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UNIVERSITY REGISTRATION STATISTICS

On page 730 will be found the registra-
tion returns for November 1, 1907, of
twenty-four of the leading universities of
the country. The only institution that
has been added to the list this year is the
University of Iowa. By reason of the
great diversity that exists in the classifica-
tion into schools of the various institutions,
it is becoming increasingly difficult to re-
tain uniformity in compiling the table, and
considerable difficulty arises especially in
connection with extension and similar
courses; in some instances students in at-
tendance on such courses are included in
the regular enrollment, whereas in others
they are carefully excluded. In spite of
the effort made to prevail upon the institu-
tions listed to distinguish closely between
regular students that have satisfied at least
the requirements for entrance to the aca-
demic department, on one hand, and stu-
dents enrolled in extension courses, eve-
ning courses, etc., who do not possess a high
school training, on the other, some con-
fusion still exists, as several institutions
were rather loath to avail themselves of the
separate rubric provided for the latter
category. Similarly, the summer session
presents certain difficulties, inasmuch as
there are, no doubt, at most of these ses-
sions a number of students who have not

MSS. intended for publication and books, etc., intended for
review should be sent to the Editor of SCIENCE, Garrison-on-
Hudson, N. Y.

Facilities	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	Wisconsin	Yale
College Arts, Men.....	447	764	609	779	2268	365	414	433	166	398	980	509	428	285	279	389	281	270	665	973	1358	316	757	1314
College Arts, Women.....	922	668	420	1633	360	423	396	460	438	438	665	915	379	672	136	507	296	706	572	477	385	746	—	
Scientific Schools*.....	794	183	585	1633	162	1059	201	221	—	443	1324	666	649	670	167	845	853	304	—	—	182	109	961	
Law.....	65	247	200	777	177	177	201	199	162	162	747	424	209	167	845	242	136	304	572	71	385	221	868	
Medicine.....	38	141	298	316	325	454	112	302	325	88	445	175	63	130	475	537	46	590	114	62	151	103	240	
Graduate Schools.....	249	381	715	205	442	165	106	115	160	36	95	927	152	235	252	—	171	339	—	—	68	30	337	
Agriculture.....	118	—	—	325	22	150	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	139	
Architecture.....	45	—	123	100	—	10	—	—	—	25	—	—	—	65	—	—	—	107	—	—	49	—	—	
Art.....	69	—	—	—	—	99	—	—	—	—	—	—	—	—	675	328	—	225	—	78	—	—	35	
Commerce.....	166	—	—	—	—	68	—	179	—	—	169	175	—	—	—	227	17	389	—	—	—	—	80	
Dentistry.....	69	—	—	—	31	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	61	
Divinity.....	—	172	—	—	—	—	—	9	—	—	—	—	—	—	—	273	—	41	—	—	637	—	83	
Forestry.....	—	—	—	—	—	105	—	61	—	107	—	16	—	400	420	—	18	—	—	—	155	—	—	
Music.....	—	—	24	—	—	—	—	—	—	—	—	—	—	—	—	142	58	—	—	—	—	—	—	
Pedagogy.....	—	180	891	—	—	—	—	—	—	86	95	85	—	—	25	298	157	131	—	—	—	—	—	
Pharmacy.....	—	—	229	—	—	260	—	51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Veterinary.....	—	—	—	81	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Other Courses.....	—	125	—	244	—	48	—	41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Deduct Double Registration.....	(45)	(193)	—	(5)	(12)	(4)	(54)	(107)	—	(25)	(31)	—	(314)	(75)	(75)	(319)	(2)	(130)	—	—	(50)	(22)	(140)	(48)
Total.....	2978	2421	4141	3878	4373	3805	1175	1964	651	1758	4489	3957	1955	2651	3233	2624	2125	3896	1311	1583	3043	757	3128	3299
Summer Session, 1907.....	522	2577	1392	755	1125	555	721	344	—	292	1064	335	452	244	540	265	425	363	—	65	205	—	651	162
Deduct Double Registration.....	(154)	(404)	(336)	(340)	(152)	(188)	(229)	(120)	—	(118)	(600?)	(85)	(133)	(83)	(125?)	(175)	(206)	(125)	—	(54)	(86)	—	(378)	(26)
Grand Total, 1907.....	3346	4594	5197	4293	5346	4172	1667	2188	651	1932	4953	4207	2274	2812	3648	2714	2344	4134	1311	1594	3162	757	3401	3435
“ “ 1906.....	3246	4731	4650	4075	5343	3810	1515	1950	618	1680	4674	3944	2071	2807	3283	2635	2180	3854	1352	1530	3004	745	3099	3477
“ “ 1905.....	3631	4557	4755	3871	5283	3635	1377	1700	688	1706	4521	3940	1887	2635	2912	2791	2057	3430	1361	1606	2776	696	3083	3477
“ “ 1904.....	3738	4035	4833	3853	5192	3369	1206	1460	740	1446	4000	3886	1704	2728	2380	2556	1758	3027	1385	1424	2452	691	3370	3008
“ “ 1903.....	3690	4146	4557	3438	6013	3239	1614	1260	694	1319	3926	3550	1540	2513	2177	2740	1710	2644	1414	1370	2207	638	3221	2990
“ “ 1902.....	3676	4296	4302	3281	5468	2819	1648	1320	669	1294	3764	3505	1408	2560	2201	2675	1603	2549	1315	1378	2020	586	2884	2804
Extension and Similar Courses.....	—	23,425	3085	—	153†	—	87	165	193	122	385	—	246‡	235	—	124	136	203	—	—	—	91	239	—
Officers.....	478	376	646	517	593	430	—	—	—	—	—	—	182	—	310	333	193	405	188	118	215	—	353	387

? Estimated (see second item of double registration for Michigan and New York University)

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

† Included in college statistics ‡ Included under agriculture † Figures for 1906-7

‡ Not a separate school; courses taken by undergraduate and graduate students in college or scientific school and graduate school, respectively

completed the secondary school course. Taking these discrepancies into consideration, and not losing sight of the fact that large registration is not necessarily synonymous with great efficiency or high requirements, the impartial observer may nevertheless be able to draw some interesting conclusions from the figures herewith presented.

Comparing the figures for 1907 with those of the previous year, it will be seen that only three institutions have suffered a loss in enrollment, namely, Princeton (3.03 per cent.), Chicago (2.91 per cent.), and Yale (about 1 per cent.), the decrease in the last case being due to a falling off in the attendance on the summer session, there having been, on the contrary, a gain in the number of students registered in the fall. Last year California, Columbia, Johns Hopkins, Northwestern and Stanford all experienced a decrease. The largest gains in terms of student units this year were made by Columbia, New York University, Illinois, Wisconsin, Michigan and Minnesota; in other words, by two eastern and four western institutions, the two New York City universities standing at the head of the list. At Harvard, Nebraska and Virginia the enrollment has remained stationary, while all the other institutions show a fair increase. Comparing this year's enrollment with that of 1902, we notice that every institution included in both tables, with five exceptions, exhibits a growth in registration during the intervening period, the exceptions being California, Harvard, Johns Hopkins, Northwestern and Princeton, the largest gains during this five-year period having been made by Pennsylvania, New York University, Illinois, Michigan, Syracuse, Cornell, Columbia and Missouri, that is, by five eastern and three western institutions. Carrying the comparison a little farther by considering the *twelve* institutions that

have made the most consistent gains during the past five years, we shall find that six of these are located in the east and six in the west, Iowa, Ohio, Minnesota and Yale being the four universities to be added to the eight mentioned above. As pointed out last year, the establishment of summer sessions is responsible for much of this growth in several instances.

According to the figures for 1906, the twenty-three universities included in the table ranked as follows: Harvard, Chicago, Michigan, Columbia, Cornell, Minnesota, Pennsylvania, Illinois, Yale, New York University, California, Wisconsin, Syracuse, Nebraska, Northwestern, Ohio, Missouri, Kansas, Stanford, Indiana, Princeton, Virginia, Johns Hopkins. Comparing this with the order for 1907, we notice that Columbia has resumed second place, while Michigan has passed Chicago. The changes are fewer this year than they have been for some time, the only other transpositions being New York University and Yale, Wisconsin and California, Indiana and Stanford, the institution first mentioned in each pair having passed the other since last year. Omitting the summer session registration, the order is somewhat changed, although practically identical with that of last year, the only changes in position being due to the passing of Harvard by Michigan, of Pennsylvania and Cornell by Minnesota, and of Syracuse and California by Wisconsin. The order this fall is as follows: Michigan, Harvard, Columbia, Minnesota, Pennsylvania, Cornell, Illinois, Yale, New York University, Wisconsin, Syracuse, California, Nebraska, Northwestern, Chicago, Ohio, Iowa, Missouri, Kansas, Stanford, Princeton, Indiana, Virginia, Johns Hopkins.

An examination of the individual faculties reveals the fact that the institutions continue to show a fairly general increase in the attendance on the academic depart-

ment, although the gain is by no means as consistent as it was last year. At three of the prominent state institutions of the middle west we discover a decrease in the number of male students enrolled in the academic department going hand in hand with an increase in the number of women, while at several other western institutions the gain in the number of women is larger than that in the number of men. The exact opposite of the first condition is noticeable in the case of at least two of the eastern institutions, namely, Harvard and New York University, where we find an increase in the number of male academic students accompanied by a decrease in the number of women students. It is no doubt safe to draw the broad conclusion that there is a more pronounced tendency on the part of eastern girls to attend separate colleges for women, and this view is borne out by the fact that there has been a steady gain in the enrollment of colleges like Smith, Vassar, Bryn Mawr, etc., during the past few years. At California and Nebraska there are more than twice as many women as men in the academic department, Chicago, Indiana, Michigan, Missouri and Wisconsin being the only western institutions that enroll more men than women in the department under discussion, whereas at all of the eastern institutions included in the table there are more men than women in the academic department, with the possible exception of Cornell and Syracuse, which do not furnish the separate figures for the two classes. Wisconsin has 87 less men in 1907 than in 1904, but 138 more women; Indiana has 176 more women but only 7 more men, while Nebraska has 30 less men but 39 more women.

With the exception of Syracuse, Virginia and Harvard, all of the scientific schools show an increase, which in some cases is quite considerable, whereas last year three of the leading institutions in the

east, namely, Columbia, Princeton and Yale, reported a decrease in the number of scientific students. It must not be forgotten that this year's falling off in the Lawrence scientific school at Harvard is to be explained by the gradual working out of the system inaugurated by the establishment of the new graduate school of applied science in 1906. Last year the professional schools of law and medicine showed a general decline in attendance, and this decrease has continued in medicine, while in law the number of students has remained practically uniform. Yale, New York University and Chicago have made the largest gains in law, while Indiana, Northwestern, and Harvard and Johns Hopkins report the largest increase in the number of medical students. It is interesting to note in this connection the figures given in the latest report (1904-05) of the commissioner of education, where we learn that the total number of law students in the country during the year under review was larger than ever before, namely, 14,714, whereas the number of medical students decreased by 1,114 to 25,835, which is smaller than the number of medical students in any other of the four preceding years. The reasons for this decline in the number of medical students were described in a previous article.

In contradistinction to last year, the graduate schools report healthy gains, a decrease being noted only in the case of Cornell, Kansas, Virginia and Yale. All of the agricultural schools, with the exception of those at Harvard, Ohio and Wisconsin, have also gained in the number of students. The schools of architecture exhibit a gain at every institution, with the exception of Pennsylvania, while dentistry has increased numbers everywhere, except at Illinois. Divinity, on the other hand, shows a loss at all of the institutions, except at Northwestern. The two institutions

that report their forestry students under a separate category have made gains in this direction. Music, pharmacy and veterinary medicine remain fairly uniform, losses in some of the institutions being balanced by gains in others. Columbia is the only university that reports a noteworthy gain in pedagogy. The most consistent and largest gains in the actual number of students have been registered by the summer sessions, California, Chicago and Yale being the only schools that have suffered an appreciable decrease in enrollment.

Harvard continues to maintain the large lead that it has held for a number of years in the academic department. Inasmuch as Cornell and Syracuse do not separate men from women in the academic statistics, it is difficult to determine the exact order for men only, but taking both men and women into consideration, the order would be Harvard, Michigan, Wisconsin, Stanford, Chicago, Minnesota, California, Syracuse, Yale, Columbia—all of these enrolling over one thousand academic students. 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, Wisconsin, Ohio State, California, Pennsylvania, Nebraska, Minnesota, Missouri and Columbia, the order being exactly the same as last year, while Princeton has this fall joined the institutions that register an attendance of over five hundred scientific students. New York University continues to have the largest law school among the institutions in the list, with Michigan second, Harvard third, and Minnesota fourth, Harvard being the only one of the four to demand a baccalaureate degree for admission. The largest medical school is still found at Pennsylvania, Northwestern being second and New York University being third. As for the graduate schools, Co-

lumbia with an enrollment of 938 students (to the 715 in the table should be added 223 graduate students in Teachers College, who are omitted in the table for the sake of avoiding double registration) has by far the largest, Harvard with 442, Chicago with 381, and Wisconsin with 353 students, following in the order named. Minnesota has the largest school of agriculture, enrolling more than twice as many students as Illinois, its closest numerical competitor, while the latter leads in students of architecture, being followed by Columbia. New York University has the largest school of commerce, Pennsylvania has the largest number of dental students, Northwestern continues to lead in divinity, and Yale in forestry, although, as pointed out last year, some of the state institutions that include forestry under agriculture or elsewhere may actually have more students of forestry than Yale; Syracuse still has the largest school of music, and Columbia the largest school of pedagogy, while the college of pharmacy of the University of Illinois has passed Columbia's. As for the summer session of 1907, Chicago, Columbia, Harvard and Michigan attracted over one thousand students, Cornell, Indiana, Wisconsin and Illinois following in the order given. In the field of extension teaching the University of Chicago occupies a unique position, Columbia being the only other institution in the list that is pushing this phase of work with energy. Columbia continues to maintain the largest number of officers.

The reporting officers of the various institutions have in several cases kindly furnished interesting information with regard to changes in registration, equipment, etc., all of which is embodied in the following paragraphs. Wherever no such information was given, the comparison is based upon the figures contained in the table of last year (*SCIENCE*, December 21, 1906).

Mr. Sutton, recorder of the faculties, reports as follows for the *University of California*:

Our registration for November 1, 1907, as compared with that of the corresponding date in 1906, shows an increase of forty-five in the graduate school, of eighty-two in the undergraduate body in arts, science and engineering, and of one hundred and eight in the professional schools. The downward drift which has been observed for about ten years in the enrollment in the professional colleges in San Francisco has apparently been checked, as manifested by an increase of twenty-five students in law and thirty-four students in dentistry. The colleges of medicine and pharmacy, however, do not yet share in this reaction. Both of these colleges are undergoing some readjustment in their matriculation requirements. In the colleges at Berkeley—arts, science, agriculture, commerce and engineering—there is a fairly uniform advance, excepting only the college of letters, which requires both Greek and Latin for the bachelor's degree. In spite of the steady growth of the university as a whole, the number of students in the college of letters is less to-day than ten years ago.

Among the more important items of the university's growth during the past collegiate year are the following:

The Hearst memorial mining building, erected by Mrs. Phoebe Hearst in memory of the late Senator George Hearst, has been completed and was formally dedicated on August 23. The building and its equipment have cost to date about five hundred thousand dollars.

By grant of the state legislature, the university has come into possession of a farm at Davisville, California, a tract of some seven hundred acres, purchased by the state to facilitate the work of experimental agriculture in the university. The cost of the farm with its equipment to date is approximately one hundred and fifty thousand dollars.

John W. Mackay, Jr., has given the university one hundred thousand dollars for the endowment of a chair of electrical engineering and for the support of research work in the laboratories of electrical engineering and mechanics.

The Bancroft library of American—particularly of west-coast—history, which was purchased by the university at a cost of two hundred and fifty thousand dollars before the San Francisco earthquake and fire, has been brought from San Francisco, where it escaped all damage, to the third

floor of California Hall, a fireproof building in which are housed the administrative offices of the departments at Berkeley. The regents of the university have entrusted the control and administration of the Bancroft collection to the council of the Academy of Pacific Coast History, an organization recently formed under the auspices of the University of California. The secretary and executive officer of the academy is Professor Henry Morse Stephens, sometime professor of modern European and English history in Cornell University, and now professor of history in the University of California.

A little over a year ago the university established a students' infirmary at Berkeley. During the past year the university has founded in San Francisco, using for this purpose one of the buildings of the College of Medicine, a university hospital, in which students of medicine will have an excellent opportunity for clinical work of the most varied sort. To get this project under way, friends of the university donated something over twenty-five thousand dollars.

The university's art college, an affiliated school formerly known as the Mark Hopkins Institute of Art, and now designated the San Francisco Institute of Art, found it necessary to suspend its work during 1906-07 on account of the destruction of its buildings. The school has resumed its work in a new building erected for it upon the site of the former building on the California street hill in San Francisco, and it already has an enrollment of sixty-nine students.

The Greek theater, the university's open-air auditorium in the eucalyptus grove on the campus at Berkeley, has been the scene of a long list of musical and dramatic events, in addition to the more formal university celebrations, such as charter day, class day and commencement. Perhaps the most novel production of the past year was the Sanskrit play, "The little clay cart," translated from King Shudraka (A.D. 600) by Dr. Arthur W. Ryder, instructor in Sanskrit in the university.

The foundations of the Doe library building are now in process of construction. For this building the late Charles F. Doe bequeathed to the university about six hundred thousand dollars. The foundations are to be completed at once and the superstructure built in sections, each section to be occupied as soon as completed. The cost of the entire structure will probably be one million dollars.

Mr. and Mrs. T. S. Brandege, of San Diego, have donated their entire botanical collection and library to the university. As a result of this gift,

the facilities for botanical research at the university are practically doubled. The university now possesses the most complete representation extant of Pacific coast flora.

Beginning with this year (1907-08) the university maintains a new administrative officer known as the alumni secretary. Mr. Gurden Edwards, of the class of 1907, has been appointed to this place. It is the duty of the alumni secretary to keep in active touch with the university graduates and former students, and to cooperate with the appointment secretary of the university in answering demands upon the university for men and women to take positions of responsibility in business and the professions.

The difficulty encountered in endeavoring to establish a just comparison of the enrollment at the *University of Chicago* with that of the other institutions has frequently been pointed out, nevertheless its fall quarter may be compared with the first half-year of the other institutions, as is done in the table. Comparing the enrollment of this fall with that of the fall quarter of 1906, we find that gains have been registered in all of the faculties, with the exception of medicine and divinity, which have remained stationary. The largest increase is found in the number of male students in the academic department, the gain being one of 62, while the law school has gained 37 students. The instruction given in the business center of the city in 1905-06 was withdrawn during 1906-07, a few courses being offered for teachers in the university buildings. This accounts for the change from 247 reported a year ago to 125 reported under "other courses" this year. The summer quarter shows a loss of 125 compared with that of 1906. In the extension division seventy-seven lecture-study courses are offered, the estimated attendance reaching 21,175, while 2,250 active students are enrolled in the correspondence-study courses.

The enrollment of *Columbia University* shows a considerable gain in comparison with the preceding year. The total gain

is one of 547, the present enrollment of 5,197 being the high-water mark in Columbia's history. This is exclusive of 3,055 students who have thus far registered in extension courses at and away from the university and in evening technical courses. The total registration of resident students this fall shows a gain of 255 over 1906.

So far as registration by faculties is concerned, Columbia College shows a slight gain, the entering class being smaller, but an unusually large number of students having entered on advanced standing from other institutions. The tuition fees in the college have been raised considerably, and this has no doubt affected the registration, not sufficiently, however, to bring about a decrease in the total. Barnard College, the undergraduate department for women, shows a total gain of 22 and a gain of 10 in the entering class. The non-professional graduate faculties of political science, philosophy and pure science, have experienced the considerable gain of 130 students, all of the three faculties sharing in the increase. The schools of mines, engineering and chemistry exhibit an encouraging increase over last year, the figures being 585 and 524, respectively, and for the entering class 186 in 1907, as against 137 in 1906. A large number of students has also been admitted to advanced standing in this faculty. A uniform first-year curriculum has been established for the different schools in applied science, and opportunities are now offered to work off conditions in the summer session, in extension courses and in parallel courses offered by Columbia College. The results of the active administration of the new head of the schools of mines, engineering and chemistry are reflected in this year's heavy registration. Fine arts records the largest enrollment in its history; the registration in the department of music having remained uniform, while there has been a

gain of 36 in the department of architecture.

The school of law, which now demands a baccalaureate degree for admission, shows a slight loss, namely, from 261 to 247. The entering class is a little smaller than that of last year, containing 103 students, inclusive of 18 seniors from Columbia College; the latter, however, are not counted in the total for the school. The standards for admission and advancement to the medical school were increased several years ago, and as a result there has been a gradual falling off in numbers, the figures for this year being 298, as against 352 in 1906. Ten Columbia College students are also registered in the school, bringing the actual total to 308. The college of pharmacy shows a decrease from 254 to 229, this loss also being due to the stricter requirements for entrance first enforced in 1905. The entering class, however, is larger than it was last year. Teachers College has increased its enrollment by no less than 165 students, in spite of the fact that its second-year class has been abolished, its first-year class having been withdrawn last fall. The grand total this year is 891, of whom 223 are candidates for the higher degrees (A.M. and Ph.D.).

The summer session of 1907 was the largest in the history of the institution, 1,350 students having been enrolled on Morningside Heights and 42 at the college of physicians and surgeons, the total number representing an increase of 351 over the summer of 1906. There is also a large gain in the number of students registered in extension courses, and the evening technical courses, first established last winter, have become exceedingly popular. The number of officers has increased from 571 in 1906 to 646 in 1907, this being exclusive of the instructors in the Horace Mann and Speyer schools.

The only new building to be chronicled

this fall is Brooks Hall, the Barnard dormitory for women. Kent Hall, a half-million-dollar building for the school of law, is in process of erection. Hamilton Hall, erected at a cost of \$500,000 for Columbia College, the undergraduate academic department, was completed and occupied last February, as was St. Paul's Chapel, the cost of the latter being about \$300,000. Teachers College is erecting a domestic economy building, an anonymous donor having recently presented \$400,000 for the development and support of a school of domestic economy. The university residence halls, Hartley and Livingston, are almost full at this writing, over five hundred rooms being occupied.

The incumbent of the Kaiser Wilhelm professorship this year is Professor Rudolf Leonhard, dean of the faculty of law of the University of Breslau, President Hadley of Yale being the second incumbent of the Theodore Roosevelt professorship at the University of Berlin.

At *Cornell University* the largest gains have been made by the scientific schools, the total increase being one of 89 students. The school of agriculture has gained 69, the academic department 48, and the school of architecture 17, students. On the other hand, the professional schools of law and medicine both show a decrease, the former of 6, the latter of 20, students, while the graduate school and the school of veterinary medicine both have 7 students less than last year. The 244 students mentioned under "other courses" are those in attendance on the short winter session in agriculture, there being 4 less than last year. The summer session shows an increase of 113 students, the grand total being 218 in excess of last year.

Harvard University reports as follows:

The increase of numbers in Harvard College, and the falling off in the Lawrence Scientific School, is to be explained by the gradual working

out of the system inaugurated by the establishment of the new graduate school of applied science in 1906. This establishment has encouraged many students who were studying for the scientific professions to exchange the prescribed groups of studies in the scientific school for a more liberal course of studies in Harvard College, with the intention of doing their more advanced and specialized work in science, after graduation from the college, in the new graduate school of applied science. The gradual disappearance of the undergraduate scientific programs, and the absorption of their students in Harvard College may be expected. The schools of law and medicine show gains in enrollment, agriculture has lost twenty-one, divinity six, while the attendance on the graduate schools and the school of dentistry has remained stationary. The summer session shows a gain of fifty-one students. Of the graduate students, fifty-five are registered at Radcliffe.

Langdell Hall, the new building of the law school, costing between \$300,000 and \$400,000, is now ready for partial occupancy.

Within the last month the university has received a gift of about 2,000 acres of valuable timber land in Petersham, Massachusetts, which is offered as a special adjunct to the division of forestry, and therefore as part of the equipment of the graduate school of applied science. The forest included in this gift comprises what is probably the best body of timber now to be found on an equal area in Massachusetts. The division of forestry will supervise the Petersham forest, and conduct there a large part of its instruction. According to the probable arrangement of the curriculum, students who enter the graduate school of applied science to study forestry will be in residence at Petersham during a considerable part of the year. There they will take up in the first of their regular two years' course, and largely in the field, all their elementary work, including tree botany, the theory and practise of forest mensuration, and the whole subject of silviculture. This will lead them directly to the work of their final year, which is mainly devoted to lumbering, forest engineering, and the study of forest production as applied to actual problems. They will secure in combination the advantages of the German *Meisterschule*, with its provision of practical experience under direction, and of the university forest school, with its broad attention to theory and principle.

By the will of Mrs. Sarah E. Potter, of Boston, the university received in June, 1907, a bequest of

\$50,000 to be used and applied in connection with the Gray herbarium. As one of a number of residuary legatees, the university has subsequently received from the executors an addition to this endowment consisting of cash and securities of an estimated value of \$130,000.

The *University of Illinois* shows consistent gains in every department, with the exception of medicine (where there has been a loss of 34 students), of dentistry (which reports a loss of 10), and of the schools of art and music (where the registration has remained stationary). The largest gain is in the school of pharmacy, namely, one of 89 students, while agriculture has gained 58 and the scientific schools 39. The students mentioned under "other courses" are enrolled in the five-year library course. The students enrolled under the head of "commerce" were last year included under the college of arts. These men have complied in full with the requirements for admission to the university, that is, they have completed the usual high school course, so that they are properly included here and not under the head of extension and similar courses. The commerce course is one of four years. There has been a gain of 53 students in the summer session, the increase in the grand total amounting to 362.

Indiana University reports a gain of 47 in its school of medicine and of 12 in its school of law, while the number of women in the academic department has remained stationary. The students in the graduate schools have been reported separately for the first time, and some of these may have been included under the academic department in previous years, thus partly explaining the loss of 89 male students in the college of arts. The summer session shows a gain of 39, the gain in the grand total being one of 152.

Inasmuch as the *University of Iowa* is included for the first time this year, no comparisons by faculties can be made with

last fall. The students mentioned under "other courses" are registered in the training schools for nurses. In order to avoid duplication, the students enrolled in courses in art, commerce and pedagogy are not indicated under these categories, but included in the college of liberal arts. More than one half of the students registered in the school of music are not registered in any other department of the university, the remainder carrying work also in the college of liberal arts, for which their credentials show them to be properly prepared.

The university occupies for the first time this fall its new hall of natural science. The building has been erected at a cost of \$300,000, is of Bedford stone, four stories in height and fireproof in construction. It houses the museum of natural history, the department of zoology, including biology and—temporarily—the university library. The building also contains a large auditorium.

During the past summer the regents organized the school of education within the college of liberal arts. Professor Bolton, of the department of education, was made director of the school, the work of which is to prepare teachers for the high schools, principalships and superintendencies. There are 240 students in the school, all of whom are included in the enrollment of the college of liberal arts. The college of law and the college of homeopathic medicine increased their requirement for admission from three years of high-school work to four years. In spite of this fact, both of the colleges show an increased attendance this fall. Forty-four of the 302 medical students are enrolled in the college of homeopathic medicine. There has been no change in tuition fees, and no special reason is apparent for the increase in attendance this fall. The attendance at this time is 220 ahead of the enrollment at the corresponding time last year, this being regarded as a normal increase.

The medical school of the *Johns Hopkins University* shows a gain of 29 students, while the graduate schools have gained 4. The enrollment in the college is exactly the same as last year, the total gain, therefore, amounting to 33 students. The undergraduate course has been increased to

four years (instead of three), and the restrictions against the admission of women to the graduate courses have been removed. There are this fall 23 women in the school of medicine and 5 in the graduate school.

The *University of Kansas* submits the following report:

The total number of undergraduates in the college of liberal arts and school of engineering is 1,279, a gain of 194 as compared with November 1, 1906. This is the largest number of undergraduate students ever enrolled at this period of the academic year. The gain in attendance in all the schools of the university is 243, or 13.6 per cent. This increase in attendance is largely due to the closer relationship of the preparatory high schools. Under the direction of a high-school inspector, the number of accredited preparatory schools whose graduates are admitted to the freshman class without examination has been brought up to 190, and by the operation of the Barnes law, recently enacted, the number will be increased to nearly 250 by another year. Slight losses have been suffered by the schools of law, medicine and music, and by the graduate schools.

The principal additions to the equipment of Kansas University during 1906-07 were as follows: Robinson gymnasium was completed and is now occupied. The cost of the building, including equipment, was \$100,000. Its facilities are such that a very large number of students may receive physical instruction at one time. The Eleanor Taylor Bell memorial hospital and clinical laboratory were completed and occupied by the school of medicine at Rosedale. These buildings cost \$90,000.

During the current biennium, by the generosity of the state legislature, the equipment of the engineering school will be materially increased. Work is now in progress on a general engineering building to cost, with equipment, \$150,000. A mining engineering building will be erected at a cost of \$50,000, and \$50,000 will be put into additional shops. General repair shops, to cost \$7,000, and additions to the heating system, to cost \$7,752, will be erected. The law library will be increased by the addition of \$6,000 worth of books.

The moral tone of the institution has made decided advances. A distinctive feature of university life is the large attendance of students and faculty at the daily chapel services. Chapel attendance is not compulsory, yet within six years the attendance has increased from a mere handful

to an attendance ranging from 800 to 1,500. The result is a unified college spirit, and, in all probability, the main contributing cause to the complete cessation of student disturbances. During the past two years there has not been a class fight or a single case of hazing at the University of Kansas. Every student enterprise receives marked support; 1,400 students have paid voluntarily two dollars each into a student enterprise fund which is managed by the university and distributed among the athletic, musical and debating organizations of the students. The payment of this sum entitles the student to admission to all entertainments by these organizations.

The total enrollment of the *University of Michigan* shows a gain of 279 students over last year, the increase in the fall registration alone amounting to 318. The largest gains have been registered in the academic department and in the scientific schools, the graduate school, and the schools of law, dentistry and pharmacy having remained stationary. Medicine shows an increase of 22 students.

Beginning with the fall of 1909, admission to the medical school will be exclusively through the literary department, and no student will be admitted to the medical school who has not secured sixty hours of credit from the literary department.—The fees in the law school have been increased by ten dollars a year.

A new dental building, to cost \$150,000, is in course of construction; also an alumni memorial building and art gallery to cost \$200,000. Plans are being prepared for a chemical building to cost \$250,000.

The largest gain at the *University of Minnesota* has been made in the college of agriculture, there being 164 more students than there were last year. The scientific schools report an increase of 51, the school of pharmacy of 14, and the school of dentistry of 13, students. There are 44 more women in the academic department, but 6 less men. The professional faculties of law and medicine both show a decrease—the former of 17, the latter of 21, students,

while the graduate schools have gained 12. The summer session remained stationary, the gain in the grand total amounting to 263. The registrar reports as follows:

Undoubtedly the standard for admission to the professional and technical schools will continue to be raised. The college of medicine and surgery requires two full years of college work as pre-medical preparation. It has gone a step further and now specifies that these two years shall include a year of physics, a year of general inorganic chemistry, one year of qualitative analysis, one year of biology and one year of language, either German or French.—The college of law is now admitting graduates from accredited schools, and will undoubtedly require one or two years of academic work in the near future.—The college of engineering is considering the advisability of extending the present four-year course to five or six years, and including correlated courses in the college of science, literature and the arts. A combination of work in the college of science, literature and the arts with the courses in the professional schools seems to be more in demand. Students may now in their senior year in the college of science, literature and the arts elect dentistry, and thereby receive two degrees in six years. Students may elect medicine in their senior year and receive two degrees in seven years, or by electing law receive two degrees in six years.

The total registration at the *University of Missouri* shows a gain of 203, no unusual conditions having affected the increase in registration. The percentage of increase for the entire university is practically the same as during the last three or four years. The decreased registration in the professional faculties of law and medicine is ascribed to increased entrance requirements recently established for these departments. The only other school registering a loss is that of pedagogy, where there are 25 students less than there were last year.

The total attendance at the *University of Nebraska* is practically identical with that of last year, although a gain is expected before the close of the year. In last year's table 200 students were included under "other courses," whereas no figures

are given under this item for 1907, and this fact may explain the apparent absence of a healthy increase. The largest gains were registered in the schools of music (85), agriculture (60), and the scientific schools (51). All of the other faculties, as well as the summer session, have remained to all intents and purposes stationary.

New York University again reports a considerable increase over last year, the largest, one of 131, being found in the school of commerce. The loss of 16 women in the academic department is offset by a gain of 16 men. The law school has gained 39 students, the medical school 27, and the graduate school 30. The department of veterinary medicine reports a decrease of 11 students, while the scientific schools have gained 7. The summer session of 1907 had 189 students more than that of last year.

Northwestern University has been in the habit of including in its statistics the students enrolled in its various preparatory departments, and consequently the earlier figures in *SCIENCE* do not seem to agree with the reports occasionally found in the press. One thousand one hundred and seventy-one students were reported by this university under "other courses," but only 131 students in the school of oratory and 167 students in the Evanston Academy that are taking courses in the college of liberal arts, in the school of music, in the theological departments and in the school of oratory, have been included, whereas 124 students, who apparently do not belong to the preparatory departments, are given under "extension courses." No figures were given last year under summer session, whereas there was an enrollment of 265 in the summer session of 1907. Mr. W. H. Long, secretary to President Harris, writes as follows:

Every item is an increase over last year at this time, and should the later registrations equal those of last year, the total attendance for the year will show a gain of more than 200. It may be of interest to note that the suspension of intercollegiate football for a term of years has not been followed by a decrease in the attendance on the college of liberal arts. The attendance in medicine has been increased partly because new requirements for admission are announced to go into effect in January, 1908.

Work on the new engineering school will begin in the fall of 1908. The course of study will extend over five years, to be extended later to six years. The course will include a large element of general culture studies, and is intended to lay the foundation for practise in any line of engineering. The new engineering laboratory, the gift of Mrs. G. F. Swift and Mr. Edward F. Swift, will be in process of construction before the year is out. The plans have been submitted and it is expected the building will be in use before the end of the next college year.

Plans are under consideration for the inauguration of a dormitory system for men. The gift of Mr. William Deering is available for the erection of the first building and it is expected that ground will be broken before the end of the college year.

Carefully laid plans have been prepared by architects and landscape gardeners for the development of the campus. This plan will lay out sites for future buildings, and includes the landscape development of the Evanston property. It is expected that it will result in a group of buildings and a campus among the most noteworthy in the country. Courses for teachers and courses in finance and accounting, in the Northwestern University building in Chicago, have been inaugurated, and have proved popular.

The following report was received from *Ohio State University*:

The enrollment for the year shows a good healthy increase in all colleges except the colleges of law and pharmacy. The slight shortage in the college of law may be due to the organization of a combination arts-law course, whereby a student is able to obtain two degrees in six years, instead of seven, receiving the A.B. degree at the end of the fourth year and the LL.B. degree two years later. Instead of entering the law college at the end of the second year of the arts college work, the students have deferred doing this until the end of the third year and have become candidates for the two degrees. The increased enrollment in

the college of agriculture and domestic science is in the course in domestic science. The demand for teachers in this line of work for the secondary schools is probably responsible for this increase.

The university announces the organization of a college of education which was opened at the beginning of the fall term. The organization of the college was authorized by legislative enactment at the first session of the seventy-seventh general assembly. Its purpose is to aid in the execution of the policy of the state to furnish training for teachers. To that end opportunity is afforded for preparation for the work of teaching in high schools and normal schools, of superintending schools, of supervising special branches, and of acquiring a knowledge of, and a right attitude toward, education. Two general classes of courses of study have been provided. The first consists of four-year courses leading to the degree of bachelor of science in education; the second consists of certificate courses two years in length. In the four-year courses, the first two years are given largely in the college of arts, philosophy and science.

A special course in dairying has been established to meet the demand for a short practical course of training in the handling of milk and in the manufacture of milk products. It is intended primarily for those desiring to engage in butter-making or cheesemaking, and those interested in the city milk supply, and who are unable to avail themselves of the advantages offered by the longer courses given in the college of agriculture. The course will extend over a period of twelve weeks, beginning December 2.

The university has been offering special opportunities in the line of manual training for teachers in its summer term. A course for artisans has been included in the course of study for the summer term of 1908.

The new buildings which were authorized by the seventy-seventh general assembly are well under way and will be ready for occupancy before the year is over. These include buildings for electrical and mechanical engineering, cattle and horse barns and judging pavilion, and a dormitory for women.

Forty-five of the scientific students and 49 of the agricultural students are registered in the short courses, which are two years in length, and 16 of the students mentioned under "other courses" are enrolled in the so-called short course in domestic science, which also extends over two years.

The *University of Pennsylvania* has experienced a total gain of 200 students, the largest increase being found in the scientific schools, namely, one of 70. The graduate schools have gained 54, dentistry 33, veterinary medicine 20, and law 7, students. The academic department shows a loss of 37, and architecture one of 29, while the schools of medicine and music have remained stationary. The students given under "other courses" are distributed as follows: Twenty-five regular students in biology, 332 special and partial students, 345 students in the college course for teachers leading to the baccalaureate degree in arts or science, and 222 students in the evening school. In addition, 203 students were reported as evening school specials and were transferred to "extension and similar courses," on the supposition that they were not students who had completed a high-school course. The summer session shows a gain of 88.

Princeton reports a decrease of 41, there being a loss of 93 in the academic department, as against a gain of 48 in the scientific schools, and of 4 in the graduate school. The entering class numbers 322, as compared with 323 last year, 385 two years ago, and 347 in 1904.

Stanford University shows a gain in the grand total of 64 students. Last year 140 students were counted twice, while all double registration was done away with this fall. As a result, it is impossible to compare the attendance of the separate faculties with that of last year. It may be well to point out again, however, that the number of women is limited to 500, and that the number of men in the undergraduate schools and in the law course is also strictly limited.

Syracuse reports a total gain of 158 students, about half of which is found in the summer session. All of the schools show a gain, although in some the increase is very

slight. The engineering school and the teachers college show an apparent loss, but this is due to the fact that last year the enrollment in these schools included a number of duplicates which have been eliminated this year.

The buildings now under construction are the Bowne hall of chemistry, which is, however, partly occupied; the Lyman hall of natural history, a section of which is occupied; the stadium, to seat 20,000 people, which will require about a month's work to finish, and the gymnasium, the foundations of which are in. The latter is to be a four-story building with glass dome. The plans call for a structure 150×210 feet. The ground floor comprises rooms for home and visiting teams near the entrance to the stadium, for a bowling alley and baseball cage, for a rowing-room and a swimming-pool and for offices; the first floor contains a large social hall, shower-room and drying-room, trophy-room, etc., also 3,750 lockers. The second floor contains the gymnasium proper, 100×208 feet, a kitchen, property-room, rooms for managers, coaches, etc. The top floor has the running track, twelve laps to the mile, lighted from above. The gymnasium will be nearly two years in building.

The *University of Virginia* shows a gain of 12 in its total, there being an increase of 38 men in the academic department, and of 15 in law, which more than offsets the loss of 9 in the scientific schools, of 30 in the school of medicine, and of 13 in the graduate school.

The following is the report from the *University of Wisconsin*:

The total increase in attendance at the university this year, as compared with last year's registration for the corresponding date, is 309. A loss of four students is shown in the college of law; this is probably due to the fact that the college has just added an additional requirement of one year's college work for admission, making the requirement for admission to the college of law two years of college credit, instead of one, as was required for last year. Our courses in commerce, pedagogy and pharmacy are included under the general head of the college of arts, and are integral parts of this college. The enumeration of the students taking these courses, therefore, with the exception of pharmacy, is included under the gen-

eral head of college of arts. On the other hand, the number of graduate students has been deducted from the separate colleges, where they were included last year, and are given now only under the head of graduate school. In the graduate school are included the graduate students in attendance at our summer session, the total number of 353 graduate students including 151 who were in attendance at the summer session only, and this latter number is consequently deducted in determining the grand total. The summer session graduate students are affiliated with this school, and many of them become candidates for the higher degrees on the completion of their work, which is limited entirely to attendance at the summer session.

Owing to a decrease in the summer-session attendance, the grand total of students in attendance at *Yale University* this fall shows a loss of 42 compared with last year. The summer session is to be withdrawn entirely in 1908. The largest gain, one of 46 students, has been made by the school of law, while the Sheffield scientific school shows a gain of 32. In addition to the 961 students mentioned in the table, there are 145 graduate students in the scientific school who are included under "graduate school." The academic department has lost 36 students, and it is interesting to observe in this connection that the gain in the academic department since the fall of 1904 is one of 28 students, as against an increase of 187 students in the Sheffield scientific school. Medicine reports a loss of 18, and the graduate school one of 17 students, while the other departments have remained practically uniform.

In endeavoring to compile a table showing the number of degrees granted by the various institutions in the list during the academic year 1906-07, considerable difficulty was experienced by reason of the large variety of degrees awarded. Although it was found impracticable to present this material in tabular form, it may nevertheless be of interest to consider some comparisons in this field. Taking the

total number of degrees awarded in course, exclusive of honorary degrees and of diplomas for teaching and the like, it is seen that the greatest number, namely, 1,187, was awarded by Harvard, the other institutions ranking in the following order: Michigan, 876; Columbia, 809; Yale, 800; Cornell, 714; Illinois, 616; Pennsylvania, 557; Chicago, 538; Wisconsin, 516; Northwestern, 508; Minnesota, 502; California, 482; New York University, 409; Princeton, 336; Syracuse, 327; Iowa, 325; Nebraska, 296; Indiana, 291; Missouri, 263; Ohio State, 249; Kansas, 246; Stanford, 234; Johns Hopkins, 154, and Virginia, 141. The largest number of honorary degrees, namely 30, was granted by Yale, Pennsylvania following with 27 and Harvard with 22. Several institutions gave no degrees *honoris causa*, the average number for the other institutions that did award them being five each.

Harvard, with 589, leads in the number of bachelor of arts degrees conferred; Yale, follows with 347, and then come Michigan, 316; Wisconsin, 250; Stanford, 219; Minnesota, 193; Columbia, 189; Indiana, 186; Nebraska, 166; Cornell, 154, and Princeton, 151. The degree of bachelor of philosophy is still popular at Yale, where it was conferred upon 211 graduates of the Sheffield scientific school; at Chicago, where it was awarded to 189 graduates, and at Syracuse and Wisconsin, where it was given to 110 and 28 students, respectively. The degree of bachelor of letters is in vogue principally at California (148), Virginia (60), and Princeton (58). Most of the institutions on the list award the degree of bachelor of science, but it is difficult to determine in every instance whether it is given on the completion of a college course or upon the completion of a professional course in engineering, chemistry, architecture, or the like. It is not at all a rare occurrence to have the degrees of civil engineer, electrical

engineer, mechanical engineer, and engineer of mines, conferred for graduate work, the B.S. being given upon the completion of the regular undergraduate engineering course. Michigan, for example, awarded 154 bachelors of science in engineering, but only 2 E.E.'s and 2 Mech. E.'s, and similarly, Pennsylvania awarded 65 B.S.'s in engineering, but only 3 Mech. E.'s, the same custom being followed at Iowa, Missouri, Nebraska and New York University. Grouping together the various kinds of engineering degrees as well as those in the related departments of chemistry and architecture, we find that Cornell heads the list with 347, followed by Michigan, 158; Pennsylvania, 100; Columbia, 94; Ohio State, 79, and Missouri, 75. However, California granted 162 B.S.'s, Illinois, 161; Wisconsin, 119; Harvard, 96; Chicago, 75; Pennsylvania, 72, and Northwestern, 69, and some of these may have been awarded at the completion of a professional course.

The greatest number of baccalaureate degrees in law was awarded by Michigan (214), which is followed by Harvard, 196; New York University, 129; Minnesota, 87; Columbia, 75; Pennsylvania, 73, and Yale, 72. New York University also gave 16 LL.M.'s and 3 J.D.'s, while Chicago gave 30 J.D.'s to students who held a baccalaureate degree in arts or science before entering the law school. In medicine (M.D.) the order is as follows: Illinois, 147; Northwestern, 131; Pennsylvania, 113; Columbia, 93; Cornell and Johns Hopkins, 72; Harvard, 70, and New York University, 68. Degrees in veterinary medicine (D.V.M. or D.V.S.) were granted as follows: Cornell, 32; Pennsylvania, 27; Ohio State, 18, and New York University, 7.

The A.M. is by far the most popular of the master's degrees, although most of the institutions still grant the master of

science, while Chicago, Syracuse and Wisconsin give the master of philosophy, and Chicago the master of letters. The largest number of A.M.'s was given last year by Columbia—193; Harvard with 152, Yale with 69, and Princeton with 52, being the only other institutions that awarded more than fifty. Chicago, with 54, leads in the number of Ph.D. degrees conferred, and is followed by Columbia, 42; Johns Hopkins, 35; Harvard, 33; Pennsylvania, 26; Yale, 23, and Cornell, 19.

Illinois leads in the number of degrees conferred upon students of agriculture—43, and is followed by Cornell with 34. New York University granted 32 degrees in commerce. Pennsylvania, with 95, leads in the number of dental degrees, being followed by Northwestern, 88; Michigan, 46; Iowa, 38, and Illinois, 34. Chicago granted 23 degrees in divinity, Yale 11, and Harvard 7, while Yale conferred 25 degrees in forestry and Syracuse 14 in music. Columbia leads in the number of bachelor's degrees in education—103, Missouri awarding 42; New York University, 37, and Chicago, 21. Northwestern granted 81 degrees in pharmacy; Illinois, 30; Michigan, 28, and California, 27; Columbia only gave 12, but to this number should be added the 110 given by the New York college of pharmacy. The largest number of diplomas (not degrees), namely 219, was conferred by Columbia University to students of the Teachers College.

RUDOLF TOMBO, JR.,
Registrar

COLUMBIA UNIVERSITY

*EVOLUTION AS IT APPEARS TO THE
PALEONTOLOGIST*¹

I DESIRE to introduce this paper by the statement of a law which seems to be axiomatic, although it is largely ignored by biol-

¹ Address before the Seventh International Zoological Congress, Section of Paleozoology.

ogists. I may term it the *law of the four inseparable factors*.

These four factors in the life of organisms are known to us under the terms heredity, ontogeny, environment and selection. The following statement regarding these factors expresses the whole truth:

1. The life and the evolution of organisms invariably center around processes which, in our observations, are grouped under heredity, ontogeny, environment and selection.

2. These have been inseparable and interacting from the beginning.

3. A change introduced through any one of these factors causes a change in all.

This I believe to be the most fundamental law of biology; far more fundamental than the well-known biogenetic law. Yet a survey of recent discussion among biologists as to the theory of evolution shows broad lines of division into several schools of opinion strictly according to the factor from which the subject has been approached. It is true that, conceiving any one of these principal factors as separable, we become involved in endless difficulties; conceiving them as inseparable and continuously interacting under natural conditions, we reach the only true conception of the evolution process. Of these four factors *selection* is the only one which can be experimentally removed through the agency of man; heredity, ontogeny and environment may be modified but they can not be removed.

I shall not stop here to demonstrate, as I shall do elsewhere, that changes may be initiated or find a gateway through any one of these four factors; I shall state simply that under certain circumstances heredity, under other circumstances ontogeny, under still others environment, or finally under selection, a new order of adjustments begins in animals and plants and a new series of characters appears. When such a new order sets in through any one of these