compensation of labor to operating expenses might be quoted, but that does not necessarily say anything against the educational efficiency of those schools. The teaching staff may indeed be highly efficient. It simply indicates that too much is being paid for non-essentials as over against teaching, which latter we must consider the main business of the college.

Again it must be borne in mind that in every college in the land there is included in the operating expense a considerable per cent. of money which goes to fellowships, scholarships and other "charitable" purposes, as, for example: subsidizing boarding-clubs, college papers, etc. If this money were not thus devoted to "charity" it might be spent for additional productive labor.[2]

Thus the seven institutions quoted show a ratio of 66.5+ per cent. compensation of labor to operating expense while the railroads show a ratio of only 62.06 per cent.

	Year Ending	Paid to Labor	Operating Expenses	Per Cent.
Throop Polytechnic Institute	Sept. 14, 1909	$ 50,000.00	$ 66,150.16	75.6+
Princeton University	July 31, 1910	462,508.42	701,679.25	65.9+
Baker University	July 15, 1910	43,801.67	64,637.61	67.7+
University of Kansas	June 30, 1910	290,788.55	429,655.93	67.6+
University of Okla.	June 30, 1910	93,599.81	125,659.08	74.4+
Howard University (federal institution)	June 30, 1910	55,450.00	119,574.30	46.3+
Marietta College	May 31, 1910	27,405.45	40,375.67	68.1+
			Average	66.5+

Moreover, less of the labor paid out of college funds is non-productive than in the case of the railroads.

And, finally, operating expense in the case of colleges includes a considerable per cent. of moneys which are devoted to "charity" by which the public profits.

C. H. HANDSCHIN

[2] In the University of Chicago 7.6 per cent. of operating expenses goes to fellowships and scholarships alone. A majority of the larger institutions will show a similar per cent.

THE DIRECTOR VERSUS NEWTON

IN this case the following conversation reported by Professor Maclaurin in SCIENCE, XXXIII., 103, January, 1911, has just come to my notice:

Supt. Your theory of gravitation is hanging fire unduly. The director insists on a finished report, filed in his office by 9 A.M. Monday next; summarized on one page; type-written, and the main points underlined. Also a careful estimate of the cost of the research per student-hour.

Newton. But there is one difficulty that has been puzzling me for fourteen years, and I am not quite . . .

Supt. (with snap and vigor). Guess you had better overcome that difficulty by Monday morning or quit.

I have heard since that the conversation was continued as follows, and I wonder if the director was not right:

Newton. I shall continue to use my own judgment about the disposal of my time.

Supt. Yes, but no scientific man should go fourteen years, or even seven, without publishing results. Fourteen years ago you ranked among the leading thousand scientific men, but seven years ago your name was dropped, and this year it was not restored. A city that is set on a hill can not be hid.

Newton. Still I think I am right.

Supt. But the director thinks that, as long as you are accepting pay as a leading scientific man, you should *publish* enough results to keep up your reputation.

CHARLES ROBERTSON

CARLINVILLE, ILL.,
May 1, 1911

AN ENGLISH COURSE FOR ENGINEERING STUDENTS

TO THE EDITOR OF SCIENCE: I am not writing at present to discuss that much-discussed topic, the teaching of practical composition to engineering students, but to explain the first semester work in a course for freshman engineers given at the University of Minnesota, a two-hour course in English which goes hand in hand with a two-hour course in the more practical composition. Two authors are studied, Arnold and Huxley, the former in Gates's "Selections from Matthew Arnold," and the latter in Snell's "Autobiography and Selected Essays by Thomas Henry Huxley" in the Riverside Literature Series.

To the boy who enters the engineering college fresh from high school, the reading of Arnold's "Sweetness and Light," "Hebraism and Hellenism," etc., is both stimulating and broadening. It forces the freshman to think, to sum up his own ideas concerning his relation to life and the world about him; and perhaps, before he realizes it, his outlook on life has widened. Arnold teaches him to value himself for what he is, to understand what ideal perfection is, to attempt, specialist though he be, to prepare himself for a well-balanced life. The results of Arnold's teaching I have found in impromptu paragraphs on "My Aim in Life," written in the composition class. Here, back of an occasional obvious effort to write what might please the instructor, I have seen evidence of a sincere desire on the student's part to be not only a perfect engineer, but a well-rounded man as well.

The transition to Huxley is made through his controversy with Arnold over the means of getting a cultural education. In Percival and Jelliffe's "Specimens of Exposition and Argument" which the men use in their composition course, is Huxley's address at the opening of Sir Josiah Mason's Scientific College in Birmingham. Arnold's reply is in Gates's "Selections." This controversy gives the freshman a good idea of different views of education, especially of scientific education, and paves the way for Huxley's talks on "A Liberal Education," "Principal Subjects of Education" and "On Improving Natural Knowledge."

The subject-matter and structure of Huxley's addresses appeal to the freshman engineer. This part of the course fits in particularly well with the exposition work in composition. The student learns how to fit his material to his audience, how to outline clearly, how to say things most concisely and in the strongest way; and the fact which the autobiography gives us, that Huxley at first detested writing and speaking, encourages the freshman to emulate Huxley's example and master his mother tongue, that he, too, may best put his ideas before others. As to the subject-matter, what is better fitted to interest the scientific student than "On a Piece of Chalk," "Coral and Coral Reefs" or "The Physical Basis of Life"? Such essays open up for him the great facts of nature which have come in with the "new knowledge."

The fact that this course, joined to the course in practical composition (which is another story), is required of all engineering freshmen and that it is the only course of its kind which they will ever get in college, makes the question of proper subject-matter of vital importance. I should welcome criticism and suggestions.

Charles Washburn Nichols
The University of Minnesota,
December 27, 1910

A KINETIC THEORY OF GRAVITATION

To the Editor of Science: In reading the article entitled "A Kinetic Theory of Gravitation," which was published by Dr. Brush in Science for March 10, I was at once struck with what seemed to me a fallacy in an illustration given early in the discussion. Perhaps the point at issue has been sufficiently discussed by Dr. Kent in Science for April 21; but since it presented itself to me somewhat differently it may not be out of place to give my line of reasoning.

I refer to the consideration by Dr. Brush of the case of the transportation of a one-pound mass from the surface of the earth to a point of equilibrium between the earth and the moon, at which point there would be no tendency for the body to move either toward the earth or toward the moon. As I understand the argument of Dr. Brush he assumes that in this case there is an apparent disappearance of energy; that there is no gain in the potential energy of the system caused by raising this body from the surface of the earth to the position of equilibrium and that there is, so to speak, nothing to show for the work done in so raising it.

The point that Dr. Brush seems to have overlooked is that attraction between two bodies is mutual. If the pound mass in the position of equilibrium is attracted by earth