SOCIETIES AND MEETINGS

THE SOCIETY OF THE SIGMA XI

THE thirty-ninth annual convention of the Society of the Sigma Xi met at 4:00 P.M. on Wednesday, December 28, in the Hotel Jefferson in Richmond, Virginia, with forty-six chapters and thirteen clubs represented by delegations of from one to three members.

In his annual report as president of the society, Professor Baitsell announced fourteen grants-in-aid totalling $3,000; the assignment of five lecturers to forty institutions all over the country; and the society's first published volume, entitled "Science in Progress," to be issued by the Yale University Press in the spring, containing the ten Sigma Xi lectures sponsored by the society in the last two years.

Four new chapters have been added to the organization during the year—Rice Institute, Wellesley College, Massachusetts State College and the University of Florida. This brings the total of chapters to seventy-six, with an active enrolment of approximately 16,000.

The treasurer's report showed permanent funds amounting to approximately $40,000, an annual expenditure of $18,000 met from current income and a surplus of income over disbursements of approximately $3,000 for 1938.

Charters for chapters were granted to the University of West Virginia and the University of Alabama.

Dr. Carl D. Anderson, of the California Institute of Technology, was elected a member of the executive committee for the ensuing five-year term to succeed Professor L. J. Stadler, whose term of office has expired. Dr. Florence Sabin, of the Rockefeller Institute, was elected a member of the Alumni Committee for the ensuing five-year term to succeed Mr. Harold Norton, whose term has expired.

A committee was appointed to study the present membership structure of Sigma Xi for report at the next convention.

An amendment to the constitution was adopted, providing for the revocation of a charter of a chapter when, and if, circumstances should demand such action.

The seventeenth annual Sigma Xi lecture, under the joint auspices of the American Association for the Advancement of Science and of Sigma Xi, was given in the Mosque by Dr. W. F. Durand on "Modern Trends in Air Transport."

EDWARD ELLERY

FINANCIAL REPORTS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AT THE RICHMOND MEETING

AUDITED financial reports of the treasurer and the permanent secretary for the fiscal year ended September 30, 1938, were presented and approved by the council. The following is a brief digest:

TREASURER'S REPORT

Balance Sheet—Assets at September 30, 1938

Securities and mortgages	$255,265.36
Cash—income account	8,933.88
Cash—reserve for current needs	15,998.90
Total assets	$280,198.14

Balance Sheet—Liabilities at September 30, 1938

Endowment—for research (1)	$114,236.45
Endowment—for general purposes (2)	92,738.38
Endowment—dues of emeritus life members (3)	9,100.00
Endowment—dues of emeritus annual members (4)	500.00
Reserve fund	35,582.41
Permanent secretary's fund	12,042.00
Annual $1,000 prize fund	4,000.00
Unused grants to affiliated academies, etc.	775.00
Accumulated income unappropriated	11,223.90
Total liabilities	$280,198.14

(1) Richard T. Colburn fund, $87,186.45; A. G. Stillhamer fund, $3,500; fees of deceased sustaining members, $7,000; fees of deceased life members, $16,550.

(2) W. Hudson Stephens fund, $4,381.21; Michael P. Rich fund, $10,000; Hector E. Maiben fund, $1,115.17; Journal of the Association, $3,559; fees of living life members, $71,382.

(3) Jane M. Smith fund, $5,000; credits to fund from fees of $100 each set up from income from the fund or from general fund reverting on deaths of emeritus life members.

(4) Luella A. Owen fund.

CASH STATEMENT

Receipts

Balance, September 30, 1937	$ 19,321.71
Newcomb Cleveland gift to Grants Committee	1,000.00
Life membership fees	1,100.00
Revertment of grants	128.31
Donation to prize fund	2,000.00
Income from research fund	3,959.88
Income from general fund	3,421.47
Income from reserve fund	1,249.18
Income from permanent secretary's current funds	422.75
Income from Jane M. Smith fund	312.90
Income from Luella A. Owen fund	18.19
Total receipts	$ 32,934.39

Disbursements

Grants for aid of research	$ 2,725.00
Grants to affiliated academies	2,035.00
Annual prize—to Philip R. White	1,000.00
For emeritus life members	300.00
For emeritus annual members	15.00
Life members' journal subscriptions	1,599.00
Fifty-year members' journal subscriptions	87.00
Maiben lecture—R. C. Wallace	200.00
Safe deposit box and collection charges	40.61
Total disbursements	$ 8,001.61
Cash on hand, September 30, 1938	24,932.78
Total	$ 32,934.39

PERMANENT SECRETARY'S REPORT

(Period October 1, 1937, to September 30, 1938)

Receipts

Annual membership dues and fees	$ 88,600.85
Life membership fees	1,100.00
Contributions from members	3,337.50
Grant from Carnegie Corporation of New York	4,000.00
On grant ($5,000) from General Education Board	2,500.00
Sales of publications	1,804.55
Miscellaneous receipts	2.698.10
Special journal subscriptions	2,436.00
Registration fees—Indianapolis meeting	2,819.00
Registration fees—Ottawa meeting	1,107.00
Receipts from exhibitors—Indianapolis meeting	5,304.50
Advance receipts from exhibitors—Richmond meeting	866.75
Total receipts	$116,574.25
Cash in banks, September 30, 1938	1.652.70
Reserve in Treasurer's hands	11,619.70
Total	$129,846.65

Disbursements

Subscriptions to journals, including foreign postage	$ 55,020.68
Allowance to Pacific and Southwestern Divisions	2,358.00
Expenses of Washington office	23,879.56
Expenses of General Secretary	329.48
Expenses of Treasurer	200.00
Circularizing for new members	6,536.47
General and travel expenses—Indianapolis meeting	3,741.03
Expenses of [illegible] meeting	3,563.00
Expenses of [illegible] meeting	603.96
General and [illegible] meeting	2,959.44
Expenses of press service—Ottawa meeting	316.63
Preliminary expenses—Richmond meeting	1,028.96
Preliminary expenses—Milwaukee meeting	75.00
Preliminary expenses—Columbus meeting	40.00
Printing symposia	2,590.26
Life membership fees to Treasurer	1,100.00
Miscellaneous expenses	2,304.52
Expenses of Committee on Improvement of Science in General Education	1,314.56
Preparing and mailing radio broadcasts	3,878.87
Special journal subscriptions	2,454.00
Total expenditures	$114,294.42
Cash in banks	3,509.78
Cash in Treasurer's hands	12,042.45
Total	$129,846.65

REPORTS

DROPLET FISSION OF URANIUM AND THORIUM NUCLEI

THE fifth Washington Conference on Theoretical Physics, sponsored jointly by George Washington University and the Carnegie Institution of Washington, began January 26, 1939, with a discussion by Professor Bohr and Professor Fermi of the remarkable chemical identification by Hahn and Strassmann in Berlin of radioactive barium in uranium which had been bombarded by neutrons. Professors Bohr and Rosenfeld had brought from Copenhagen the interpretation by Frisch and Meitner that the nuclear "surface-tension" fails to hold together the "droplet" of mass 239, with a resulting division of the nucleus into two roughly equal parts. Frisch and Meitner had also suggested the experimental test of this hypothesis by a search for the expected recoil-particles of energies well above 100,000,000 electron-volts which should result from such a process. The whole matter was quite unexpected news to all present.

We immediately undertook to look for these extremely energetic particles, and at the conclusion of the conference on January 28 were privileged to demonstrate them to Professors Bohr and Fermi. It was subsequently learned that the particles had been observed independently by Fowler and Dodson at the Johns Hopkins University on the same day, by Dunning and coworkers at Columbia University on January 25 and by Frisch in Copenhagen two weeks earlier.

The experiments made in our Atomic-Physics Observatory at the Department of Terrestrial Magnetism of the Carnegie Institution of Washington are no doubt typical of similar experiments done at the other laboratories, but details of this work are not available to us. The experimental work here was done chiefly by my colleagues, R. B. Roberts, R. C. Meyer, L. R. Hafstad and N. P. Heydenburg.

For observations of the high-energy particles, an ionization-chamber, about five mm deep, was placed about three cm below the neutron-source and was so arranged that interchangeable copper disks about three cm in diameter could be placed on the collector, which was connected to a linear pulse-amplifier. The upper faces of these disks were then coated with the materials to be tested.

With the amplifier feeding a cathode-ray oscillograph the usual alpha-particle pulses were observed when a layer of uranium oxide was placed on the disk. On exposure to neutron-radiation from (Li + D) at 1,000 kv two additional groups of pulses were observed. The first group corresponded to the "neutron-recoils" from the air in the chamber, as previously measured with the same amplifier gain and without the uranium. These neutron-recoils gave pulses about four times the size of the alpha-particle pulses. The second additional group was 20 to 40 times larger than the largest "recoil"-pulse, thus coresponding to energies of 75 to 150 Mev released in the chamber, or 150 to 300 Mev total energy for each individual process. With paraffin surrounding source and chamber the yield was roughly 30 counts per min per μ A of 1,000-kv deuterons, which is a neutron-intensity corresponding to about 10,000 millicuries of radon-beryllium.

The yield from thorium was of the same order of magnitude.

No effect was observed from bismuth, lead, thallium, mercury, gold, platinum, tungsten, tin or silver with as much as 1/1000 the intensity of that from uranium and thorium.

No effect was observed with either uranium or thorium produced by the gamma rays from 3 μ A of 1,000-kv protons on lithium or on fluorine.

To determine roughly the energy-range of the neutrons involved in the fission-process, observations were made with the neutrons from several reactions, both with and without cadmium surrounding the ionization-chamber to filter out the thermal neutrons produced in the surrounding paraffin. Bearing in mind that the ratio of the counts with cadmium and without cadmium depends to a large extent on the amount of paraffin surrounding the source and chamber, the results of these tests may be deduced from Table 1 in which the relative number of "fissions" is given, with the total yield for