A QUESTIONNAIRE IN CHEMISTRY.

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In this day of commercialism, it often seems necessary to glance at every activity from the commercial standpoint. So, we may well ask, will a knowledge of chemistry prove of any value to the would-be mechanic, farmer, business man, or ordinary laborer? It seems to the many eminent authorities of whom the writer has asked this very question, that the answer is without doubt in the affirmative. Everything about us, paper, cloth, wood, food, air, plants and earth, are intimately associated with chemistry. It is almost impossible to name anything about us with which the science of chemistry is not concerned.

Chemistry in high schools should be composed of varying courses. These should be of such a nature as to discipline the mind and to give a step toward a better understanding of the chemical principles upon which occupations depend. So in a hundred ways chemical knowledge is most valuable to the high school girl and boy, especially if he or she does not desire to take a university course. Chemistry will come to be looked upon in the same light as spelling was of old. The writer says this because in almost every bulletin, paper, magazine and report, articles on pure food, paints, fertilizers, medicines, etc., are listed. Some knowledge of chemistry enables one to grasp and understand far better the contents of these. Otherwise, the almost indispensable and valuable information given is of no value. A little chemical knowledge is often the means of saving many dollars. The reverse is equally true. In order that chemistry may serve its best and most efficient use, there should be not only one kind (preparation for college) but many kinds taught.

During the last twenty to twenty-five years, chemistry has not gained in percentage but has actually lost. The writer believes this would be expected if we would keep in mind that the great rapidity of advancement in all capacities of civilization has caused us to swing the commercial pendulum with a large amplitude of vibration. So, physical sciences in high schools have been overlooked in the last years.

During 1909-10 nine and thirty-eight-hundredths per cent of the total number of students attending private schools were taking chemistry. In the public schools the percentage dropped to six and eighty-nine-hundredths per cent. Why this drop? Per-

haps, because of better laboratory apparatus in the private school, and because a far larger per cent complete the four year work.

During the early part of the year 1914, the writer sent out a questionnaire to several of the leading cities in this country. Replies were received from most schools where the questionnaire was sent.

The population of the schools responding to the questionnaire was over 20,000 pupils. 2,200 of these were taking chemistry. Twenty-four men and four women were engaged in teaching the subject. The table on page 136 will show the numerical tabulation of the questionnaire's results.

It is noted that very few high schools offer courses which require chemistry for graduation. Houston, Texas, requires chemistry for all courses except the commercial. Wilmington, Del., has a general course which requires the subject. Broadway High, Portland, Ore., requires chemistry in its domestic science course. Los Angeles High School and John Marshall High School, Richmond, Va., require it in their scientific course. Scientific and manual training courses in Helena, Mont., necessitate chemistry. Boys' industrial course offered at Burlington High demands chemistry.

Baltimore City College; English High at Boston; Hume-Fogg High School, Nashville; and John Marshall High School, Richmond, have no separate chemistry department but have chemistry under the science department. Broadway High, Portland; Mobile High, and Burlington High have the same arrangement.

Houston, Texas, and Wilmington, Del., are the two which possess a supervisor of science. None have city supervisors of chemistry. Many cities have supervisors of writing, English, mathematics, etc., but science seems to be forgotten. Why is it? Is it because there is so much jealousy between different branches of science, i. e., biology, geography, physics and chemistry? Is it not possible the broadening gained in scientific study should lead us chemistry teachers and other science teachers to a closer union, to closer realization of what is valuable for the different branches? Less duplication of apparatus and subject matter would result if our high school sciences of today were closely linked and thoughtfully planned from the kindergarten to the end of high school. Uniform system of note-keeping which in itself is no small matter would result. Think of how much time of the student is spent each term in acquiring a different system of recording his notes. Does this not lead the student to think it

SUMMARIZATION OF IMPORTANT DATA

School	Number in School	Boys	Girls	Number in Fourth Year	Year From Which Students Come	Year From Courses which Require Chem. for Graduation	Number of Chemistry Students	Number of Men Teachers	Number of Women Teachers
Baltimore City College.....	1,060	1,060		200	3 & 4	0	136	4	0
Boston English High.....	1,900	1,900		200	4	0	275	2	0
Houston High.....	1,277	500	777	250	4	All Except Commercial	125	1	0
Minneapolis West High.....	1,501	667	834	209	3	0	147	1	1
Wilmington High.....	930	375	555	85	2,3 & 4	General 91	1	0	
Portland, Ore., Broadway High.....	1,617	754	863	264	3 & 4	Domestic Science 82	1	1	
Los Angeles High.....	1,950	800	1,150	450	4	Scientific	350	2	2
Nashville, Tenn., Hume-Fogg High.....	1,200	500	700	250	2 & 3	0	140	2	0
Richmond, Va., John Marshall High.....	1,300	400	900	60	3	Scientific	90	1	0
Mobile High.....	600	200	400		4	0	16	1-Part Time	0
Brooklyn Boys' High.....	2,200	2,200	0	0	2 & 4	200-2nd Yr. 100-4th Year	2.5	0	
Helena High.....	285	116	169	34	3	Scientific and Manual Training	18	1	0
Burlington, Vt., High.....	429	206	223	65	4	Boys' Industrial	21	1	0
Detroit Central High.....	2,700	1,300	1,400		3	0	356	3	0
Rochester, N. Y., West High.....	1,100	500	600	150	3 & 4	0	53	1	0

matters not which way some things are done, for everyone seems to have a system of his own? The inefficiency of the affair is self-evident.

Boys' High of Brooklyn and English High of Boston, each give two courses in chemistry. One of these prepares for college, the other is informational. Wilmington High gives a household chemistry besides the general course. Rochester West High, Portland, Ore., and Burlington High do the same. Detroit Central adds an industrial course, while Baltimore adds qualitative chemistry to the above two.

In general, the replies show a marked belief in offering a different course to girls than to boys.

To the question: Would you be in favor of chemistry being required the last two years and then offering more courses? Dr. Leslie H. Ingham of Baltimore says: "No, but I think it would be good to have more advanced elective courses, if possible"; Los Angeles High answers: "We have a college department which offers several chemistry courses"; Hume-Fogg High of Nashville says "No;" John Marshall High of Richmond answers: "Yes, if time permitted"; Mr. Frank S. Spaulding of Boys' High, Brooklyn, says: "No, I would favor a required informational course in second and third year, followed by elective courses"; Mr. Harris of Mobile, reasons: "This would tend to specialization in high school work, which here I do not deem advisable. It would work where there is a demand for special chemistry training." Helena would require one year and then offer elective courses. Burlington would not have it required and Detroit Central says: "No."

A few more than half the replies indicate a desire to have the student possess a knowledge of physics before beginning the work in chemistry. Smith and Hall in *The Teaching of Physics and Chemistry* say: "the study of either subject is bound to hasten the process of acquiring the other, but the precedence of physics is the more economical arrangement, since it will but little diminish the speed with which physics may be acquired, while greatly accelerating the progress of the pupil in chemistry." It seems as though more of us ought to agree with Smith and Hall.

All but Mobile say that they commercialize their courses more than is done in the text.

It was a surprise to see so few teachers using their own quota of experiments. It seems that the laboratory is an excellent

place to connect the community interest with the subject matter of chemistry. The laboratory is the live wire and should not be grounded by using the experiments of some one not in touch with the community.

The recitation and laboratory periods seem to be practically the same the country over. Three recitation and two double laboratory periods is the prevailing scheme. Periods average forty minutes.

Demonstrating is done in the classroom, but little is done in the laboratory. Right here is a chance for debate. Many believe that teachers are prone to talk too much, and they would have us drill the student on the literature of his text, which in the vast majority of cases is meagre in its illustrations and applications. Cannot a demonstration in the classroom be of more value than a dense array of descriptive material? The chemistry of the laboratory is the only real chemistry.

Los Angeles; Hume-Fogg, Nashville; and Mobile High do not have their students write up notes while in the laboratory. Many others simply have the students make a rough draft of notes in the laboratory and then write them in detail later. The rest require complete writing of notes in the laboratory. Notes are finally inspected, as a rule, after school.

Nearly all say there is no time to do work for themselves. How are teachers going to be able to keep abreast with the advances of modern science if they are overburdened with routine work?

The salary of the head of department or teacher in charge averages \$1,748 a year, the extremes being \$2,650 and \$1,200.

All teachers who replied possess a college or university degree. Few possess doctorate degrees and some have the master's degree.

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REPORT ON MAGNESITE.

The annual statement of the United States Geological Survey on the production of magnesite in 1914, now available for distribution, shows an increase over 1913 of seventeen per cent, 11,293 short tons of crude magnesite, valued at \$124,223, having been produced or sold and treated in the United States during the year.