

us into the nonillions of grams. The weight of the Einstein universe bears the same relation to the weight of the whole earth as the latter bears to a kilogram. The weight of the earth to that of the sun is as 1 to 324,000. Hence we should have to take a trillion suns to get the weight of the universe.

It would take a ray of light, traveling at the rate of 186,000 miles per second, one billion years to go around the universe. To go around the universe it would take the fastest aeroplane 3 quadrillion years; the fastest automobile five and one half quadrillion years; and an express train, traveling at the rate of 60 miles an hour, 11 quadrillion years.

In conclusion, I wish to call your attention to the fact that the dimensions of this finite universe of Einstein are more than ample to include the spiral nebulae—whether regarded as galactic phenomena or even as island universes. On the assumption of approximate equality of size for celestial objects of the same class, which has been used by Shapley and other investigators, the extreme distance of the most remote of the spiral nebulae, considered as galactic phenomena, would be of the order of 10 million light-years; and, considered as island universes, would be of the order of 100 million light-years. Thus, even the most remote spiral nebulae would fall far within the bounds of the Einstein universe with its super-diameter of 300 million light-years.

Descartes, confronted with the question "What lies beyond?", always affirmed that a finite universe was impossible. This question has no meaning for Einstein because the foundation of general relativity is the doctrine that there is no space without matter or energy. If all the heavenly bodies we know belong to our galactic system, it is possible, says Einstein, that "other universes exist independently of our own." They may remain forever optically isolated from us by the phenomenon of the cosmic absorption of light. While other universes may palpitate beyond our own, no ray of knowledge, says Nordman, "could ever reach us from them. Nothing could cross the black, dumb abysses which environ our stellar island." We are doomed to dwell within a finite universe a thousand million times greater than the region now accessible to astronomical observation. Our glances are confined for ever within this giant—this all too minute—monad.

ARCHIBALD HENDERSON

THE UNIVERSITY OF NORTH CAROLINA

A NEW ERA FOR AMERICAN MUSEUMS

ON March 30, it was announced in *SCIENCE* that a grant of \$30,000 had been made to The American Association of Museums contingent upon the raising of

\$55,000 more, and that the campaign for funds was expected to continue through the autumn of 1923. It is therefore a matter of pride to the association that announcement can be made now of the success of its project and of the consequent establishment of national headquarters at Washington, D. C.

This development signals the beginning of a new era for the association, of course, but much more than that, it is believed to mark the beginning of a new era for the museums of America.

Organization on a national scale to the end of maintaining a staff to work for a common cause has been found highly advantageous by local units in many fields. Most wide-spread interest has attached to industrial and commercial developments along these lines, but the same methods have been equally successful in fields of social, civic, religious and educational endeavor. The recourse by museums to organized co-operation is therefore not surprising, but it is a clear indication of the hopeful trend in museum affairs.

The funds now available have been contributed in part by individuals, many of whom are members of museum boards. Unfortunately no more than a dozen museum corporations have shared to any considerable extent in the financial burden, but it is hoped that the three-year demonstration, which is now assured of support, will bring about more general participation by museums. It is felt that the responsibility will have to be shared in equitable fashion by a majority of active museums before the movement can enter upon the road to permanent success. However, the work is now afoot, and the future will depend upon the success of activities during the next three years. For those who are most closely associated with the project, there is a great responsibility.

Fortunately there is no lack of interest and moral support on the part of museums—at least so far as official attitude can be judged by the consensus of opinion among some five hundred museum employees and trustees, who make up the active membership of the association.

The program which has been drafted looks far into the future, and there is no thought that more than a few of the most important projects can be initiated within the near future.

The Program

I. PROPAGANDA SERVICE FOR MUSEUMS.

To acquaint the American public with the work and aims of museums.

A. Press publicity—news items, articles and special departments in newspapers, magazines, trade papers and house organs.

B. Screen publicity—production and circulation of films and slides showing the value of museums; efforts to induce producers of educational films to utilize museum material.

- C. Platform publicity—establishment of a board of lecturers made up of trained museum workers willing to give an occasional lecture for the association in places where such a lecture would help to stimulate interest in museums; lectures by the field secretary.
- D. Exhibit publicity—participation in expositions to the extent at least of showing a traveling exhibit to convey the museum idea and to show the value of a museum to the community, to industry, to schools, etc.
- E. Enlisting the active interest of communities and of various organizations with a view to inducing the establishment and development of museums in every community and of special museums under the auspices of industrial concerns and other organizations.

II. PUBLICATIONS SERVICE.

To make available the results of headquarters service, field surveys and research and to supplement the propaganda service.

A. Technical publications.

For museum workers and those intimately interested in museums.

- 1. Museum Work—a class periodical devoted to special articles, technical discussions, news of museums, proceedings of the association and items of current value with reference to association service.
- 2. Monographs—on museum principles and practice.
- 3. Museum Data—a loose leaf report service for members devoted to reference material.

B. Popular publications.

For the general public.

- 1. Special pamphlets—containing articles which may be useful in quantity to museums for the furtherance of such work as a membership campaign.
- 2. Popular magazine—to be established later for the purpose of supplementing the propaganda service.

III. LOCAL SERVICE IN FIELD.

To bring to any community the latest museum information from the entire country, particularly with reference to notable support of museums by their respective communities and the establishment of new museums.

A. Personal surveys by field secretary and recommendations concerning such matters as:

- 1. Membership.
- 2. Educational work.
- 3. Publicity methods.
- 4. Extension work—assistance in preparing plans for correlating museum educational programs with school curricula.

B. Personal assistance of field secretary in such matters as:

- 1. Membership campaigns.
- 2. Interviews with local authorities.

3. Talks at meetings.

4. Local publicity.

5. Establishment of museum councils—to consist of officials of museums in one community to secure effective coordination of effort.

6. Establishment of educational councils—to consist of officials of museums, colleges, schools, libraries and other educational institutions to secure a wise and correlated plan for the educational forces of a city.

IV. HEADQUARTERS SERVICE.

A. Clearing house between museums and organizations in allied fields.

To avoid duplication of effort and to make mutually available information concerning activities and services such as:

- 1. Lecturers and lectures.
- 2. Traveling exhibits.
- 3. Material for exchange and inter-loan.
- 4. Slides and films.
- 5. Expeditions and explorations.

B. Service bureau.

To perform for museums demanded services along lines covered by the clearing house and not already rendered by other organizations, until such time as an organization in the appropriate field may be induced to assume the service.

C. Information bureau.

To collect and to disseminate useful information and to foster cooperation and interchange of information between museums; report service to answer inquiries concerning such matters as:

- 1. Buildings.
- 2. Exhibition.
- 3. Administrative methods.
- 4. Educational methods.
- 5. Publicity methods.

D. Employment bureau.

To supply information concerning available or needed museum workers; to arrange for exchanges of staff members.

E. Cooperation with foreign associations of museums.

To foster international relations.

V. ADVANCEMENT OF MUSEUM SCIENCE AND PRACTICE.

To foster research and the training of museum personnel.

A. Research.

- 1. Study and analysis of museum problems and, if possible, formulation of general principles.
- 2. Effort to induce study of museum problems by research students and organizations.

B. Personnel training.

- 1. Studies and committee work to outline courses of undergraduate and graduate study in museumology.

2. Efforts to secure introduction of such subject matter into college undergraduate courses in education, art, history and science.
3. Cooperation with universities to establish graduate work in museumology.
4. Studies and committee work to outline training courses to be conducted in museums.
5. Efforts to secure establishment of such training courses in museums.
6. Vocational guidance for students and apprentices.

During the first year emphasis will be placed upon four undertakings. First, the bi-monthly publication, *Museum Work*, will be developed in order that the joined forces of museums may have a voice. Second, researches into museum principles and practices will be undertaken by the staff or will be set afoot through the good offices of other agencies concerned with museum problems. Third, an information bureau and service-center will be established at the Washington headquarters. Fourth, an effort will be made to modify in some degree the present misconception and inadequate understanding of museums which exists in the public mind. Beyond these four projects the trend of work will be influenced by expediency and the evolution of plans as time elapses.

THE STAFF

The new director of the association is Charles R. Richards, who until recently was director of Cooper Union. Professor Richards has already sailed for Europe, where he is to make a survey of museums with special reference to educational and economic service in the field of industrial art—a project which is being financed by the General Education Board, though it is to be carried forward in part as an association activity.

During the first year the secretary, who has become a resident member of the staff, is functioning as acting-director and will initiate the new inter-museum enterprise.

LAURENCE VAIL COLEMAN,
Secretary

SCIENTIFIC EVENTS

THE NUMBER OF MEDICAL STUDENTS

ACCORDING to statistics collected by the *Journal* of the American Medical Association, the total number of medical students in the United States for the year ending June 30, 1923, excluding premedical, special and postgraduate students, was 17,432, an increase of 1,292 over last year. This is the largest enrolment of students since 1912. Of the the total number of students, 16,771 were in attendance at the non-sec-

<i>Medical College Attendance</i>		
Year	Non-sectarian	Total
1880	9,776	11,826
1890	13,521	15,404
1900	22,710	25,171
1901	23,846	26,417
1902	24,878	27,501
1903	24,930	27,615
1904	23,662	28,142
1905	24,119	26,147
1906	23,116	25,204
1907	22,303	24,276
1908	20,936	22,602
1909	20,554	22,145
1910	20,136	21,526
1911	18,414	19,786
1912	17,277	18,412
1913	15,919	17,015
1914	15,438	16,502
1915	13,914	14,891
1916	13,121	14,012
1917	12,925	13,764
1918	12,727	13,630
1919	12,259	13,052
1920	13,220	14,088
1921	14,033	14,872
1922	15,247	16,140
1923	16,771	17,432

tarian (regular) colleges, 341 at the homeopathic, 99 at the eclectic and 221 at the three nondescript colleges.

During the past year there were 1,030 women studying medicine, the largest number since 1905, when there were 1,073. The percentage of women to all medical students this year is 5.9. There were 214

<i>Women in Medicine</i>		
Year	Total Women Students	Percentage of all Students. Both Sexes
1904	1,129	4.3
1905	1,073	4.1
1906	895	3.5
1907	928	3.8
1908	835	3.7
1909	921	4.2
1910	907	4.2
1911	680	3.4
1912	679	3.2
1913	640	3.8
1914	631	3.8
1915	592	4.0
1916	566	4.0
1917	610	4.5
1918	581	4.3
1919	686	5.2
1920	818	5.8
1921	879	5.9
1922	989	6.1
1923	1,030	5.9