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ACADEMIC STUDENT ELECTIONS

IN SCIENCE, October 24, 1913, are some interesting tables exhibiting the results of much patient work by Dr. Frederick C. Ferry, dean and professor of mathematics in Williams College. His tables give the registration of students taking various subjects of study in eighteen American colleges and universities. These subjects are commonly divided into three groups, roughly determined by the nature of the topics included. Thus, group I. may be called the "language group"; group II., the "humanities group"; and group III., the "science group." The distribution of work in each of these groups in any given college affords some indication of the popularity of the group. To express this distribution it is necessary to give, as Dean Ferry has done, for each subject the number of "student hours of instruction." In view of the great variation in total attendance at different colleges Dean Ferry has reduced his figures to percentages, on a semester basis, limiting them to undergraduates in the academic college.

On examining Dean Ferry's tables the present writer perceived the possibility of making the comparisons somewhat more pointed, and of securing a fair representation of popularity not only for groups but for separate subjects of study. A "student-hour of instruction" may be interpreted to mean one hour per week in the classroom, taken by one student throughout one semester. The actual work done includes an estimated pair of hours spent in study in preparation for the work of the classroom. This estimate is often not realized, the student taking his chances of escaping a test, especially if the class is rather large. Two or three hours in the laboratory are hence fairly counted as the equivalent of one hour in the classroom. Let h denote the value in student-hours for a given course; for example, if the student has 3 meetings per week in the classroom and 2 afternoons per week in the laboratory, then $h = 5$. Let n denote the number of students taking this course during a given semester; then nh denotes the work done in this course.

Now, let $\Sigma(nh)$ denote the work done in the sum of all the courses of a given subject; for example, there may be four courses in physics. Let A denote the whole academic work in stu-

dent hours done in all subjects in the college during a semester. Then the quotient of $\Sigma(nh)$ by A yields a percentage, p, that expresses the numerical demand for this special subject by the students, on the assumption that there is freedom of election of studies. Various local considerations apart from the nature of the subject are often operative in determining the student's election; such as the personal popularity of the professor and the reputation of his courses for ease or difficulty. English, for example, may be a "soft snap" under one professor and a formidable stumbling block under another. The evils connected with freedom of election, especially for freshmen and sophomores, are increasingly appreciated by educators; so that the assumption of unlimited freedom is now, happily, not quite warranted.

But the student who aims at a bachelor's degree finds himself often put to the necessity of choosing between what he regards as evils. By taking an average of such elections in a considerable number of colleges the personal element is to some extent eliminated.

The percentage, p, is obviously a rate, substantially the same for an annual session as for a semester. If the value of p for a selected subject is found in eighteen or twenty different colleges, the average of these values may be expressed by P. This average will of course be affected with enough uncertainty to be expressed as an integer. Thus, if the numerical popularity of French comes out as 8.74, and of physics as 4.37, the corresponding percentages would be taken as 9 and 4, respectively; indicating that out of the work done in these colleges about 9 per cent. may be expected to be in French, and about 4 per cent. in physics; or that the popularity of French is more than double that of physics, though the exact numerical results, 8.74 and 4.37, would seem to indicate an exact ratio of 2 to 1, which has to be taken with some grains of allowance.

In the accompanying table these integral percentages are given in the middle column, as the result of studying Dean Ferry's tables. To show the range of variation the maximum and minimum values of p are additionally tabulated, along with the names of the corresponding institutions. Thus, the popularity of Greek is greatest at Yale and least at Wis-

TABLE OF PERCENTAGES

	p (max.)		P	p (min.)	
Group I.:					
Greek	Yale,	3.91	2	Wisconsin,	0.41
Latin	Bryn Mawr,	12.87	5	Harvard,	1.89
Germanic Languages	Wisconsin,	12.85	8	Princeton,	4.49
Romance Languages	Dartmouth,	13.28	4	Oberlin,	5.75
24.50			29		
Group II.:					
English	Mt. Holyoke,	21.84	16	Stanford,	10.46
History	Yale,	12.88	9	Amherst,	4.79
Political Science	Cornell,	12.75	5	Oberlin,	2.02
Economics	Harvard,	12.65	7	Amherst,	2.98
Philosophy	Columbia,	12.59	6	Stanford,	2.92
Bible	Wellesley,	8.01	4	Princeton,	0.06
46.78			47		
Group III.:					
Mathematics	Princeton,	11.46	8	Bryn Mawr,	2.04
Astronomy	Mt. Holyoke,	1.87	1	Wisconsin,	0.11
Physics	Johns Hopkins,	7.54	4	Oberlin,	1.20
Chemistry	Cornell,	12.95	6	Wellesley,	1.84
Biology	Wesleyan,	13.36	5	Bowdoin,	2.55
Geology	Wisconsin,	4.24	2	Smith,	0.53
28.72			26		
100.00			97		

consin. Nearly 4 per cent. of the academic work at Yale is in Greek, while at Wisconsin it is less than half of one per cent. The general popularity of this subject in the eighteen institutions compared is seen to be 2 per cent. The eighteen institutions selected by Dean Ferry are Amherst, Bowdoin, Bryn Mawr, Columbia, Cornell, Dartmouth, Harvard, Johns Hopkins, Mount Holyoke, Oberlin, Princeton, Smith, Stanford, Wellesley, Wesleyan, Williams, Wisconsin and Yale.

In making out the present table a number of subjects of small popularity have been excluded, such as Sanskrit, Slavic languages, archeology, anthropology, art, music, Semitics, Egyptology, veterinary science, history of science, etc. Their total value is 3 per cent., so that the sum of the recorded work for column P is 97 instead of 100; but, for each subject included, the value of P was made out on the basis of 100. The total for group I., as recorded in Dean Ferry's table, is seen to be 24.50 instead of 24; for group II., 46.78 instead of 47; for group III., 28.72 instead of 26. It will be noted that everywhere the tendency seems to be for students to crowd their work into group II., the amount of work taken in this group being nearly as great as in both of the other groups put together. Apart from the interesting humanistic character of the subjects included, they are wholly free from the intricacies of grammar and especially of mathematics.

English naturally leads in importance, with 16 per cent.; and mathematics, in spite of its rigors, presents 8 per cent. These high rates are partly accounted for by the fact that in most, if not all, American colleges these two subjects are prescribed, at least for freshmen; so that here the assumption of freedom of election is in large measure to be discarded.

For the 16 subjects represented in the table, with total value 97, the average percentage obtained by dividing 97 by 16 is a little over 6. This number may hence be taken as a rough standard for comparing the student demand for different subjects; or, for the average extent to which a subject may be studied, whether prescribed or elected. This average of 6 per cent. is not reached by astronomy, Greek, geology, physics, Bible, Latin, political science or biology. It is reached by philosophy and chemistry. It is exceeded by economics, Germanic languages, mathematics, Romance languages, history and English.

The table shows that the study of astronomy, so nearly universal in the senior classes of American colleges two generations ago, has now nearly vanished, being only half as much pursued as that of Greek; and this in turn was a subject of the first importance among our grandfathers. The popularity of astronomy is expressed by 1.87 at Mount Holyoke, a woman's college, where the teaching of this subject seems to be conducted with much pedagogic skill. It is least at Wisconsin, where the percentage number is only 0.11, despite the fact that the professor in charge, a man of international reputation, has done much original work.

Geology, a department of science which, as taught in our colleges, can not be compared with astronomy in mathematical difficulty, seems to maintain in these a degree of popularity about the same as that of Greek, 2 per cent., or one third of that of chemistry and of philosophy.

Physics and Bible study are apparently of equal popularity, about half of that of mathematics, and two thirds of that of chemistry. The demand for Bible study is by far greatest in institutions for women. It is expressed by 8.01 at Wellesley; 6.62 at Mount Holyoke; 5.88 at Oberlin. It is only 0.21 at Yale, where Y. M. C. A. influence is most widely diffused and voluntary attendance on morning chapel exercises throughout the annual session is maintained by popular demand. It is only 0.06 at Princeton, the presbyterian stronghold, which is fortified additionally by the power of the adjacent theological seminary.

The average percentages just discussed should be interpreted only as variables which indicate the modern academic trend. The range of variation for the particular list of colleges compared is worth noting in the first and last columns of the table. In every indi-

vidual college it may be expected that local influences will produce marked deviations from the indications of the table. But, none the less, the figures seem to be of enough educational value to be published.

W. Le Conte Stevens
Washington and Lee University,
December 24, 1913

SCIENTIFIC NOTES AND NEWS

Professor Theodore Richards, of Harvard University, has been elected president of the American Chemical Society for the year 1914. M. T. Bogert and A. D. Little have been elected directors and C. H. Herty, Julius Stieglitz, L. H. Baekeland and W. L. Dudley councilors-at-large for a three-year period.

Professor R. S. Woodworth, of Columbia University, was elected president of the American Psychological Association at the recent New Haven meeting. Professor R. M. Ogden, of the University of Tennessee, was elected secretary for a three-year period.

At the recent Princeton meetings, Dr. George F. Becker, of the U. S. Geological Survey, was elected president of the Geological Society of America, and Professor A. P. Brigham, of Colgate University, was elected president of the American Society of Geographers.

The Society of American Bacteriologists, at its Montreal meeting, elected Professor Charles E. Marshall, of Amherst, to the presidency and Professor F. C. Harrison, of MacDonald College, to the vice presidency.

It is proposed to present to the Royal Society a portrait of the retiring president, Sir Archibald Geikie, the distinguished geologist. A committee, with Sir William Ramsay as chairman, has been formed to collect subscriptions, which it is agreed should not exceed three guineas.

Professor W. B. Scott, of Princeton University, and Professor E. L. Trouessart, of Paris, corresponding members of the Zoological Society of London, have been elected foreign members of the society. Professor E. Ehlers, Göttingen, Mr. J. H. Fleming, Toronto, and Dr. C. Gordon Hewitt, Ottawa, have been elected corresponding members of the society.

Dr. Albert Ernest Jenks, professor of anthropology in the University of Minnesota, has been granted leave of absence from the university the second semester of the current year. Certain aspects of ethnic amalgamation, and environmental influence will be given field study. He will spend February and March in the southern part of the United States, and the next five months in Europe and northern Africa.

At a meeting of the State Geological Commission of Oklahoma late in December, the resignation of D. W. Ohern as director of the Oklahoma Geological Survey was accepted. L. C. Snider, the assistant director, declined to consider the directorship and C. W. Shannon, field geologist, was appointed director. The personnel of the scientific staff of the Survey as now constituted is as follows: C. W. Shannon, A.B., A.M. (Indiana), director; L. C. Snider, A.B., A.M. (Indiana), assistant director; L. E. Trout, A.B., A.M. (Oklahoma), field geologist; Wm. A. Buttram, A.B. (Oklahoma), chemist.

A series of three lectures has been planned for the classes of blind children that visit the American Museum of Natural History. In the first of these on December 18, Admiral Robert E. Peary recounted some of the experiences of his memorable Arctic journey which resulted in the attainment of the North Pole.

The Herter Lectures of the University and Bellevue Hospital Medical College will be given during the week beginning January 12, 1914, at Carnegie Laboratory, 338 East 26th Street, New York City. Professor Sven Hedin will lecture on "Colloids and their Relation to Biological Chemistry."

At a recent meeting of the Abernethian Society at St. Bartholomew's Hospital, London, Sir William Osler delivered an address on "The Medical Clinic—a Retrospect and a Forecast."

Professor E. M. East, of Harvard University, delivered in December a lecture entitled