

must lie open yet awhile at least, but every line of approach, however hypothetical, may well be pursued if controlled by due reservations.

As remarked at the outset, many of these considerations are applicable to states of the earth which might have arisen at an early day under any of the cosmogonic hypotheses. We have given precedence to one of these hypotheses partly because it seems to merit a fuller exposition in this particular than it has received, and partly because it seems to us to present a physiographic setting more favorable for synthesis than would probably have arisen under the alternative cosmogonic hypotheses.

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#### UNIVERSITY REGISTRATION STATISTICS—I.

THE registration returns for November 1, 1908, of twenty-five of the leading universities of the country will be found tabulated on page 912. One institution has been added to the list this year, namely, Western Reserve University. A special effort was again made this year to prevail upon the reporting officers to do away altogether with the first item of double registration, but without complete success, and it must, therefore, be borne in mind that an institution with a large double registration in the fall enrollment naturally makes a comparatively better showing in the schools in which this duplication occurs, than one where this item has been reduced to zero. Furthermore, some difference of opinion evidently still exists concerning the proper classification of students enrolled in extension courses, evening courses, etc., for entrance upon which standards of admission are, to all intents and purposes, non-existent, and similarly there will be found in the summer session and even in regular

faculties, for example, in music and agriculture, students who have not completed a high-school course. Then again, a few institutions demand a baccalaureate degree or its equivalent for admission to one or more of their professional schools, as Harvard does for law, medicine, theology and engineering, Johns Hopkins for medicine, and Columbia for law, whereas at certain other institutions admission to the professional schools rests practically on a high-school graduation basis. Another factor that must not be overlooked is the difference in the number of partial students in attendance on various institutions: Columbia and Chicago, for instance, are apt to have more than Princeton or Stanford, and this circumstance should not be lost sight of in preparing figures intended to show the proportion of officers to students. All of these points are mentioned in order to emphasize once more the fact that the figures herewith presented have, from the very nature of the case, little qualitative significance, inasmuch as such items as standards of admission and advancement, efficiency of instruction, equipment, and the like, are necessarily ignored in the comparison. The figures have in every instance been furnished by the proper reporting officer, who has, in a number of cases, added interesting information about the development of the institution involved during the year just past.

Comparing the figures for 1908 with those of the previous year, it will be seen that, in spite of the prevailing economic depression, only two institutions, Harvard and Stanford, show a slight loss in enrollment, whereas two years ago five suffered a decrease. Taking the total attendance into consideration, *i. e.*, including the summer session, the greatest gains in terms of student units have been made by Chicago, Columbia, Wisconsin, Indiana, Pennsylvania,

Cornell, California and Minnesota, each one of these having gained over four hundred students; omitting the summer session attendance, the largest increases have been registered by Columbia, Minnesota, Cornell, Northwestern, Wisconsin, Pennsylvania and Ohio, in the order given, the growth in each case being one of more than three hundred students. Comparing this year's grand totals with those of 1902, we

ment. The largest gains during this period have been made by Pennsylvania, New York University, Illinois, Michigan, Cornell, Columbia, Syracuse, Minnesota, Missouri, Ohio and Iowa, each of these universities showing an increase of over one thousand students, an increase in which the establishment of summer sessions plays no small rôle in several instances.

According to the figures for 1907, the

Faculties	California	Chicago	Columbia	Cornell	Harvard (incl. Radcliffe)	Illinois	Indiana	Iowa	Johns Hopkins	Kansas	Michigan	Minnesota	Missouri	Nebraska	New York	Northwestern	Ohio State	Pennsylvania	Princeton	Stanford	Syracuse	Virginia	Western Reserve	Wisconsin	Yale
College Arts, Men.....	526	749	645	873	2231	402	536	518	166	427	1027	557	478	289	298	480	335	352	641	434	1387	292	310	842	1273
College Arts, Women.....	879	685	467	873	394	442	405	520	223	515	653	909	432	523	167	495	323	20	496	1387	292	269	788	894	967
Scientific Schools*.....	818	677	1727	109	1081	174	126	209	184	706	523	260	168	809	252	125	326	815	582	388	390	98	142	154	428
Law.....	95	209	318	223	681	174	126	209	184	706	523	260	168	809	252	125	326	815	582	388	390	98	142	154	428
Medicine.....	36	148	306	207	319	502	260	302	355	79	445	244	55	110	408	524	563	119	180	282	152	89	98	30	142
Graduate Schools.....	324	408	737	246	460	233	40	126	177	48	160	97	137	94	255	211	71	339	91	95	45	31	15	216	391
Agriculture.....	137	.....	.....	394	443	.....	.....	.....	.....	.....	1029	222	375	.....	.....	.....	216	.....	.....	.....	.....	.....	.....	.....	.....
Architecture.....	†	.....	131	130	†	182	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	165	.....	.....	.....	.....	.....	.....	.....
Art.....	107	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Commerce.....	153	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dentistry.....	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Divinity.....	.....	198	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Forestry.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Musie.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pedagogy.....	.....	183	950	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pharmacy.....	65	.....	284	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Veterinary.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other Courses.....	.....	292	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deduct Double Registration.....	27	209	.....	3	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<b>Total.....</b>	<b>3199</b>	<b>3563</b>	<b>4540</b>	<b>4247</b>	<b>4302</b>	<b>1877</b>	<b>1032</b>	<b>1877</b>	<b>698</b>	<b>1806</b>	<b>4937</b>	<b>5355</b>	<b>2250</b>	<b>2921</b>	<b>2457</b>	<b>2392</b>	<b>1442</b>	<b>1221</b>	<b>1314</b>	<b>1525</b>	<b>1084</b>	<b>777</b>	<b>1016</b>	<b>2347</b>	<b>3448</b>
Summer Session, 1908.....	631	2391	1722	841	1249	656	1005	376	584	1036	352	508	54	621	257	563	472	.....	.....	.....	.....	.....	.....	.....	.....
Deduct Double Registration.....	101	750	96	8	22	208	50	134	101	57	50	130	11	1	1	27	130	.....	.....	.....	.....	.....	.....	.....	.....
<b>Grand Total, 1908.....</b>	<b>3751</b>	<b>5114</b>	<b>5675</b>	<b>4700</b>	<b>5242</b>	<b>4400</b>	<b>2113</b>	<b>2356</b>	<b>638</b>	<b>2686</b>	<b>5188</b>	<b>4607</b>	<b>2558</b>	<b>3754</b>	<b>2951</b>	<b>3113</b>	<b>2700</b>	<b>4555</b>	<b>1314</b>	<b>1541</b>	<b>1304</b>	<b>757</b>	<b>1016</b>	<b>2347</b>	<b>3448</b>
" " 1907.....	3546	5104	5197	4224	5246	4172	1667	2188	651	1122	4953	4207	2274	2512	2548	2714	2344	4134	1311	1504	1303	757	1016	2347	3448
" " 1906.....	3240	4731	4676	4075	4433	3810	1515	1700	618	1090	4274	3944	2071	2807	2232	2035	2180	2084	1352	1220	1004	745	1016	2347	3448
" " 1905.....	2931	4557	4753	3871	5283	3325	1277	1700	688	1700	4321	3940	1887	2037	2012	2701	2057	2430	1351	1006	2776	766	873	1033	2477
" " 1904.....	2735	4055	4838	3883	5292	3360	1206	1600	710	1340	4000	3882	1704	1728	2380	2856	1738	2027	1335	1424	2452	691	808	1033	2477
" " 1903.....	2790	4146	4757	4388	6013	3279	1614	1250	694	1311	4926	3750	1540	2531	2177	2740	1710	2044	1434	1370	2207	628	755	1021	2690
" " 1902.....	2790	4146	4757	4388	6013	3279	1614	1250	694	1311	4926	3750	1540	2531	2177	2740	1710	2044	1434	1370	2207	628	755	1021	2690
Extension and Summer Courses.....	1130	.....	2579	.....	1112	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Officers.....	67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

\* Includes schools of mines, engineering, chemistry and related departments.

† Included elsewhere.

‡ The attendance on the 188 courses given during the past year was 53,841.

find that Harvard and Princeton are the only institutions that exhibit a loss in registration during the intervening period, but the higher education of this country would suffer no deterioration if more of our institutions would only copy Harvard's standards at the risk of quantitative losses in enroll-

ment. The largest gains during this period have been made by Pennsylvania, New York University, Illinois, Michigan, Cornell, Columbia, Syracuse, Minnesota, Missouri, Ohio and Iowa, each of these universities showing an increase of over one thousand students, an increase in which the establishment of summer sessions plays no small rôle in several instances.

Comparing this with the order for 1908, we observe that Columbia now heads the list, having changed places with Harvard, Pennsylvania has passed Illinois, Wisconsin and California have passed Yale, and Indiana has passed Kansas. Omitting the summer session enrollment, the order is, of course, somewhat different, namely, Michigan, Columbia, Minnesota, Harvard, Cornell, Pennsylvania, Illinois, New York University, Yale, Wisconsin, California, Syracuse, Northwestern, Nebraska, Chicago, Ohio, Missouri, Iowa, Kansas, Stanford, Indiana, Princeton, Western Reserve, Virginia, Johns Hopkins—Columbia and Minnesota having passed Harvard, Cornell having passed Pennsylvania, New York University having passed Yale, California having changed places with Syracuse, Northwestern with Nebraska, and Missouri with Iowa.

Considering in order the various faculties, we find first, that so far as the undergraduate academic department is concerned, there has been a general increase of men as well as of women, the actual and percentage gains being larger in the case of the male than in that of the female students. Chicago, Harvard, Princeton, Stanford, Virginia and Yale have experienced losses in the number of male academic students, while California, Michigan, Minnesota, Nebraska and Northwestern—all western institutions—have fewer academic women students than they had last year. At more than half of the western institutions there are more women than men in the academic department, the exceptions being Chicago, Indiana, Michigan, Missouri, Ohio, Western Reserve and Wisconsin. In all of the eastern institutions, on the other hand, with the possible exception of Cornell and Syracuse, who do not separate their academic registration into two divisions, the number of men is considerably in excess of that of women.

In spite of a large growth this year in the number of men, Wisconsin still has fewer than it had in 1904, while the number of women is larger by 180. Comparing the total academic enrollment—men and women—for 1908 with that for 1902 in the case of those institutions which are included in the tables of both years, we find that there has been a loss in numbers at Chicago, Indiana, Nebraska, Pennsylvania and Princeton, while the largest gains in the academic division during the same period have been made by Syracuse, Wisconsin, Michigan, Missouri, Northwestern, Minnesota and Columbia. The scientific students were grouped with the academic students at California and Stanford in 1902, and consequently no comparisons can be made for these institutions. The largest number of male academic students is still found at Harvard, which is followed by Yale, Michigan, Wisconsin, Chicago, Columbia, Princeton, Minnesota, whereas if the women be included the order would be Harvard, Michigan, Wisconsin, Minnesota, Chicago, California, Syracuse, Yale, Columbia, Iowa—each of these enrolling over one thousand academic students.

The only institutions that have registered a decrease in the number of scientific students are Harvard, Kansas, Nebraska and Virginia, and of these the first mentioned is the only one that shows a loss as compared with 1902, of course owing to the fact that the baccalaureate degree is now required for admission to the Harvard engineering schools. The gain in this field since 1902 is in several instances quite remarkable, *e. g.*, from 597 to 1,352 at Michigan. The largest number of scientific students is still found at Cornell; Michigan and Illinois being the only others that attract over one thousand students to their scientific schools; these are followed by Yale, Ohio State, Wisconsin, California,

Pennsylvania, Minnesota, Columbia, Missouri, Nebraska and Princeton, each of these universities having over five hundred students in attendance on their scientific schools.

The attendance on the schools of law connected with the universities under consideration shows, in general, a fair gain since last year, whereas in the case of the medical schools the gain is only slight; in fact, there are at present no less than approximately eight hundred fewer students of medicine in attendance on the institutions credited with medical schools in the tables of both 1908 and 1902, than there were in the latter year, while in the case of the law schools there has been a gain of about five hundred students during the same period. Minnesota, Yale, Columbia and Virginia exhibit the largest increase in law since last year, Indiana,<sup>1</sup> Minnesota and Illinois in medicine; Harvard, Illinois, Indiana,<sup>1</sup> Michigan, New York University and Ohio showing losses in law, and California, Cornell, Harvard, Kansas, Missouri, Nebraska, New York University, Northwestern, Pennsylvania and Virginia in medicine. New York University still possesses the highest law school enrollment, being followed by Michigan, Harvard, Minnesota, Yale, Pennsylvania, Columbia and Virginia. Of these the Harvard and Columbia schools are the only ones on a graduate basis. Pennsylvania continues to have the largest medical school, followed by Northwestern, Illinois, Michigan, New York University, Johns Hopkins, Harvard, Columbia and Iowa—Harvard and Johns Hopkins having the

<sup>1</sup> The large increase in the school of medicine is accounted for by the consolidation of all the medical schools in Indianapolis and their absorption by Indiana University, while the falling off in the school of law is due to the fact that all the duplicates have been eliminated this year, only actual candidates for the law degree being included.

only graduate schools of medicine among those here mentioned.

The graduate schools show healthy gains all along the line, with the exception of Indiana, Syracuse, Princeton and Nebraska, the increase being especially noteworthy at Michigan, California and Illinois—all western institutions. Columbia, with an enrollment of 958 students (to the 737 in the table should be added 221 graduate students at Teachers College, who are omitted here for the sake of avoiding the item of double registration), has by far the largest graduate school, followed by Harvard, Chicago, Yale, Pennsylvania, California and New York University.

The agricultural schools show a most encouraging increase, practically without exception, Minnesota this year having an enrollment of over one thousand, being followed by Illinois and Cornell. The schools of architecture have likewise grown, the largest being those connected with Illinois, Pennsylvania, Columbia and Cornell. The largest schools of commerce are at New York University and Pennsylvania, and they exhibit a large increase over last year. The dental schools for the most part have suffered a loss, Pennsylvania still having by far the largest number of dental students, being followed by Northwestern. The latter, Chicago and Yale show a slight gain in the number of divinity students, whereas the enrollment at Harvard has remained stationary. Where the forestry students are listed separately, a small increase is apparent, whereas a number of institutions have registered losses in music, Syracuse, with 690 students, still heading the list in the latter department, followed by Nebraska and Northwestern. Syracuse is the only institution to report a decrease in the number of students of education, Teachers College of Columbia University, with 950 students, continuing to head the list, being followed by New York

University and Missouri. All of the schools of pharmacy, with the exception of that of Illinois, have experienced satisfactory gains in attendance, Columbia now having the largest enrollment, with Illinois second and Northwestern third. Ohio State and Pennsylvania report gains in veterinary medicine, these being the two largest schools.

Northwestern, Stanford and Syracuse are the only institutions that experienced a loss of students in the summer session of 1908, the Yale summer courses having been withdrawn this year. In some instances, the growth has been quite noteworthy, for example at Wisconsin, where no less than 1,027 students were enrolled, as against 651 in 1907, and at Indiana, which reported an increase from 721 to 1,005. In addition to Chicago, the following institutions attracted over one thousand students last summer, ranking numerically in the order given: Columbia, Harvard, Michigan, Wisconsin and Indiana. The students taking summer work in surveying, geodesy or mining are not included in the Columbia figures.

The eastern colleges for men and those for women included in the writer's geographical distribution statistics<sup>2</sup> all report gains in the fall registration over last year, with the single exception of Bryn Mawr. The Massachusetts Institute of Technology shows an increase from 1,415 to 1,462, Purdue one from 1,518 to 1,534. Similarly Bowdoin has grown from 394 to 419, the loss in medicine occasioned by an increase in standards being more than offset by gains in the collegiate department, Amherst from 513 to 525, Dartmouth from 1,219 to 1,233 (the academic department from 1,131 to 1,136), Brown from 924 to 995 (the academic department from 661 to 727), Wesleyan from 316 to 319, Lehigh from 655 to 664, Wellesley from 1,209 to

1,281, Smith from 1,482 to 1,561, Mt. Holyoke from 711 to 746, and Vassar from 996 to 1,014, while Bryn Mawr has registered a decrease from 407 to 395. Comparing the enrollment of these institutions with that for November 1, 1903, we note a slight loss in attendance at Wesleyan (3 per cent.), Massachusetts Institute of Technology (4 per cent.), and Bryn Mawr (7 per cent.), while gains have been made in the following order: Smith, 51 per cent.; Dartmouth, 42 per cent.; Wellesley, 31 per cent.; Purdue, 29 per cent.; Amherst, 28 per cent.; Bowdoin, 14 per cent.; Mt. Holyoke, 11 per cent.; Lehigh, 10 per cent.; Vassar, 9 per cent., and Brown, 6 per cent. In the case of the Massachusetts Institute of Technology, the relatively large registration in 1903 (1,528) was due to the unusually heavy enrollment in the class of 1906, which entered immediately before the increase in entrance requirements and in tuition fees became operative. During the past ten years the percentage of students entering the Massachusetts Institute of Technology from other colleges has grown from 6 to 13 per cent. At Bryn Mawr the decrease in numbers is accounted for by the facts that the fees for board were increased from \$175 to \$200 in 1907 and that the charge for tuition for undergraduate students was increased by \$50 in 1903. It has been the policy of the board of directors to limit the attendance to the number which can be accommodated in the halls of residence, and for the last year or two the enrollment has been within forty of that number. The entering class at Dartmouth is smaller than it was last year, owing to the financial stringency of the past year. At Mount Holyoke the increase in registration is due to the larger number of rooms at the disposal of students, the number accepted each year being determined by the accommodations available on the campus and in the village. At

<sup>2</sup> SCIENCE, October 30, 1908.

present admission is being refused to several hundred applicants each year. At Vassar the total number of students is limited to about one thousand.

The following changes in the course of study and additions to the equipment have been reported: At Dartmouth a new dormitory, New Hampshire Hall, accommodating 107 students, has been erected, and the chapel has been enlarged, its capacity having been increased about half. Wesleyan has adopted a new course of study, which substitutes the "group and major" system for the semi-required system of previous years. English is the only subject required of all students, while candidates for the B.S. degree must take some mathematics and some modern languages. North College, the new dormitory to take the place of old North College, burned a few years ago, was opened last January and is now fully occupied. The most important change instituted at Lehigh this fall is the establishment of a conference department, which provides extra instruction in modern languages, mathematics, physics, and chemistry for freshmen and sophomores, the purpose being to furnish help at a very low rate to students of the first two years who experience difficulty in handling their work. Smith reports the erection of a new college library, which is to be ready for occupancy next September, and Mount Holyoke the addition of a music hall—containing a concert room, class rooms and practise rooms—and a library, which are to be completed before the close of the present academic year. The Sanders Laboratory of Chemistry, at Vassar, is to be completed before the second half-year. An additional instructor has been engaged for the German department, who gives her entire time to colloquial practise. A half-year of work in the history of philosophy is now prescribed as a prerequisite for the senior

course in ethics, both of these courses being required at Vassar for the A.B. degree. At the Massachusetts Institute of Technology physical training has been prescribed for all first-year students.

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(*To be concluded*)

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JAMES FLETCHER

DOCTOR JAMES FLETCHER, botanist and entomologist of the Experimental Farms System of Canada, died November 8 in Montreal. He had been suffering for some time with internal hemorrhage, and went to Montreal to consult a specialist. He remained there for a week under treatment, but in spite of expert medical assistance the illness terminated fatally. Doctor Fletcher was one of the most widely known and most universally loved entomologists in North America. He was also widely known among the botanists and other men of science. He had been connected with the American Association for the Advancement of Science since 1883, had attended most of the meetings, and had thus become known to very many.

He was born at Ashe, Kent, England, March 28, 1852. He was educated at Kings School, Rochester, England, and came to Canada in 1874, taking a position in the Bank of British North America. Later he became connected with the Library of Parliament at Ottawa, and in 1887 was made entomologist and botanist to the Dominion Experimental Farms, and entomologist to the Geological Survey. His acquaintance with Canadian naturalists was, of course, even wider and closer than with those of the United States. He organized the Ottawa Field Naturalists' Club and was president of it. He was one of the leading spirits in the Ontario Entomological Society, and for a long time had been a fellow of the Royal Society of Canada, at one time holding the office of honorary secretary and honorary treasurer of that important organization. He was the heart and soul of the Botanical Club of Canada. He was also a fellow of the Linnean Society of London,