

answer, the meaning of the cytological facts will not become entirely clear.

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WOODS HOLE, MASS.,
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HIGHER EDUCATION IN PITTSBURGH: A COMPARATIVE STUDY OF SALARIES

IN the numerous articles on the question of college and university salaries that have recently appeared there seems to be a perfect unanimity of opinion that, considering the high services rendered, the salaries of teachers are altogether too small. The conviction seems quite general that teachers are less adequately paid than any other class of workers. The figures published in the bulletins and reports of the Carnegie Foundation for the Advancement of Teaching have further deepened and enforced this conviction.

In these reports two classes of figures have been given, the average and the maximum salaries of professors and other teachers. But the minimum salaries of teachers and the salaries of presidents have not been given. Had these been included in the reports it is quite likely that the conception would have been still further deepened that teachers are poorly paid. In some institutions the minimum salaries are distressingly low, and afford the best basis for reckoning the actual conditions. After an experience of some years in the University of Pittsburgh I have been interested in a comparison of salaries which I herewith present as possibly of general interest.

I have not been able to obtain figures for all the institutions I wished to include in the comparison, as the view seems to prevail that the business of universities, other than state institutions, is the private affair of the trustees and need not be given to the public. The figures I give have been taken from official reports and from Carnegie Foundation publications, or have been received directly from officers of the various institutions. In all cases the figures used are the salaries of full professors, and for the academic year 1908-09 only, except where comparison is directly made with other years. No doubt in some

cases the figures for the past year, 1909-10, would differ from these, but they are not yet available.

A curious fact about Pittsburgh is that the high school pays uniformly better salaries than the university, except in the single case of the heads of the institutions. In the high schools of the city, the minimum for professors is \$2,000, in the university \$1,200; while the maximum in the high schools is \$2,500, and in the university \$1,800. Similarly, the high-school principals receive \$3,000, and the university deans \$2,000. On the other hand, the director of high schools receives \$4,000, while the chancellor of the university receives \$7,500. Thus it appears that high-school teaching pays much better than university teaching, but high-school administration pays only a little better than half as well. Every year it happens, therefore, that students in going from the high school to the university pass up to teachers receiving much less than their preparatory teachers, but come under a chancellor who receives almost twice as much as their high-school director. It may be said in passing that the high school has a regular schedule of salaries, whereas none exists for the university, each teacher being engaged on an individual salary.

It should be said in fairness that the foregoing figures for the University of Pittsburgh are in some respects different from those of previous years. For some time preceding the academic year of 1908-9, one salary of \$2,500 had been paid. But for that year, that and another of \$1,800 were dispensed with, and in their places two of \$1,500 and \$800 were given, the latter to an instructor. A saving of \$2,000 was thus made for the university; but as the chancellor for the same year received an increase from \$6,000 to \$7,500, the net saving to the university was only \$500.

An interesting set of facts can be obtained by a comparison of the average salaries of professors of the University of Pittsburgh for several successive years. The second annual report of the president and treasurer of the Carnegie Foundation for the Advancement of Teaching, published October, 1907 (p. 24),

gives the average professorial salary in the Western University of Pennsylvania (now the University of Pittsburgh) as \$1,864. The third annual report of the same institution, published October, 1908 (p. 44), gives the average as \$1,718. The figures I have obtained for the academic year 1908-9 show the average as \$1,609 for full professors in the college and school of engineering, not including the heads of the two or three departments who had only the rank of instructor. These figures show that the university in three years by careful management was able to reduce the average expenditure for professors' salaries by \$250.

On the other hand, the salary of the chancellor has undergone a steady and rapid increase. Up to 1900 the regular salary was \$2,500. In 1901 it was increased to \$5,000. In 1904 the present chancellor assumed office at that salary. The following year the amount was increased to \$6,000. After 1907 the salary schedule no longer appears in the financial report, but I have learned that in 1908-9 the chancellor received \$7,500. Thus it appears that while the salaries for instruction have been gradually but surely decreasing for some time, that for administration has been rapidly increasing. The salaries for instruction and administration seem to vary in inverse proportion.

In this institution, the University of Manitoba, as I find, salaries are on a very different scale. All professors receive exactly the same salary, \$2,500, and assistants are likewise on a regular schedule. Up to the present time there has been absolute equality in professorial salaries, and for the future the minimum, at any rate, is certain to be no less. On account of the system of denominational colleges that until a few years ago constituted the teaching bodies of the university, there has been no president. But now that the university itself has a large staff of teachers a president is to be appointed. Within the past month the committee has fixed the salary at \$6,000.

Similar proportions are shown by the figures for some other universities that are

neighbors to the University of Pittsburgh. For instance, in West Virginia University the minimum professorial salary is \$2,200, having been recently increased from \$2,000. The vice-president receives \$2,600, and the president \$4,200 and residence, or a total of about \$5,200. The average salary of professors is given in Carnegie Report No. 2 as \$2,025 (evidently made up before the increase).

Summing up, we have the following table:

	Salaries of Professors		Dean or Principal	Average	Salary of President or Head
	Minimum	Maximum			
Pittsburgh high school	\$2,000	\$2,500	\$3,000		\$4,000
University of Pittsburgh	1,200	1,800	2,000	\$1,609	7,500
University of Manitoba	2,500	2,500	2,500	2,500	(6,000)
University of West Virginia	2,200	2,500	2,600	(2,025)	5,200(?)

Were the salary of the chancellor of the University of Pittsburgh arranged on the same scale as in the other two universities, it would be a very different amount. Comparing only with West Virginia University, where there is a similar range of figures in all the columns, if made to bear the same relation to the minimum, it would be approximately \$2,800, and if based on the maximum it would be \$4,000, instead of the \$7,500 it actually was. Apparently, in the University of Pittsburgh, no attempt is made to keep the salaries of professors at any established proportion of that paid to officers of administration. Who is responsible for the anomalous condition it is difficult to tell.

It clearly ought not to be possible in any institution of learning for the head to profit by the decrease of the salaries of teachers, nor for the head of a university to obtain between four and five times the average of that of the full professors. The salaries of teachers ought not to be subject to exploitation by the head, but teachers should receive in all institutions (whether state or not should make no difference) a fair share of the proceeds of the

institution. Professor Cattell recently said in an address at Harvard that "The first step of a really great president would be to refuse to accept a larger salary than is paid to the professors."¹ In the University of Pittsburgh, however, there is an increasing difference between the salaries for teaching and for administration.

There seems to be a diversity of opinion on the matter of presidents' salaries. In Bulletin No. 2 of the Carnegie Foundation, May, 1908, it is stated that "the salaries [of presidents] are not much above the upper range of what a professor may receive" (p. 25). From the figures just given it will be seen that this statement holds approximately true for the two state universities referred to, but is very wide of the mark for the University of Pittsburgh. And there is every reason to believe that many more small colleges and universities show a similar disproportion. In view of these and other considerations, it seems to me that the Carnegie Foundation should make a complete and thorough investigation of the matter, especially of those institutions now on the accepted list. The foundation has already done great service by publishing the average and the maximum salaries for professors in many institutions, but this has been as much in the interests of institutions as of the faculties. A very great service could be rendered to the professors themselves by publishing also the minimum professor's salary and the president's salary. Inasmuch as the prime purpose of the foundation is to advance the profession of teaching, and not institutions as such, a thorough investigation should be made, and at the earliest possible moment.

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ON THE ORIGIN OF FLINT-LIKE SLATE NEAR
CHAPEL HILL, N. C.

TO THE EDITOR OF SCIENCE: In a recent bulletin of the North Carolina Geological and

¹"The Case of Harvard College," *Popular Science Monthly*, p. 613, Vol. LXXVI., No. 6, June, 1910.

Economic Survey Dr. F. B. Laney¹ has occasion to refer to an article by me² on the flint-like slate near Chapel Hill, and concludes from the partial chemical analysis and petrographic description there given that I am unwarranted in ascribing to the rock a sedimentary origin. In the quotations from my article no reference is made to the field data upon which the classification of the rock as a sediment was based.

The rock in question lies in distinct beds in a sedimentary series which includes sandstones and conglomerates, and in places it grades off into a fine sandstone. It coincides in dip with the other members of the series and can be traced for miles along the strike, and does not pinch out as would be the case with a lava flow. At several localities along Morgan's Creek, the one nearest Chapel Hill being at King's Mill, two miles distant, the slate lies unconformably upon sheared felsite or rhyolite, the marked difference between the two rocks being apparent at a glance.

The partial chemical analysis of the rock was given to show specifically its close resemblance to the local sheared felsites from which it was supposedly derived by mechanical wear. Dr. Laney does not seem to realize that the material of a felsite or rhyolite, broken down and reconsolidated, may show the same essential characteristics as the original rock. It is evident that he has not seen the flint-like slate in place in this neighborhood.

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THE OSCILLATIONS OF SWINGING BODIES

TO THE EDITOR OF SCIENCE: May I be allowed to say that farther investigation shows that the forms of two of the curves in a

¹North Carolina Geological and Economic Survey, Bull. 21, 1910, "The Gold Hill Mining District of North Carolina," by F. B. Laney, p. 18.

²Elisha Mitchell Scientific Society, *Journal*, Vol. 24, No. 1, April, 1908, "Micro-structure and Probable Origin of Flint-like Slate near Chapel Hill, North Carolina," by H. N. Eaton.