

in medicine and sanitary organization as much as do civilians. A good deal of medicine and hygiene came out of war.

The relation of science to war is not easy to disentangle from a complex of factors, such as the downfall of feudalism, the Reformation, the rise of liberalism and democracy and hence of "high capitalism" and the trader. But the evidence collected by specialists indicates plainly the pressure that the exigencies of war have exerted upon physical scientists.

The effect of war on technology is especially clear. There is not the slightest doubt that the blast-furnace, the coke-oven, the steam-engine, machine-tools and the heavy chemical industry came directly out of military necessity with the introduction of firearms. Here the researches of such scholars as Merton and Werner Sombart are authoritative.

The branches of biology which have made most progress are agriculture and medicine, and the relation of both to war has been brought out time and time again. Moreover, it is significant that the biological sciences as a whole lag behind the physical sciences for the reason that military advantage and profits lie in chemistry, physics and engineering but not in the study of life.

Lastly, there is the remarkable fact that the Chinese, on the whole a stable and pacific people with a culture that has come down intact from ancient times, long made no military use of gunpowder, though they were familiar with it for centuries. As technicians and craftsmen they were in no way inferior to their European contemporaries until the arrival of the Jesuits. Much of the Taoist doctrine of non-action and non-violence must have sunk into the masses. It is significant that in Europe, where gunpowder was used in war, science leaped forward with the introduction of cannon, whereas in China, where gunpowder was used only in pyrotechnics, experimental science was not developed. At any rate it is clear that social influences can not be disregarded in tracing the history of science. And the social influences in Europe have always been chiefly military and economic, with war and economics evolving hand in hand.

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AREA FIGURES FOR UNITED STATES AND GREAT LAKES STATES

It will be a surprise to practically every one to realize that the leading reference books of the world give the total area of the United States some 61,000 square miles less than it actually is; the State of Michigan some 40,000 square miles less; Wisconsin about 10,000 square miles less; with similar though lesser diminution of the total area figures for all the other Great Lakes States.

These errors are due to the practice of computing the total areas as if the northern boundary of the United States, which is also the northern boundary of each of the Great Lakes States, were the southern shoreline of the Great Lakes; whereas the international line through the Great Lakes region has nothing whatsoever to do with shore, channel or even presence of water, but is as definite and fixed in perpetuity as the 49th parallel.

Publishers of various reference books, when advised of these inaccuracies, reply that they are quoting the official figures of the U. S. Bureau of the Census.

The Bureau of the Census, in its area table, has an outright error in the total area of the United States. The same tabulation, by its misleading manner of presentation of the facts concerning the total areas of the Great Lakes States, has given rise and authority to the currently quoted total area figures for those states, which are incorrect.

Former Director Austin of the Census Bureau saw these mistakes—which have been of long standing—and agreed to correct the misleading method of presentation in the Census of 1940. After a change of directorship was made, the decision was reversed.

The Bureau of the Census refused to revise its manner of presentation (1) for its own statistical convenience; and (2) because it wishes not to arouse sea-coastal states which advance uncertain claims for strips of ocean water of varying width. For these two reasons it prefers to disregard the fact of absolute ownership by the United States and the Great Lakes States of the American portion of the Great Lakes, and continues to treat this part of the United States as if it were the high seas.

In final extenuation of their attitude, the Director of the Census has advised: "I call your attention to the fact that *land and water areas shown in Census publications have no legal status*. They are used by us solely for statistical purposes."

In direct contrast with the foregoing paragraph is the statement of the Librarian of Congress that the Bureau of the Census is the only authority at present for figures concerning the area of the United States and of the individual states.

The director of the American Geographical Society, speaking for himself, not in behalf of the society, agrees that from the jurisdictional point of view the waters of the Great Lakes within the international boundary should be considered as part of the United States, and their areas assigned to the several states of which they are a part, and that the Census Bureau would have done well to have made this clear.

Canada and Ontario find nothing to prevent the inclusion of their share of the Great Lakes in their total area figures.

Benjamin Franklin fought and defeated France, Spain and England, in Paris, in 1783, when they sought to set the limits of the United States at the southern shores of these bodies of water; but he has been thwarted now by a generation of statistical geographers in our own country who seem to consider the 60,000 square miles of American-owned Great Lakes water nothing but a general nuisance, who have discounted and discredited it, and even disregarded it completely.

This water right now is bearing the most important traffic in the world. Save for the iron ore which must pass over our Great Lakes, the Allied Nations could hold up their hands in complete surrender. Compare the value of this region—now excluded by arbitrary dictum from the total area figures of the Great Lakes States and the United States—with the hundreds of thousands of useless acres of land which are counted in the area of other states such as Texas.

The press of Michigan and Wisconsin has strongly advocated the correction. The best legal opinion in the country says that the case for the Great Lakes States is clearly proven and unanswerable. The Committee on Constitutional Revision in Michigan will include the accurate total area of Michigan in the new constitution of that state.

The Bureau of the Census can correct the situation in the world's reference books by a simple revision of its major area table. Sooner or later this will have to be done.

Meanwhile every one concerned with accurate knowledge rather than the exigencies of statistics will wish to correct his atlas as follows:

TOTAL AREA IN SQUARE MILES			
Illinois	57,926 (land,	55,947; water,	1,979)
Indiana	36,519 (land,	36,205; water,	314)
Michigan	96,791 (land,	57,022; water,	39,769)
Minnesota	86,280 (land,	80,009; water,	6,271)
New York	53,203 (land,	47,929; water,	5,274)
Ohio	44,679 (land,	41,122; water,	3,557)
Pennsylvania	46,068 (land,	45,045; water,	1,023)
Wisconsin	66,216 (land,	54,715; water,	11,501)
UNITED STATES ..	3,082,809 (land,	2,977,128; water,	105,681)

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MISUSE OF THE TERMS "CLASS DISTINCTION" AND "DEMOCRACY"

PROFESSOR MAST's letter on page 465 of the May 21, 1943, issue of SCIENCE misuses these two terms. Regardless of its validity, no recognition of outstanding ability can properly be called "class distinction." Certainly no one should think that a democracy implies a group of individuals either having absolutely uniform ability or a pretense at such uniform ability

such as would be implied by the elimination of all marks of recognition for outstanding ability. A literal and logical acceptance of the plea to eliminate "starring" of names in the biographical directory of American Men of Science would mean the abolition of all honorary societies, all medals and awards, and, in fact, all recognition of outstanding ability and achievement.

The means by which "stars" are awarded in the various editions of the biographical directory may not be perfect, but it is probably the most "democratic" method by which any recognition of outstanding achievement may be determined.

As to a referendum on "starring" scientists, I would hazard the guess that while many of those with "stars" might vote against the system there would be an overwhelming majority in favor of the system from those not so "decorated."

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THE DISCOVERY OF "STARS"—A PRESENT PROBLEM

I HAVE been interested in the discussion of the "stars" in SCIENCE, believing that such discussion is wholesome. I have heard of Americans being called "dollar chasers" abroad, and I have seen "money grubbers" myself and I have assumed that a broader American culture would supply a wider variety of goals for man to strive for. Hence I have seen no harm in prizes, academic honorary degrees, societies with honorary memberships and even those with qualified membership, since they are supposedly awarded for personal merit. Every one will recognize that a quiet Willard Gibbs might in any generation be overlooked by an Academy of Sciences in its elections. Nevertheless, the peers of such a Willard Gibbs should be the best qualified to locate the "stars" of their generation.

It is of great benefit to the public that the star is located because (1), his productivity may thereby be enhanced, either by the encouragement or by increased facilities afforded; (2) his work may be more certainly preserved for posterity; (3) their results may be utilized, and his work used for the emulation of others.

It is not a question of personal vanity at all. It is not a matter of concern whether the ancestors of Gibbs came over on the *Mayflower* or were aborigines. It is rather what he did, how well we can use those results and what we can learn from his life. Mozart, Schubert and Poe were indeed stars, but it is difficult to believe that neglect on the part of the public of their period made them great. On the other hand, we instinctively feel that our neglect caused the loss of invaluable treasures of music and art.