SPECIAL ARTICLES

COMPETITIVE ATHLETICS AND SCHOLARSHIP

ONE of the most important considerations for schools and colleges in this whole problem of athletic control is that of scholarship.

This paper is an attempt to answer some of the questions which have arisen regarding the scholarship of students on teams representing educational institutions and the effect of competitive athletics on scholarship. It will also endeavor to show what are some of the causes which produce this result and to suggest remedies therefor.

The materials were largely collected in 1898, but no use was made of them until December, 1905.

The questions which will mostly concern us are: (*A*) Is there a material difference in scholastic standing between the students who represent our schools and colleges on athletic teams and those who do not? (*B*) If there is such a difference, whether in favor of or against the athlete, is it due to competitive athletics immediately or remotely, or to the natural mental powers, or disposition of athletes? (*C*) If there is a material difference, whether due to competitive athletics or natural powers, what should be our attitude toward it? The major part of this paper will be devoted to matters of fact indicated in (*A*) and (*B*).

(*A*) Is the scholarship of athletes on varsity teams materially different from that of their classmates?

Historical.—The bibliography of this subject, which has to do with facts, or statistics, was, until quite recently, very meager, although there is scarcely an educator of note but has expressed his opinion upon it on one side or the other. Of the few contributions which deal with facts we select the following as bearing most directly on our theme.

In 1889 Professor E. L. Richards, of Yale University, wrote in the *Popular Science Monthly* that, having examined the records of 2,425 students, he found the athletes to fall slightly behind the non-athletes in scholarship.

The bursar of the University of Pennsylvania some seven years ago published the statement that for that year the scholarship of the athlete at the University of Pennsylvania fell below that of the student body about 4 per cent., an amount which he considered negligible.

In SCIENCE for July, 1906, is an article on "Intercollegiate Athletics and Scholarship" by Professor William Trufant Foster, of Bowdoin College. This deals in a comprehensive and scientific manner with the facts regarding the scholarship of athletes and non-athletes in colleges and schools.

Professor Foster found by a careful examination of the scholarship records at Bates College for the five years 1900–1901 to 1904–1905, that the average annual difference in rank between the students playing on the baseball and football teams varied from four to eight per cent. with an average difference for the whole period of "5.6 per cent., always in favor of the men who have not taken part in intercollegiate games." In this investigation the grades were made up by twenty-five instructors. There were 132 athletes and 620 non-athletes.

In a similar study of the football and baseball men, just completed at Bowdoin College, Professor Foster found for the five years from 1899–1900 to 1903–1904 an average annual difference in favor of the non-athletes varying from .95 per cent. to 5.21 per cent. with an average difference for the whole period of 2.8 per cent. These figures represent each year the scholarship records of 280 men. They were compiled by students in education at Bowdoin.

He reports further that all the secondary schools from which he had adequate returns showed similar records. These schools are quite varied in character. At Brighton Academy the ranks for four years show that the athletes are one per cent. behind; at Thomaston High School for four years the athletes fall three per cent. below the others; at Westbrook Seminary, a private school, the athletes are slightly below the others; at Hebron Academy the athletes for three years fell five per cent. below the non-athletes.

Professor Foster concludes:

The facts were gathered by twenty men of varied opinions on the question, who were not endeavoring to make the figures from any theory or support any opinion. So far as the facts go they are authentic.

Method.—In 1898 the writer commenced an investigation into the relative scholarship standing of athletes and non-athletes in Amherst College. This investigation embraced at first the classes from 1886 to 1897, inclusive, later those from 1898 to 1903 were added. The athletic class was restricted to the players and substitutes on varsity baseball, football and track teams. In each case the books of the registrar were the sources of information and in every case the grade of a student at graduation, or for the entire time he was in college, was taken as his rank throughout. Where a comparison was made of athlete's grades in terms when he was playing and when he was not playing, as in the second part of the investigation, the term averages are of course used.

The registrar's books seem to us a fair index of the men's educational attainments. They represent the consensus of many different instructors wherein the personal equation is largely averaged out. If anything the figures will favor the athlete, for surely the majority of instructors are in favor of athletics.

No account has been taken of delinquencies, as those of past years could not be ascertained. The mark given in the subject when it, or its substitute, was made up, was alone used. This method is favorable to the lower rank men. It especially favors them in the comparison between their rank in playing and non-playing periods.

In the cases of those students who did not last out the fall term and who had delinquencies on the books no record was made of them or a passing grade given. This too is favorable to the low-grade men.

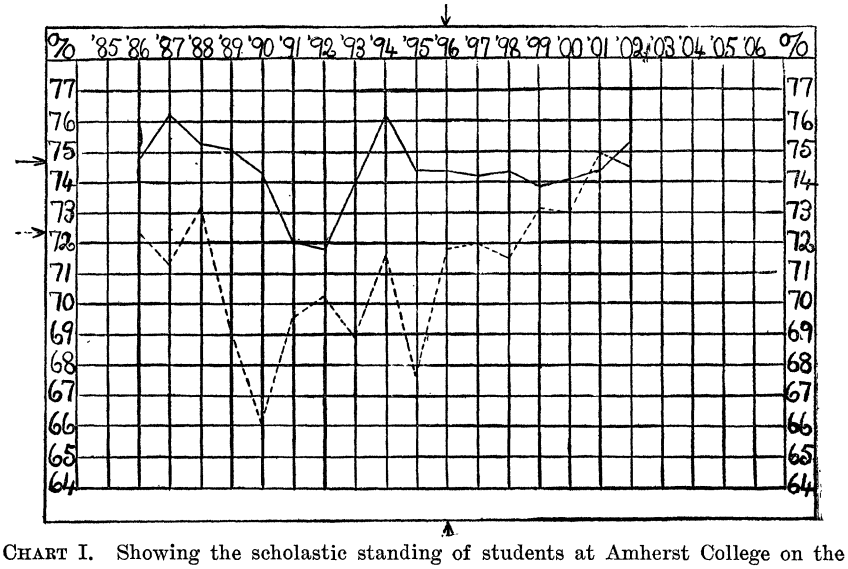

Chart I. Showing the scholastic standing of students at Amherst College on the varsity teams as compared with those not on teams, 1886–1903.

The writer undertook this investigation in the expectation, partly because of his own participation in competitive athletics and his remembrance of individual cases of high scholarship among the athletes of his day, that the athlete would make a good showing. There certainly was no prejudice on his part *against* the athlete.

It is to be remembered that at present we are not discussing the athlete's intellectual *ability*. All will agree that college marks are

not an infallible index of that. We are considering now what he accomplished intellectually in the work prescribed by his instructors. It should also be borne in mind continually that the comparison is not of the students taking normal physical exercise with those who do not, but of those in strenuous athletic competition with those not so engaged.

The averages of the three teams mentioned have been taken separately and conjointly for the years 1886 to 1903 and are indicated graphically on the accompanying charts, I. and II., in comparison with the averages of the non-athletic students. On each of these charts the years are indicated at the top and the grades at the sides. So the rise or fall of the lines shows a commensurate rise or drop in scholarship.

In Chart I., which contains the conjoint averages of all three teams, comprising 318 different athletes and 1,692 different non-athletes, a total of over 2,000 different men, it will be noted that the average scholarship of non-athletes in college varies between 72 and 76 in the different years, while that of the athletes lies between 66 and 75. The averages for the whole period are: of non-athletes 74.4 per cent., and of athletes 70.4 per cent., a difference of four per cent. The most remarkable fact shown by the comparison, however, is that in the whole eighteen years the average of athletes rises above that of non-athletes but once, and that once after the scholarship rules for athletes were made and enforced in 1896. (See arrows on the chart.)

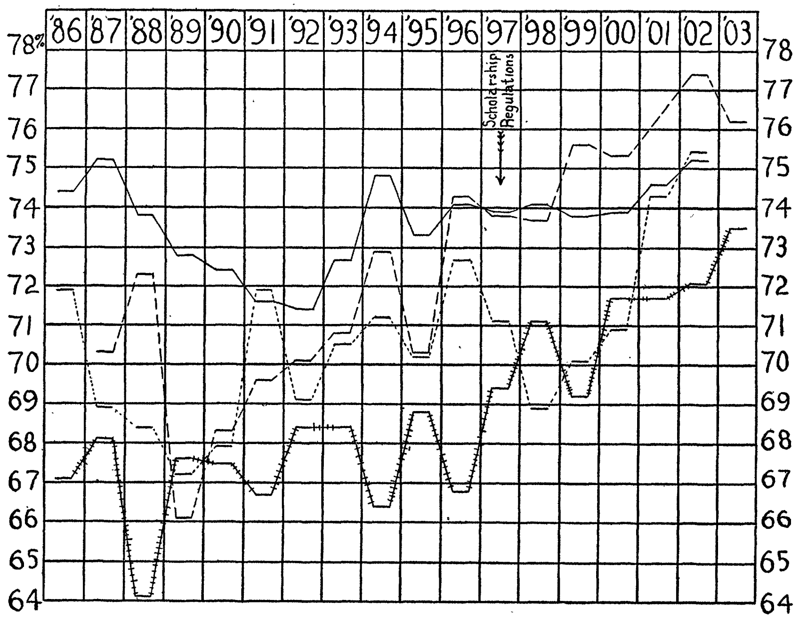

CHART II. Showing the scholastic standing of students at Amherst College on the varsity track, baseball and football teams as compared with the rest of the student body in the years 1886 to 1903.

——— non-athletic — — — track team .... base ball team ++++++ foot ball team

In Chart II., where the team averages are plotted separately, the additional information is brought out that on the average the track team stands highest, the baseball about one per cent. below, and the football some two per cent. below that, the football team never equaling the average of the non-athletes in college the same year.

The statistics at Amherst thus corroborate those published by Professor Foster from Bates, Bowdoin and the Maine preparatory

schools. They agree also with the opinions in letters recently received from preparatory schools and universities in answer to a questionnaire. From this mass of statistics it may be safely predicated thus early in our study that, unless special means are employed to debar low-stand men or keep them up in their studies, or both, the men on varsity teams will be found below their classmates in scholarship.

Some will object to this that, while the facts are true regarding the rank and file of athletes, the great athletes, who stand head and shoulders above their team mates, will generally be found to be great scholars also.

An unusual opportunity was given at Amherst to test the validity of this statement in 1905. An all-Amherst football team was selected by competent judges and published in the college paper. Of the eleven men chosen four were above the college average in rank, seven below it, and the average of the team fell about five per cent. below the average of the non-athletes. While these figures do not prove the assertion that great athletes are not up to college average, it does furnish interesting evidence to refute the statement made above, and is a result quite the reverse from that at which President Hyde arrived in his study of fifteen years ago, in which he found that the best athletes were the best scholars of the athletic class.

Granting that the men on varsity teams are below their classmates in rank, is the four per cent. difference worthy of consideration? The bursar of the University of Pennsylvania considers it negligible; Professor Foster thinks it "so small as to overthrow two thirds of the *a priori* assumptions regarding the *excessive* injury of intercollegiate games to the scholarship of the men who play." If it is negligible, then an inquiry into whether this inferiority is the result of athletics would scarce repay us.

An analysis of these averages of athletic men is of interest as showing in part why they are lower than those of their classmates and whether the disparity may be summarily dismissed.

Such an analysis we have shown on Chart III. by distributing the athletes according to their rank, after Galton's method.

At the bottom of the chart will be seen the grades from 45 per cent. to 95 per cent. At the sides are percents from 0 to 26. The per cent. of athletes who attain each grade is indicated by a dotted horizontal line drawn above that grade at the proper level. The height of this line, then, will indicate the number of athletes per hundred who attained the subjacent grade.

Continuous horizontal lines have also been drawn on this chart to show the distribution of the grades of the non-athletic students. The chart represents 212 different athletes appearing a total of 531 times, because some of them were members of more than one team. The ranks of athletes in the later classes were added to these, but they made no material difference in the result.

The most evident thing shown by this chart is that the low averages of the athletic men are due to their greater per cent. of low grade and their lesser per cent. of high-grade men. This is especially noticeable between 50 and 65 per cent., where there were two or three times as many athletes per 100 as non-athletes, and between 85 and 95 per cent., where there are over three times as many non-athletes as athletes. Between 65 per cent. and 80 per cent., comprising three fifths of the whole class, there is not much difference in the number at each grade.

This marked inequality between athletes and non-athletes is due mostly to the football men. About six times as many football men have grades between 55 and 60 as the non-athletic class, and seven times as many non-athletes have grades from 85 to 90 as have football men. The track men make the best showing and the baseball men are intermediate in the averages.

Is it worth while for us, then, to go farther. Having seen that a difference of about four per cent. exists between the scholarship of the athlete and his classmates, and in favor of the latter, and having also, by this analysis, ascertained to what kind of marks it is due, will it repay us to find out whether this inferiority

is due to competitive athletics directly or indirectly, or to natural inability, or disinclination to learn: in short, is the game worth the candle?

The most impressive thing in the results obtained is not that there is an average difference of four per cent. between the two classes, but that the athletes fall below so uniformly. When the three teams were traced separately it was found that in the fourteen years from '86 to '99 inclusive, out of forty-two possibilities only one team equaled and one exceled the general average of the non-athletic students, really one case against forty. This means that there is some underlying constant factor depressing the grades of the athlete which we should know if we are to act intelligently. This does not postulate that if we find intercollegiate competition the cause of it we shall abolish it or even control it. Other things are to be considered.

Again, four per cent. means about one sixth of the variation in college marks, say from 65 to 90, a difference which means more than even educators fancy. This particular four per cent., say from 72 to 76, includes about 25 per cent. of all students, a drop of four per cent. then puts a quarter of the class above them. As an example of how soon a drop in scholarship is appreciated and how much it means to a college I would cite the consensus of the faculty on various classes. A class is

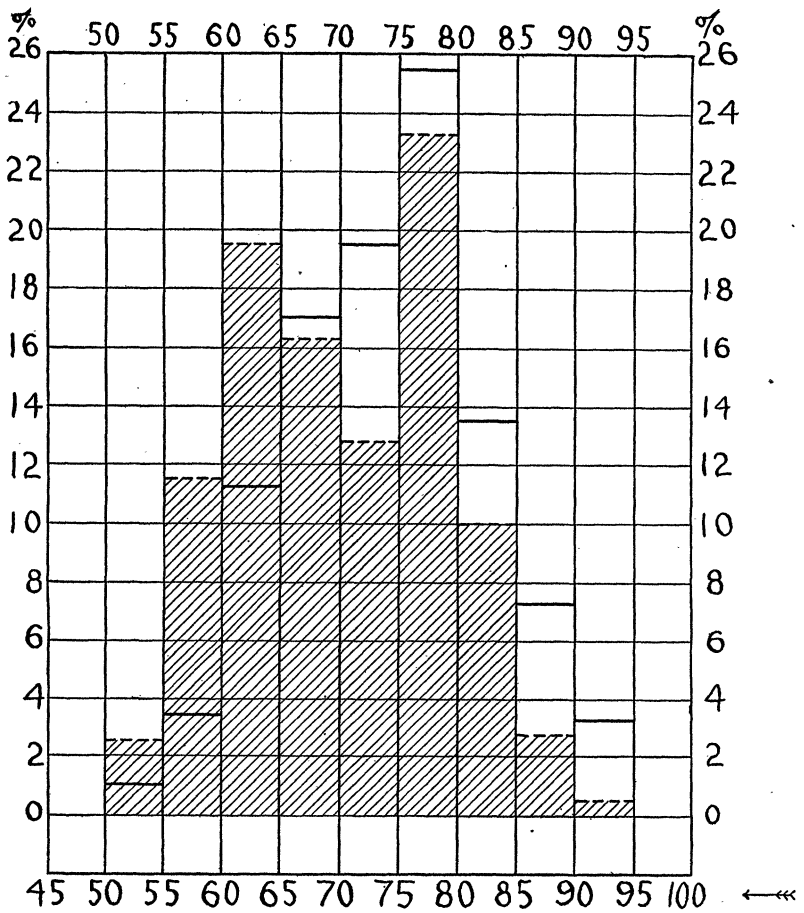

CHART III. Showing the percentage of varsity athletes who attain various scholastic grades as compared with the percentage of other students who attain the same grades.

called good, in scholarship, or poor, by common consent, when there is a difference of not more than two or three per cent. With but one exception every college professor whom I have asked says that there is a marked drop throughout the class in scholarship from the winter to the spring term and yet our Amherst statistics show a deterioration of less than one per cent. in that term.

Further, the drop of four per cent. in any considerable group of students naturally, and in this case does, in fact, bring a considerable number of students toward the failing line and so throws more work on the teachers. "There is in every garden an outside row which needs a lot of hoeing." If it is wise to attempt to reduce this four per cent. by a scholarship rule for athletes the labors will be somewhat reduced.

Once more, the effect of much poor work in the class-room is somewhat demoralizing, especially when it is done largely by one group at certain seasons, making them seem a privileged class. Assuming, then, for our argument that it is worth while to further question the cause of this difference, let us ask ourselves first, do the competitive athletics cause the drop of four per cent? To get light on this subject we have taken the averages of men on various teams in terms when competing and when not competing. This has been a rather difficult task, as the men frequently are on different teams. The men have been taken in order in the four classes, 1897, 1898, 1899 and 1900.

The results are as follows:

	Average Scholarship Standing—		
	In Terms Playing	Not Playing	Difference
Football men	72.63	75.70	3.07—
Baseball men	69.62	74.25	4.63—
Track men	70.91	70.87	.04+

These figures indicate that both the football and baseball men drop off noticeably in their work during the terms in which they are competing, while the track men keep at about the same level.

It may be objected, regarding the figures for baseball and track men, that there is, as indicated previously, a noticeable dropping off in work on the part of all students during the spring term. To ascertain what that really is we have averaged the scholarship work of non-athletic men each of the terms of the college years under consideration and find for these:

Fall terms	76.62
Winter terms	77.42
Spring terms	76.79

There is to be seen here a drop of .63 from the winter to the spring term, but the fall term averages are even lower, .80 per cent. below those of the winter term. When, however we take the averages of the winter and spring terms to compare with the fall one, as in estimating the scholarship of football men, there is but slight difference and the same is true when we average the fall and winter terms to compare with spring in considering baseball men's rank.

Thus much of this difference in rank between athletes and non-athletes may be ascribed to the competition and not to inherent mental inferiority or to seasonal effects.

Our paper has brought us then to these conclusions: first, that the average scholarship of men competing on varsity football, baseball and track teams in various schools and colleges is, if uncontrolled, below that of their fellows by an amount approximating four per cent., that it is lowest in the football, next in the baseball and highest in the track team; that this difference is due to the large number of low-rank men on these teams and the small number of high-rank men as compared with the non-athletic students; and that the low rank of these athletes may, in the case of foot- and baseball, in large measure, be ascribed to the effect of being on these teams and not primarily to incapacity.

Would it be better to keep the standard of scholarship up on these teams, at the expense of depriving some of the members of this stimulus to exercise—if not to study. What is it wise to do?

If the enforcement of such a standard would deprive any considerable number of students

of the opportunity for judicious exercise the question would be an open one for the physical educator, but we are not speaking of all athletes. Only those who make the teams are subject to the strenuous requirements thereof and they, as a class, need the exercise and stimulus the least. The application of a scholarship rule to keep up the standard of scholarship then seems to us beyond a question desirable. What its effect may be is to be seen in Chart I., where the line of average scholarship in athletics rises about up to, and once above the general college average.

None of these sports, in our opinion, is it wise to abolish: they are too valuable. The responsibility is upon the faculties of our educational institutions to control them.

The number of intercollegiate or interscholastic games may be reduced, the trips cut down, or the varsity season deferred so as to last but a month and promote dissemination of sports, in the way suggested by Mr. Derby in a recent *Outlook*, but the most potent regulation is through scholarship rules.

The raising of these standards is in the hands of the faculty; it does not take great mentality, but plain old-fashioned courage to do this. If each of our colleges and schools would set and maintain such high standards for itself that any league agreements would be well outside them, then the educational ideals would be preserved.

PAUL C. PHILLIPS

THE SO-CALLED VOLCANO IN THE SANTA MONICA MOUNTAINS, NEAR LOS ANGELES, CALIFORNIA

THE California papers have recently contained accounts of a so-called volcano in one of the canyons of the Santa Monica Mountains near Los Angeles. Reports of a similar kind have frequently been made heretofore with reference to points in Santa Barbara County, where fire has started in the petroleum-bearing shale near the surface; and the fire recently observed in the Santa Monica Mountains is due to the same cause. Occurrences of this kind have been described in a recent article in the *Journal of Geology*.[1]

Mr. H. R. Johnson, of the U. S. Geological Survey, now stationed at Los Angeles, visited the locality of the Santa Monica occurrence March 3, and the following notes concerning it were obtained at the time of this examination.

The "volcano" is situated about 200 yards up Pulgas Canyon from the ocean, two and one half miles northwest of Santa Monica, and about fifteen miles west-northwest of Los Angeles. Here a little point of Monterey (middle Miocene) shale jutting into the creek exhibits several small openings, from which very strong sulphurous fumes, light bluish-gray in color, are issuing. At distances of from six inches to a foot or more from the surface in the vicinity of these holes the shale is at a dull cherry-red heat, the temperature being high enough to immediately ignite bits of wood forced into it. The ground, which is here covered by shale fragments and small amounts of humus for a radius of 75 or 100 feet around this group of openings, is uncomfortably hot for the feet and at some places is too hot for even a momentary contact with the hand. At one point an oily condensation, which smelt like hot asphalt, was noted.

The shales show an interesting progressive discoloration which will be described, beginning at the outer edge of the area of alteration. Normally of a dirty yellowish-gray calcareous phase, they are first blackened by the heat, then given that intense peach-blow red which is to be seen in all of those localities in the Santa Maria oil district and elsewhere at which this peculiar type of metamorphism has taken place, while the last stage of oxidation seems to result in a crumbling greenish-gray ashy material. The finding of fragments of scoriaceous shale at the burnt area has recently been reported, but the writer saw none personally. Neither did he see any bursts of flame, which it is said have been seen at the locality, although it is very likely that such might be visible at night.

[1] "Metamorphism by Combustion of the Hydrocarbons in the Oil-bearing Shale of California," by Ralph Arnold and Robert Anderson, *Journal of Geology*, Vol. 15, No. 8, November–December, 1907.