for in this agreement, the increase to continue so long as the purchasing value of the dollar shall remain by as much as 10 per cent. below that in the year 1938.

In case the parties hereto disagree in respect to the meaning, intent or execution of any of the provisions of this indenture, the question at issue shall be submitted to three arbitrators to be appointed within three months of the date of such disagreement, one to be appointed by said grantors or their personal representatives, one by said Association and a third by the arbitrators so chosen. In case one of the parties hereto fails to appoint an arbitrator within the three months' time limit and the other party does appoint such an arbitarator, then the arbitrator so appointed shall appoint another arbitrator, and the two shall proceed as if one of them had been appointed by each of the parties hereto. The decision of such arbitrators or a majority of them shall be final and binding upon the parties hereto.

The American Association for the Advancement of Science hereby constitutes and appoints Forest Ray Moulton to be its attorney, for it and in its name, and as for its corporate act and deed, to acknowledge this indenture before any person having authority to take such acknowledgment, to the intent that the same may be duly recorded. This indenture is executed by the association pursuant to action taken by the executive committee of the council of said association at a meeting of said committee duly called and held on October 22, 1938.

IN WITNESS WHEREOF said grantors, James McKeen Cattell and Josephine Owen Cattell, have signed and sealed these presents and said association has caused these presents to be signed by its president and attested by its permanent secretary and has caused its corporate seal to be hereunto affixed the day and year first above written. Executed in duplicate.

MINUTES OF EXECUTIVE COMMITTEE AND COUNCIL REFERRING TO EXECUTION OF INDENTURE

The executive committee at its regular meeting on October 22, 1938, took actions as expressed in the following items which were later approved in writing by all members who attended the meeting:

"A copy of the proposed indenture by which Dr. Cattell and Mrs. Josephine Owen Cattell propose to transfer to the association titles to SCIENCE and *The Scientific Monthly* was given by Dr. Cattell to each member of the Executive Committee."

"The members of the Executive Committee were requested to send their copies of the indenture to the Permanent Secretary with such changes in the wording of the indenture, without changing its meaning, as they might wish to suggest."

"The Permanent Secretary was requested to prepare revised copies of the indenture and to send one to each member of the Executive Committee."

"The Executive Committee approved and authorized the President and the Permanent Secretary to execute the indenture, subject to such changes in wording, without changing its meaning, as might be desirable."

On recommendation of the Executive Committee, the Council on December 30, 1938, adopted the following resolution:

"Resolved that the Council, having accepted [by action of the Executive Committee under authority of the By-Laws Art. IV., Sec. 1: "The Executive Committee shall have full power to act for the Council when the Council is not in session."] on October 22, 1938, the offer of J. McKeen Cattell and Josephine Owen Cattell to sell and transfer to the A. A. A. S. the journals SCIENCE and *The Scientific Monthly,* and having directed the Executive Committee to complete the details of the purchase and transfer, hereby approves and ratifies the action of the President and Permanent Secretary in executing on December 12, 1938, by direction of the Executive Committee, the contract on behalf of the A. A. A. S."

Thereupon the Council initiated and passed the following motion:

"The Council again expresses to Dr. Cattell and Mrs. Cattell its appreciation of the work they have carried on for many years in editing and publishing the journals, and for transferring them to the A. A. A. S. under most generous terms."

MEMBERSHIP OF THE AMERICAN ASSOCIATION

By Dr. F. R. MOULTON
PERMANENT SECRETARY

SINCE the sections of the American Association for the Advancement of Science and its affiliated and associated societies cover rather comprehensively all the natural and social sciences, its record of membership is at least a rough measure of the progress of science. Since the association is truly national in scope, the geographical distribution of its membership measures approximately the distribution of interest in science in the United States.

For the purposes of this discussion it will be sufficient to present the membership of the association and the population of the United States by decades, except

for the interval from 1930 to 1940 in which the membership of the association is especially interesting because of economic conditions and the relatively small increase in population. The association was organized in 1848 with a membership of 461. The statistics will be presented in Table I for the years divisible by 10 because the U. S. Bureau of the Census gives the population of the country for these years.

TABLE I

MEMBERSHIP OF ASSOCIATION AND POPULATION OF UNITED STATES, 1850–1940

Year	Membership	Change Per cent.	Population (millions)	Increase Per cent.
1850	684		23.2	35.9
1860	644	−5.8	31.4	35.6
1870	536	−16.8	39.8	26.6
1880	1,555	29.0	50.2	26.0
1890	1,944	12.5	62.9	25.5
1900	1,925	−1.0	76.0	20.7
1910	8,021	41.6	92.0	21.0
1920	11,547	14.4	105.7	14.9
1930	19,059	16.5	122.8	16.1
1940	21,065	1.1	131.7	7.2

The decline in membership in the interval 1860–1870 may be ascribed to the Civil War; in fact, the association held no meetings in 1861–65, inclusive. There was a serious and prolonged depression in the decade 1890–1900. In 1900 SCIENCE became the official journal of the association. The period 1910–1930 was one of phenomenal increase in the applications of science in industry. The decade 1930–1940 (Table II) was one of depression and recession in industry and of slow increases in universities.

TABLE II

MEMBERSHIP DATA FOR 1930–1940

Year	New members, reinstatements	Members died or resigned	Total members	Change Per cent.
1930	1,507	910	19,059	3.2
1931	1,977	1,147	19,889	4.4
1932	1,397	1,621	19,665	−6.2
1933	823	1,939	18,549	−5.7
1934	2,029	2,025	18,553	0.0
1935	1,171	1,878	18,102	−2.4
1936	1,513	1,208	18,242	0.7
1937	1,142	1,081	18,776	2.9
1938	2,156	1,112	19,059	1.5
1939	2,210	1,362	20,195	6.0
1940	2,195	1,323	21,065	4.3
Average	1,647	1,419	19,196	0.8

New members of the association are obtained from direct applications for membership, from invitations extended to persons listed in directories of scientists and from nominations for membership, by existing members. The first source does not result in a large number of new members, the second is costly, the third is cheapest and the most effective. The total cost of circularizing for new members in the eleven years was $43,419; average per year, $3,947.

There have been marked changes in the geographical distribution of the membership of the association even during recent years. For brevity comparative statistics for the United States will be presented only for the years 1936 and 1940, an interval during which there has been a continuous increase in membership of the association. In order to give a somewhat longer base for comparisons of the number of members in foreign countries, statistics will be presented for 1934 and 1940.

TABLE III

MEMBERSHIP OF THE ASSOCIATION AND THE DIVISIONS

	1936	1940	Increase
			Per cent.
Entire Association	18,242	21,065	15.5
Pacific Division[1]	1,934	2,075	7.3
Southwestern Division	338	377	11.5

[1] The Pacific Division (organized in 1915) includes members of the association resident in Alaska, British Columbia, Washington, Oregon, California, Idaho, Utah, Nevada and Hawaii.

[2] The Southwestern Division (organized in 1920) includes members of the association resident in Arizona, New Mexico, Colorado, Sonora and Chihuahua (Mexico), and Texas west of the 100th meridian. The territory between the Pecos River and 100th meridian was added in 1937, the division acquiring 28 members by the addition. Without this addition the increase in membership in the interval 1936–1940 is 3.3 per cent.

The variations in the increase in membership of the association from one region to another are in part due to variations in rates of increase of the entire populations. To make possible a rough allowance for this factor the changes of population are included for the decade 1930–1940 (census years) in Table IV.

TABLE IV

GEOGRAPHICAL DISTRIBUTION OF MEMBERS

	Members[1]	Increase[2]	Population change[3]	Members per 10,000 population
		Per cent.	Per cent.	
New England States				
Maine	92	9.5	6.2	10.9
New Hampshire ..	97	12.8	5.6	19.7
Vermont	74	60.9	−0.1	20.6
Massachusetts	1,155	8.1	1.6	26.7
Rhode Island	108	1.0	3.8	15.1
Connecticut	445	16.2	6.4	26.0
	1,971	11.1	3.3	23.4
Middle Atlantic States				
New York	3,430	7.4	7.1	25.4
New Jersey	782	19.0	2.9	18.8
Pennsylvania	1,416	10.0	2.8	14.3
	5,628	9.5	4.8	20.4
South Atlantic States				
Delaware	85	18.1	11.8	31.9
Maryland	550	23.0	11.6	30.2
Virginia	382	48.1	10.6	14.3
West Virginia	132	12.0	10.0	6.9
North Carolina ...	259	30.1	12.7	7.2
South Carolina ...	91	28.3	9.3	4.8
Georgia	158	38.6	7.4	5.1
Florida	193	40.9	29.2	10.2
	1,850	31.4	12.9	10.4
East North Central States				
Ohio	1,101	25.0	3.9	15.9
Indiana	380	26.3	5.8	11.1
Illinois	1,392	22.1	3.5	17.6
Michigan	649	25.5	8.5	12.3
Wisconsin	401	21.9	6.8	12.8
	3,923	23.8	5.3	14.7

West North Central States				
Minnesota	443	17.8	8.9	15.9
Iowa	319	11.9	2.7	12.6
Missouri	447	0.7	4.3	11.8
North Dakota	43	−4.4	−5.7	6.7
South Dakota	40	17.6	−7.2	6.2
Nebraska	170	23.2	−4.5	12.9
Kansas	191	11.7	−4.3	10.6
	1,653	10.7	1.7	12.2
East South Central States				
Kentucky	168	20.9	8.8	5.9
Tennessee	177	12.0	11.4	6.1
Alabama	124	39.3	7.1	4.4
Mississippi	52	18.2	8.7	2.4
	521	21.2	10.9	4.8
West South Central States				
Arkansas	56	43.6	5.1	2.9
Louisiana	179	12.6	12.5	7.6
Oklahoma	166	31.7	−2.5	7.1
Texas	485	22.8	10.1	7.6
	886	30.5	7.3	6.8
Mountain States				
Montana	61	1.6	4.1	10.8
Idaho	33	−19.5	17.9	6.3
Wyoming	33	17.9	11.2	13.2
Colorado	186	−1.1	8.4	16.6
New Mexico	83	23.9	25.6	15.6
Arizona	98	5.4	14.6	19.6
Utah	93	29.1	8.4	16.9
Nevada	37	2.8	21.1	33.6
	624	6.6	11.2	15.0
Pacific States				
Washington	218	20.4	11.1	12.5
Oregon	153	19.5	14.2	14.0
California	1,601	11.2	21.7	23.2
	1,972	12.8	18.8	20.3

OTHER AREAS

	June 1, 1934	*July 1, 1940*	*Increase*
Other U. S. Areas			*Per cent.*
District of Columbia	842	938	11.4
Alaska	11	15	36.4
Hawaii	89	94	5.6
Total	942	1,047	11.1
U. S. Possessions			
Puerto Rico	35	61	74.3
Philippines	56	61	8.9
Canal Zone	13	13	0.0
Total	104	135	29.8
Foreign Countries and Areas[4]			
Canada	338	441	30.5
Mexico	29	32	10.3
Central and South America	66	123	86.4
European countries	157	127	−19.1
African countries	22	24	9.1
Asiatic countries	118	124	5.1
Australasia	12	15	25.0
Total	742	886	19.4

[1] Statistics for members are for September 30, 1940, the close of the fiscal year.

[2] Increase in membership is from September, 30, 1936, to September 30, 1940.

[3] The population changes are for the decade 1930–1940.

[4] On July 1, 1940, there were members of the association resident in 75 foreign countries. They are decreasing rapidly in Europe as a consequence of the war.

OBITUARY

SIR JOSEPH JOHN THOMSON

IT is characteristic of the progress of science that periodically stages are reached at which possibilities of new discoveries seem to have come to an end. The wonders of the days which have passed have become moulded into a theory in terms of which the understanding of man is content. And the theory, having in its new-born state contributed to progress by suggesting further possibilities, finally reaches a point at which it has no more to say. In its old age it sits down, claims that all is finished, that there will be nothing new, and spends its declining years in grumbling about the impossibility of anything which, in the mind of some enthusiast, seems as though it might be possible. And then some new upstart does find new phenomena uncontemplated by the theory. A minor revolution in thought has to be created and while the new epoch is being stabilized many new things are born. Freed from restraint, discovery runs ahead of the warnings of the theories as to what can and can not be discovered. Science has a new lease of life, and a new generation of its workers is born.

It was in such a period of transition that J. J. Thomson came upon the scene. He came thoroughly trained in the old school of mathematical analysis, the school of Newton and of Maxwell and of Kelvin and of Rayleigh, but he came to an orchard in which all the good fruit seemed to have been picked. After a few early flutters in which his genius enabled him to find a little more fruit even among the trees which had already yielded so much and in which he wrote on "vortex rings" and on "application of dynamics to physics and chemistry," he became attracted to that curious realm of phenomena so dishearteningly complex, and without meaning to the school of thought of the day, phenomena having to do with the discharge of electricity in gases. His earlier work along the conventional lines had already brought him recognition in the form of election to the Cavendish professorship of physics in the University of Cambridge, so that at the age of 28 years he was able to start out upon that new field which was to bring immortality to his name and to give birth to a new school of physics and of physicists destined to carry science through a greater revolution of thought and phenomena in the space of half a century than had been achieved during the whole previous history of the human race.

At the time when Thomson commenced his work, science had acquired almost an inferiority complex in expression to its utterances. Dynamics, so dignified by the illustrious Newton and his followers, was always admitted with respect in all the halls of learning provided that it did not talk about anything too concrete. The more generalized the coordinates the happier the mathematical physicist, who was thereby