at the present time, a large proportion of whom are raising wheat, which affects this average in proportion to what they produce. Is it not safe to assume that a considerable proportion of our farmers are using methods that yield them about the same returns as the farmers of England obtained under medieval systems of agriculture? Have we not, all of us, seen examples of a tenant farmer with insufficient capital, with poor and decrepit livestock, without ambition or adequate training, use methods not unlike the medieval methods and by injudicious cultivation, by inefficient methods, bring down the yields of even our better farms to a level of the yields obtained by the medieval farmers of England?

On the unfertilized wheat plot at Rothamsted the yield of wheat has declined to an average of about 12 bushels per acre. If this plot had been cultivated with insufficient capital, with half-starved animals and if the weeds had not been rigorously subdued by a laborious system of hand-picking, the yield of wheat on this plot would probably have come down to the yield of wheat under medieval conditions and with a much more rapid decline than has actually been experienced. It is safe to say that in a period of five years on most of the soils of the United States the yield of wheat could be brought down to the yields obtained under medieval methods in England if those same methods and conditions were revived now in this country. It does not take centuries to impair the productive power of soils. It requires only a few years of the life and effort of a man to lower the level of productivity to that of the medieval English farmer.

On the other hand, many of the long-time fertilizer and rotation experiments of modern times have shown that in a period of from five to fifteen years through intelligent methods yields equal to the present English yields can be obtained by the individual farmer. They have obtained these larger yields by rotations alone, by the application of fertilizers alone, or with a combination of fertilizers and rotations.

These things are well known and yet with all of our experience and all of our knowledge we must consider that these improved methods must be adopted by a large proportion of our farmers before they sensibly affect the average yield of the country.

So it seems to me that the low average yield in medieval times must be ascribed to the methods, to the system, rather than to any loss of plant food from the farm and that the increased production of England to-day must be ascribed to the methods, system, and to the higher average intelligence of the man who works the soil.

If, by further research of the political economists or the soil experts, the line b–c is found to be substantially correct or if on the average in the past three hundred years the increase in wheat production is shown to have been around one bushel in twelve and one half years the question may well be asked: What are the possibilities of the future and where is the end to the possible production of the soil? To answer this I can only refer to King's statement in his study of the agriculture of China that he himself measured the yield of wheat on a field cultivated by a Chinese farmer and determined that the yield per acre was 117 bushels and that in traveling through the province he saw many fields that yielded as much or more. Whether we can ever attain such yields as these Chinese farmers have secured or whether, if it were possible, it could ever be economically done under the general economic conditions of the world is another question; but so far as I can see the limit of possible production even for the average farmers in England has not yet been reached. While the world can obtain wheat at low cost from countries where the yield is low because of primitive methods but where vast quantities of the grain can be secured for the international markets, the question of increasing our yields is dependent upon economic conditions; but we are concerned here only with the possibilities of wheat production—with the maximum yield that may be obtained, and in weighing the evidence for or against soil exhaustion, as this term is usually understood.

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THE GEOGRAPHICAL DISTRIBUTION OF MEMBERSHIPS IN THE NATIONAL ACADEMY OF SCIENCES

THE geographic distribution of membership in the National Academy of Sciences is a subject which has interested me for several years. At my request Dr. Aitken has prepared for SCIENCE the tabulations of membership distribution in the academy, as set down below, on the basis of states in the Union, and of universities, colleges and research institutions. Three members of the academy are at present residing outside of the continental area of the United States—at Manila, P. I., at Arequipa, Peru, and at Freiburg, Germany; these have been credited respectively to Washintgon, D. C.; Cambridge, Massachusetts, and Chicago, Illinois, in the several tabulations. The number of members assigned to the individual states or institutions may be in error here and there to the extent of one member, because changes of address may be unknown to us; but these possible defects can scarcely affect the significance of the tables.

MEMBERSHIP IN THE NATIONAL ACADEMY OF SCIENCES BY STATES

New York	41	Pennsylvania	4
Massachusetts	39	Ohio (Cleveland district)	4
Washington, D. C.	27	Rhode Island	3
Illinois	23	Michigan (Ann Arbor)	2
California	21	Missouri (St. Louis)	2
Connecticut	18	Arizona (Flagstaff)	1
Maryland	14	Indiana (Bloomington)	1
New Jersey	8	Iowa (Iowa City)	1
Wisconsin	8		
		Total	217

MEMBERSHIP IN THE NATIONAL ACADEMY OF SCIENCES IN INSTITUTIONS OF LEARNING

Harvard University	27	University of Michigan	2
University of Chicago	17	Northwestern University	2
Yale University	17	Washington University	2
Columbia University	15	Case School of Applied Science	1
Johns Hopkins University	13	University of Indiana	1
University of California	8	University of Iowa	1
Princeton University	7	Vassar College	1
Stanford University	7	Carnegie Institution	9
University of Wisconsin	7	Smithsonian Institution and National Museum	8
Cornell University	6	Rockefeller Institute	6
University of Illinois	4	U. S. Geological Survey	5
California Institute of Technology	3	Bureau of Standards	3
University of Pennsylvania	3	American Museum of Natural History	2
Brown University	2	U. S. Department of Agriculture	2
Clark University	2	Miscellaneous	32
Massachusetts Institute of Technology	2		
		Total	217

If on the map of the United States a broken line be drawn from Salem, Massachusetts, on the Atlantic Coast through Schenectady, Ithaca, Pittsburgh and back to the Coast through Washington, D. C., the area defined will contain the residences of 154 out of the 217 members of the academy, or 71 per cent. A broken line from Cleveland through Ravenna (Ohio), Bloomington (Indiana), Urbana (Illinois), Chicago, Madison and Ann Arbor will enclose the residences of 38 members, or 17.5 per cent. A line in California starting at Berkeley, and passing through Palo Alto, Mt. Hamilton, Pasadena and ending at La Jolla will carry 21 members, or 10 per cent. Only 4 members are left to represent the remainder of our country: 2 at St. Louis (Missouri) and 1 each at Flagstaff (Arizona) and Iowa City (Iowa); in other words, excepting 21 members in California there are only 4 members living west of a north and south line drawn through Madison (Wisconsin). There is no member in the part of the country lying east of the Mississippi and south of a line drawn from St. Louis through Bloomington (Indiana), Pittsburgh and Washington, D. C., and there is no member in the three New England States north of Massachusetts. Six states and the District of Columbia contain 183 members, and 10 states contain the remaining 34 members; 32 states out of the 49 divisions have no members.

It should be said that the policies of the National Academy of Sciences have limited its memberships to representatives of the physical and biological sciences, with very few exceptions. The distribution of memberships seems to be worthy of the thoughtful consideration of all who are in any way responsible for the higher educational interests of the nation.

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SCIENTIFIC EVENTS

THE LIVERPOOL MEETING OF THE BRITISH ASSOCIATION[1]

THE meeting of the British Association which concluded on September 19 was in many ways notable, and marked the successful introduction of various changes in the local and scientific proceedings. In point of numbers it was the third largest meeting (Australia in 1914 excepted) in the long history of the association, but the actual number of tickets taken is not the only criterion for success. Figures are, however, of some value; for one of the objects of the association, namely, to spread knowledge of science and what it stands for, can be most successfully accomplished by an appeal to the public receiving ready response.

While the membership numbered 3,296, not less than 15,000 people attended the free public lectures in Liverpool and the surrounding boroughs, while more than 7,000 paid admission to the Scientific Exhibition held under the auspices of the association in the Central Technical School on September 10–22, and this number does not include members of the association itself, who were admitted free.

Further, the sectional meetings were almost all not merely well attended but often overcrowded, a condition which spoke well for the enthusiasm for scientific knowledge among the members, but also illustrated the attractiveness of the programs.

The inaugural meeting, when the president delivered his address, was remarkable for the fact that the whole proceedings were broadcasted, and in two halls in Liverpool the wireless version was accompanied by lantern illustrations identical with and shown simul-

[1] From an article in *Nature* by Dr. Alfred Holt.