The Correlation of High School and College Chemistry.

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This subject I submit for consideration, not as one who has anything final to offer, but as a teacher who has considered several different systems and has tried some of them.

Inasmuch as the objects sought in the various high schools and college courses differ, it is difficult or impossible to devise any system of correlation which will suit all cases with the maximum of efficiency. Local conditions and previous training of students, as well as the future plans of the students, so far as these are definite, must be determining factors. In any case, efficiency rather than convenience should be our guide.

In considering this question I have found it convenient to propose three alternatives for students who have completed a high school course in chemistry and elect to continue the subject in college. The alternatives are as follows: First, to admit the student at once to second year chemistry, usually qualitative analysis; second, to give the student the same course as those who have had no previous work in chemistry; third, to give to such students a special course in general chemistry.

The first alternative—to admit the student at once to second year chemistry—I do not favor for theoretical reasons and because my experience has found it unsatisfactory. In this case you have high school students, the nature of whose courses in chemistry has differed widely, subjected to the same prescription as college students whose courses have usually been more uniform and deeper. This is apt to be especially true because the college recitations and laboratory periods are usually longer and because, in a great many colleges courses in general chemistry more or less qualitative analysis is introduced. This enables the college student to start qualitative analysis at a somewhat advanced point.

On the theoretical side we find similar differences. The time is past, if it ever did really exist, when a course in qualitative analysis conducted in a mechanical way may be considered properly taught. The theory of the

subject is presented in our best text-books from the point of view of ionic equilibrium, the periodic system, and the electro-chemical series. Our best college text-books and laboratory manuals in general chemistry emphasize these same subjects. This, it seems to me, gives the correlation between general chemistry and qualitative analysis which is not secured by courses which do not place emphasis on these three subjects. Equations also must be well learned throughout all chemistry courses. We must not, to be sure, give too much time to equations to the exclusion of other parts of the science. But have you ever known a good chemistry student who could not write equations? I often wonder if equations are being neglected.

The second alternative—to put all students into the same course in general chemistry—admits of several interpretations. Shall we give full credit for the course to the student who has receeived an entrance credit in chemistry? This may mean duplication of credit. Such duplication exists in one form or another in some subjects. Shall we do the same in chemistry? This question is variously answered by different institutions.

Duplication of credit may be avoided by requiring different laboratory experiments and different written work in the laboratory and in connection with the text-book, from the two classes of students. This is rendered difficult by the different contents of the high school courses. Or we may avoid this duplication by giving only part credit for the college work to those who have entrance credit in chemistry. This may appear to the student to be work without credit, and is often opposed on those grounds.

The third alternative—to give a different course to the two classes of students—may be accepted in different forms. In some cases students have totally omitted the first part of the course, and taken the latter part entire. This I think is objectionable because of sins of omission and commission. The student should have much of what he omits in the first part, and duplicates much that is familiar to him in the second part. We may on the other hand give a shorter course covering the whole subject to our students with entrance credit, avoiding duplication of work which may be supposed to be familiar, and giving only what we think will impart the advanced point of view which we consider advisable.

This accomplishes in another way much the same end as the plan of assigning different work under the second alternative. These two plans are subject to the same difficulty. The students have had quite different courses in high school and do not well admit of the same diagnosis.

Will not a satisfactory solution of our problem be accomplished by the introduction into our high schools of the new courses in general science now being advocated? This would leave the specialization along different branches of science in the hands of the colleges and would enable us to treat all classes of students alike without fear of duplicating credit, or of omitting anything essential. Probably our high school science should be conducted with the purpose of enabling the student to interpret his daily environment. In college, however, while considering fully the interest of the student whose object in chemistry is cultural, we must be guided mainly by the professional student and by those who, for various reasons, wish to specialize in chemistry.