

# How Much Do College Students Learn?

BY MAX MCCONN

*Results of the Carnegie Foundation Study in Pennsylvania*

IT WOULD seem offhand as if a college student should learn a good deal in his four years. Throughout that period he attends classes of some sort — lectures, recitations, or laboratory periods — from fifteen to eighteen or twenty hours a week; and college catalogues commonly state that each hour of recitation or lecture requires two hours of outside preparation. As a general statement that is, of course, absurd, for two reasons: subjects vary greatly in difficulty, and students differ greatly in ability. So the mathematical conclusion that all college students spend forty-five hours a week or more in intellectual pursuits does not actually follow — and probably it shouldn't.

But the fact remains that every college student — even the athlete or other “campus leader” — must do some appreciable amount of studying pretty regularly if he is to stay in college. Because he is constantly being checked up. Every few weeks he must face quizzes, and at the end of the semester of sixteen weeks a final examination, in every subject;

in which tests he must retail at some length the information he has acquired from lectures, textbooks, outside reading, and laboratory exercises. It would seem that the cumulative result of this process over four years should be considerable, that when the senior in cap and gown receives his sheepskin from the president of the college he should be a fairly well-informed young man — within reasonable limits suited to his years, a man of learning. And if knowledge is power, if with increase of knowledge goes increase of understanding and wisdom, then he should be in some degree really educated. Parents and the general public and even professors and deans — except a few cynics and pessimists — have assumed that this result does indeed follow.

But now comes the Carnegie Foundation for the Advancement of Teaching, announcing, in its *Annual Report* for 1930, certain preliminary results of an investigation called the Pennsylvania Study, which results — taken at their face value — seem to show that college students learn

practically nothing, that seniors within a month of graduation are nearly as ignorant as freshmen, and in some important fields even more so!

It should be explained that the Pennsylvania Study is an "inquiry into the relations of secondary and higher education," in which forty-odd Pennsylvania colleges and eighteen public schools systems (including Pittsburgh) are coöperating with the State Department of Public Instruction and the Carnegie Foundation. The programme upon which these more than sixty co-workers are engaged is laid out over a period of seven years. It involves following the educational progress of some 12,500 pupils who entered the seventh grade in September, 1928, through the junior and senior high school (grades 7-12) until they graduate from the high school in June, 1934; and also following the educational progress of several thousand high school graduates of 1928 through the co-operating Pennsylvania colleges until they receive degrees in June, 1932.

The plan adopted in following the progress of the college group — the high school graduates of 1928 who will finish their college courses in 1932 — includes giving the entire group, at several stages, what are known as objective or new-type tests of their intellectual achievement at each stage. Two of these tests have already been given, the first in May, 1928, when the students in question were high school seniors, the second in May, 1930, towards the close of their sophomore year in college. The third is to be given in May, 1932, just before they graduate. Thus we shall eventually have a definite

record of the progress of this group, and of each individual member of the group, clear through the college course, and shall certainly learn a great deal more than any one has ever known before about the actual fruits of a college education, at least in this somewhat fundamental matter of definite knowledge acquired and retained. But meanwhile we already have, from the Sophomore Test of 1930, the curious and disconcerting results cited above.

Among the forty-odd colleges co-operating with the Carnegie Foundation there were six inquisitive and audacious institutions which decided to give the Sophomore Test not merely to their sophomores but to all four college classes. They wanted to find out how much better the sophomores would do than the freshmen, and how much better the seniors would do than the sophomores, on exactly the same test. They are probably somewhat startled by the answer they have obtained.

FOR a proper understanding of that answer a brief description of the Test itself is necessary.

The so-called objective or new-type tests are very different from the old subjective or essay type of school and college examination. The old kind consists usually of five or ten questions, in answering each of which the student must write at least a paragraph and often a longish article or essay. The grading of such answers is necessarily arbitrary, a matter of subjective judgment and impression. It has been found by trial that no two teachers can read the same examination paper and expect, except by rare chance, to hit exactly the

same total grade. The differences of evaluation may occasionally range from an honor grade to actual failure.

The new-type examination contains a much larger number of questions, at least fifty, usually several hundred, so phrased that the student can answer them nearly as fast as he can read them, by writing "yes" or "no" or making a plus sign or a minus sign in spaces provided in the margin, or by underlining a single word or phrase out of several alternatives presented. The questions all deal with known and accepted matters of fact, so that the answers are indisputably right or wrong. Consequently any one provided with a key can mark or score the papers, and, aside from purely clerical errors, which can be checked and corrected, there is no possible variation in the result. Subjective differences of evaluation are eliminated. It will be evident that the new-type examinations are much superior to the older kind, at least for the purpose of comparing different students or different groups.

The Carnegie Sophomore Test of 1930 was an unusually extensive one. It contained over 3,000 new-type questions, and was given in five three-hour sessions during five half days. It included:

(1) An intelligence test, similar in kind to the intelligence tests which many up to date elementary and secondary schools are now using.

(2) A "general culture" test, which Dr. William S. Learned, who with Dr. Ben D. Wood of Columbia University is in charge of the Pennsylvania Study, describes as "ranging from very simple to very diffi-

cult, over the following fields: general science, 290 questions; foreign literature, 330; fine arts, 250; and general history and social studies, 340" — total, 1,210 questions. "The knowledge required for success in this section of the test," says Dr. Learned (in the Carnegie Foundation Report), "would nowhere appear as organized college courses. The questions were prepared, however, by experienced university teachers with the avowed purpose of testing such knowledge as one would expect to find increasing from year to year as the result of reading and study both within and without the limits of formal courses. The examination is believed to offer a fair measure of the permanent increment, the *effective* accumulations, attributable to a student's desire really to assimilate the ideas that constitute an academic education as contrasted with the urge merely to possess a degree as the result of having secured credits in a sufficient number of semester courses."

(3) Five tests in subjects which are regularly covered by formal college courses: English, 450 questions; mathematics, 220; foreign language, about 325; social sciences, about 200; and natural sciences, about 300. In the last three fields the student chose one of four languages, one of four social sciences, and one of five natural sciences, in which to be examined.

SO MUCH for the Test, which, I think it will be granted, was about as inclusive and thorough as could well be desired. Now for the unexpected and striking results in the six colleges which gave the Test to all four classes.

The accompanying table, from the Carnegie Report, gives the median test scores, for the four classes in one of those six colleges, in the common subjects (omitting the foreign languages, social sciences, and natural sciences, among which a choice was offered).

	<i>Freshman</i>	<i>Sophomore</i>	<i>Junior</i>	<i>Senior</i>
Intelligence test	56	57	57	58
English total...	227	218	211	221
Spelling.....	31	30	28	30
Grammar....	30	31	29	29
Punctuation .	31	29	29	31
Vocabulary ..	60	58	58	58
Literature...	73	71	70	72
Mathematics...	53	52	51	49
General culture total.....	265	285	302	289
General Science.....	74	77	87	86
Foreign literature.....	58	64	69	68
Fine arts....	56	55	59	60
History and social studies.....	81	81	80	79

To get the full effect of this table, compare the Senior column with the Freshman column. *There is nowhere any substantial gain.* In the English total and in mathematics there is even a steady falling off, except that the seniors seem to stage a partial come-back in English in the final year.

Dr. Learned comments as follows: "The intelligence tests reveal approximately uniform mental ability, as one would expect. . . . English shows a loss in total score of more than six points, and that loss is not merely in the mechanics of English, where some might consider it excusable, but in literature and even in vocabulary, where it goes to the very core of the educational purpose. The peak of literary knowledge, both of words and of books, is apparently reached in the freshman year; fifty-three per cent of the college seniors

tested in English literature and vocabulary stood lower than the median freshman. Even mathematics shows a less serious decline, although all would probably agree that, whether desirable or not, a gradual deterioration in that subject (among students not continuing it) is reasonable."

Then he turns from the situation in the single college represented in the table to "the general aggregate of scores in the six institutions," covering about 1,700 candidates for the B.A. degree, and "finds very similar conditions: senior scores slightly higher, but everywhere enormous overlapping and variability.

"Mathematics exhibits a consistent backward movement with increase of variability in the senior year. In a test with 220 points the class medians run: 60, 55, 50, and 47.

"The mechanical elements of English — spelling, grammar, and punctuation — were tested on a proof-reading passage and are virtually stationary at 30 points out of a possible maximum of 50. There is a two-point increase in spelling. Literature shows a gain of one point in 200 and vocabulary a gain of about five words in the 100 assigned. The latter were all words familiar to any well-educated person, and the test required merely the recognition of a synonym among four options. Out of the group of 431 seniors there were 43, or 10 per cent, whose maximum score was 35 out of the 100 words designated — a well-submerged tenth.

"In the four fields — general science, foreign literature, fine arts, and general history — which have been described as constituting the test in

general culture, the median scores do indeed advance somewhat in the successive class-groups but the difference means little. In general science 39 per cent of the freshmen did better than the median senior; in foreign literature, about 24 per cent; in fine arts, 36 per cent; and in general history 38 per cent of the freshmen secured scores in excess of the median senior performance. In the test as a whole, 30 per cent of the seniors were below the freshman median, while about the same proportion of freshmen outdid the senior median. The heretofore pardonable and undisproved conviction of the fourth-year man that any senior must of necessity be wiser than any freshman should apparently undergo revision."

Dr. Learned seems particularly perturbed by the showing in the vocabulary test, as he well may be in view of increasing evidence to the effect that copiousness and accuracy of vocabulary constitute one of the most significant of all measures of intellectual development and capacity.

"As for vocabulary," he says, "particularly the literary vocabulary, the effect of college on the word supply of the ordinary student appears to be almost negligible and in some cases positively injurious. The story of the test to the effect that the average college senior recognizes only 61 out of 100 words in familiar use by educated people as compared with 56 recognized by freshmen brings us face to face with the familiar poverty of campus language, the absence of conversation on subjects of study, and the dearth of general reading on the part of students. A student out of the lower quarter of this senior group,

in a paper completed with meticulous pains, recognizes only 23 out of the 100 words correctly, is ignorant of such words as *inert*, *lenient*, *baffle*, and *immerse*; thinks that *culpable* means *tender*, that *declivity* means *climate*, and that *demure* means *abject*. Yet she is about to graduate from an 'accredited' college and is earning one of her senior credits in a course in the 'American Drama'. To a senior with average score the word *benighted* means *weary*, *recreant* means *diverting*, and *spurious* means *foamy*. Possibly the fact that he takes the word *assiduous* to mean *foolish* may help explain his case."

How can these devastating results be explained or interpreted?

Certain people — including, I regret to say, some college professors and administrators — are inclined to answer that such results are unimportant, because, they say, a test of this kind measures only factual knowledge — "mere knowledge," they are likely to call it — which is by no means the principal thing we are after in a liberal education.

Well, let it be granted that the Carnegie Test does not *directly* measure reasoning power, capacity for expression, literary or other esthetic appreciation, or ethical idealism. And let it be granted, also, that such outcomes are the ultimate goal, that "mere knowledge" is not in itself sufficient or very valuable, in short, that a student might conceivably make a splendid showing in such a test and remain essentially uneducated — illogical in his thinking, inarticulate, stolid before beauty, and unsocial in behavior.

Does this concession, then, nullify

the Test? Does it admit a valid plea in extenuation for seniors who are ignoramuses and the colleges that produce them?

Not quite. Because, while knowledge does not inevitably lead to the ultimate desirable outcomes, those outcomes do inevitably fail without knowledge. How can any student reason in a vacuum? Express himself when unfamiliar with the common counters of language? Appreciate beautiful things which he has not apprehended? Or even build up substantial ideals while he remains ignorant of nearly all those occasions and problems, historic and current, in connection with which human ideals have arisen and without reference to which they are empty phrases?

It comes to this: a high score in this kind of test does not infallibly demonstrate the attainment of what we call a liberal education; but a low score does infallibly demonstrate a lack of liberal education, because it reveals the absence of the foundation on which a liberal education must stand. Let me vary the figure. One may have a flourishing tree without fruit, but one can not have fruit without a tree; knowledge — ample and accurate knowledge — is the tree on which the fruit we call culture must grow.

Moreover, the flourishing tree which is barren is a rare phenomenon; ordinarily such a tree bears its appointed fruit. And so with the tree of knowledge: real knowledge *usually* flowers and fruits in reasoned thinking, self-expression, appreciation, and ideals. After all, then, a knowledge test does, not directly, but indirectly and presumptively and in the vast majority of cases, measure

positively, as well as negatively, the ultimate desirable outcomes.

So I am afraid we must grant that the evidence is valid and pretty damning.

But some one may remember the many hours of class attendance, and not inconsiderable periods of study outside of class, to which college students are subjected, as related at the beginning of this article, and may wonder why, after such extensive attention to books and studies over four long years, so many young men and women have so little to show for it.

There are at least two causes contributory to this futile result. The one which Dr. Learned stresses most is the curious organization of the whole programme of studies in American colleges on the basis of isolated semester *courses* with the accompanying *credits*.

This phenomenon of the course, as we know it, came into being some fifty to sixty years ago with the abandonment of the old fixed curricula — which were undoubtedly narrow, but were at least cumulative, with definite objectives — in favor of free electives. Under the plan of free electives, as originally practised at Harvard and elsewhere, each student might study anything he pleased, and as much or as little of it as he pleased. Accordingly, something like our courses had to be instituted. The whole of human knowledge was, as it were, canned to be displayed on the shelves of an intellectual piggly-wiggly for the attraction of customers. Since then, of course, free electives have been greatly restricted; students are now required to concentrate many of

their choices under "majors" and "minors" and "groups." But in the meanwhile both the managers of the piggly-wiggly — the faculty — and the customers — the students — have grown so accustomed to cans that it scarcely occurs to them to deal in any other kind of goods.

The extent to which our present courses are self-contained and insulated against any penetration of facts or ideas from the outside is truly remarkable. A student taking a particular course understands that he must follow the lectures, read the textbook, and at least skim the outside reading prescribed in that course; at the end he will be required to pass a reasonably searching examination on that specific block of material. But he is not ordinarily required, or even much encouraged, to draw upon data or concepts with which he has become acquainted in other courses, much less upon material he may encounter outside of purely academic instruction — in newspapers or magazines, in books or plays, or in conversation. In short, there is little intellectual free trade, but rather a high tariff wall around each little course.

This conception of courses as segregated units seems to be largely induced and perpetuated by the remarkable American invention — unknown elsewhere in the world — of *credits*. When a student has passed a course, he becomes entitled to a certain number of these credits (corresponding to the number of class periods per week), and they are forthwith recorded in the registrar's office, toward a grand total of credits (usually 120) which will give him his degree. Thenceforth those credits are

sacred. They can never be invalidated — no matter if it subsequently appears that the student has forgotten completely the content of the course; the credits will still stand and count towards the degree.

Under this system the common attitude of students towards their successive packages of instruction is neither strange nor entirely illogical. Many students when they have passed a course and got their credits feel that they are "through" with the whole matter. They quite commonly sell their textbooks and chuck their notes in the waste basket, and these physical procedures are only too accurately symbolical of the accompanying mental procedure. As a corollary of this idea, students generally hold that an instructor has no right, in any quiz or examination or even in a recitation, to call for any material, however relevant, which has not been specifically presented in that particular course; if ever this enormity is perpetrated, they are likely to appeal to the head of the department or the dean for redress. From the other side this new point of intellectual ethics is amusingly illustrated in a story which Dr. Learned relates. A troubled youngster went up to the instructor in charge of a course examination for clarification on a point of conscience. "I know the answer to this question," he said, "but I learned it in another course. Would it be fair for me to use it here?"

It will be evident, I think, that under this system and conception the results which the Carnegie Test revealed are exactly what we might expect. The seniors who did so badly in that Test had undoubtedly all had,

at one time or another, a "passing" acquaintance with a large part of the facts, terms, and ideas for which the Test called. They had credits in the registrar's office to prove this, and a few weeks after the Test they all received diplomas to tell it to the world. But it was nearly all "passed" in a double sense, leaving no substantial residuum, for definite recall or any possible use, beyond what they had had on the average when they entered as freshmen four years earlier.

The trouble is that the course-credit conception of knowledge as a series of blocks, to be successively acquired and separately stored away, is diametrically contrary to nature in this matter of learning. The raw data of knowledge can become a part of an effective mental life only in so far as they are continually woven and interwoven with old and new attainments, and thus constantly recalled and integrated and used, and carried forward as a growing, living organism. Of course there are in our colleges students who learn in this way, "self-educating individuals," Dr. Learned calls them, "minds of high intelligence and native curiosity that refuse to be restricted; minds that knowledge in one field irresistibly propels into another; minds to which courses and points earned and all such machinery are negligible because of native thirst and appreciation for ideas." But the course-credit system not only does nothing to encourage such valid learning but actually inhibits and discredits it. So long as this system remains entrenched we may expect further sorry exhibits of the kind the Carnegie Foundation has just displayed to us.

There are, of course, a good many

colleges which are fully alive to the demerits of the course-credit system and which are experimenting — in general somewhat timidly — with other plans. The most common of these is the honors plan; under which selected high-grade students in the last two years are permitted to concentrate in a chosen field of interest, are sometimes excused in whole or in part from course and credit requirements, and are in any case expected to supplement courses by a large amount of independent reading; all in preparation for a Comprehensive Examination, in which they must be able to recall and use freely all the material they have covered in the whole two years. This plan certainly encourages, even — so far as any mere system can do so — requires, the kind of study and learning which has been described above as valid. But the new plan is commonly limited at present to the last two years, and within those years to the ablest students (who need it least), leaving the freshmen and sophomores and the more mediocre juniors and seniors to continued stultification by courses and credits. It would seem that the principle at least of the honors plan should, as speedily as possible, replace the course-and-credit principle for all the students in all classes.

**B**UT there is a catch here. The colleges are afraid to try the honors plan except with their very ablest students. They are afraid that most of the young men and women whom they now admit could not work under that plan. These students can get along under the course-credit system, where they need memorize

only small bodies of material, which may be freely forgotten after sixteen weeks, and so can be carried on, not with any noticeable increase of learning (as the Carnegie Test has shown), not towards anything that can be called education, but by the accumulation of credit to a degree, which after all is what these students and their parents chiefly want. But what if they were confronted as freshmen with the necessity of choosing a field of intellectual interest in which to concentrate? Or set an extensive programme of independent reading? Or denied the privilege of "passing" at brief intervals parts of what they were supposed to learn, and required to carry it all in mind for four whole years?

No college has yet dared to put such questions to the test of trial. Because everybody knows that a considerable part of those college students who now attain degrees would be simply bewildered by any such programme, and would have to give up and drop out. Which is to

say that we know they are not capable of real liberal education and so we provide a sham. This brings us to the second and perhaps even more fundamental reason for the deplorable showing made in the Test, namely, the indiscriminate admission to college at present of many students who lack the necessary mental ability and intellectual interest to profit by instruction (under any plan) at the college level.

Since most colleges desire large enrolments and depend in considerable measure upon the income from fees, this second point is particularly difficult to deal with. But some day some college, amply endowed, will set about receiving only really first-class minds, and will undoubtedly turn those minds loose from the beginning in something like the present honors courses, with the honors-course requirement that learning shall be cumulative and alive. It seems at least probable that a Carnegie test given to the seniors of such a college would yield happier results.



# Ship's Bread

BY CAPTAIN WILLIAM OUTERSEN

## *A Story*

THE boat drifted head on to the waves, held in that position by a bar of driftwood, made fast at its centre to the painter and left to drag in the water as a sea anchor. A fine drizzle was falling from low dun-colored clouds, and the dawn was gray and cheerless. In the boat were two persons, a man known as Burley, and a boy called Angus, who sat on the bottom boards facing the stern, his eyes fixed on a cloud-wreathed island not more than a mile distant. His expression revealed an intense longing to reach the shore to which they were drifting, but he made no effort to hasten the movement of the boat in that direction, although four good oars were lying along the thwarts. It was Burley's pleasure to let the boat drift slowly toward the land, and Angus was too weak to handle the oars, since he had eaten no food during the past ten days.

The man sat crouched in the bows, and from time to time took out of his pocket a piece of ship's biscuit, which he put into his mouth secretly, in order that the boy might not observe him. He waited awhile after each of these sly motions, to give the fragment in his mouth time to

soften, unwilling to chew it while it was hard, as the boy would hear the sound of crunching, and turn his big hungry eyes on him while begging for a piece of the bread. This had happened several times, and it annoyed Burley, who was an escaped convict from Sing Sing and showed signs of rugged health, having had plenty of food to sustain him since the foundering of the ship on which he and Angus had been foremast hands. It would have been an easy matter for this man to handle the oars, but he saw no reason why he should. On the land toward which they were drifting there might be men, although his keen eyes had as yet discovered no signs of them, and where there were men there was always the law, which he feared and hated.

The skin of the boy's face was drawn tight from starvation, and his cheekbones protruded, yet Burley had a pocketful of ship's biscuits, and a canvas bag nearly full of these lay in the boat's after locker, the key of which the man kept in his own possession and jealously guarded. For the first few days after they had been cast adrift, Angus had received a certain share of the food, but as