengthen the party loyalty of a wavering area by planning development of low-grade ore deposits, planting an experimental crop or starting a Federal school.

(3) The bill ought to satisfy the political element interested in suppressing private enterprise and substituting government by administrators who "serve at the pleasure of the President." Not the least contribution to scientific achievement through the centuries has been made by statesmen who have planned and fostered political freedom. Only in a free society can the cooperations and initiatives flourish which generate the unplanned and unforeseeable major advances of science. The bill gives the new office power "To make, amend, and rescind appropriate rules and regulations to carry out the purposes of this Act and all the powers and duties vested in the Office, which rules and regulations shall have the force and effect of law." Since one of the declared purposes is "to promote the full and speedy introduction of the most advanced and effective techniques . . ." and another is "to assemble, coordinate, and develop for use, in the public interest, all scientific and technical data and facilities . . .," there is here a clear avenue for governmental interference with every detail of laboratory, classroom and shop. The assertion of Dr. K. A. C. Elliott and Dr. Harry Grundfest[2] that the bill should not be attacked on the ground of "regimentation" and their comparison of the powerful new office with such limited agencies as the Public Health Service seem naive.

But destructive criticism of this bill is not enough. Science and expertness generally are affected with a public interest. If scientists as individuals persist in ignoring the social responsibilities of science, there evidently is serious risk that objectionable political measures will be improvised. In universities and scientific organizations the innocently selfish leadership of specialists must be supplemented by leadership aware of the world.

JOHN Q. STEWART

PRINCETON, N. J.

STARS IN "AMERICAN MEN OF SCIENCE"

THE note on stars for American men of science by Dr. S. O. Mast appearing in SCIENCE for May 21, 1943, was read with interest.

The suggestion by Dr. Mast that we ask for a vote on the stars in "American Men of Science" by those concerned is a good one. This has already been done. All those who are included in the sixth edition of the directory were asked whether the stars should be included, and a majority voted for their continuation. A minority of those who replied suggested various ways by which the method might be revised. Accordingly, the American Association for the Advancement of Science was asked to appoint, and appointed, a committee, to take up the question, but owing to the war emergency this committee has not been able to meet. In order that there may be continuity it has been decided to use the same method as in previous editions. When the eighth edition comes up for editorial consideration it is hoped that this committee may be able to function, and that the editor be advised as to the best method to carry out the voting.

Much discussion has appeared in SCIENCE and in earlier editions of the directory in regard to the stars. It has been pointed out that there are advantages and disadvantages; but up to the present time, the advantages have appeared to overshadow the disadvantages.

Election to the National Academy of Sciences takes care of rather a small group of scientific workers and the stars in "American Men of Science" make possible a wider recognition of leaders in science in their respective fields.

JAQUES CATTELL,
Editor, American Men of Science

AUTOBIOGRAPHY IN A DEMOCRACY

IN SCIENCE of February 19 under the title "What Price Glory" Professor Warren T. Vaughan of Richmond, Virginia, discusses in an entertaining way the inequal quality and length of many of the sketches which make up that indispensable volume, "Who's Who in America," while in the current SCIENCE (May 21) under the caption "Class Distinction Among American Men of Science" the method of starring 1,000 leading scientists by a sort of popular vote as done in the past five editions of "American Men of Science" is ridiculed by Professor S. O. Mast, of Johns Hopkins University.

Albeit these criticisms have their value as a part of current notation and opinion, yet they need not be taken over-seriously. The compilation of these volumes is a severe task; they are gotten out hurriedly. The publishers must and in a way may fairly depend on the *en masse* result. Both the participants and subscribers find that the final result is effective, meeting the many thousand ever-varying individual uses and needs. All is like the majestic flow of some great river, the Mississippi, for instance, as I remember it when long since doing river and harbor work below St. Louis. "Mark twain"! Certainly we see that those who have reached great distinction may well show a most becoming modesty and shorten their sketches, the main facts of their lives and their achievements being well known to all. Then too, there are facts of importance not easily brought into the average sketch. All of us work forward towards some greater objective and goal, and it must often prove difficult to set forth

[2] SCIENCE, April 23, 1943, p. 376.