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A CONTRIBUTION TO THE HYGIENE OF TEACHING.¹

By WM. H. BURNHAM.

In the schools of Europe and North America there are perhaps two million school teachers; in the United States alone, over 500,000. The hygiene of this great army of teachers is as important as military hygiene. In regard to the latter, however, we have special handbooks, in regard to the former, none. The hygiene of teaching is not quite the same as school hygiene. We often find schoolhouses or schoolrooms hygienic for the pupils, but in some respects injurious to the teachers; for the schoolhouse is usually built and arranged solely with regard to the health of the child. Only in very recent years have a few hygienists begun to consider the special conditions that favor the health of teachers.

In regard to the mortality and morbidity of teachers we have no adequate statistics. Special investigations, however, have been made in Germany by Blöckh and Klatt, by Lexis, Goldhahn, Siegel, Wichmann and others. While the results indicate that the mortality of teachers in the *Volkschulen* is less than that of the general population; and, while that of teachers in the higher schools does not compare unfavorably with that of those in other learned professions, it appears that, as regards morbidity, teachers represent an unfavorable class. For example, Dr. Siegel's study of 1,157 teachers in Leipzig showed 42.8% suffering from definite diseases, although the candidates who enter the profession represent a sifted material that should be specially free from disease.²

The observation and experience of many physicians indicate

¹This preliminary report was contributed to the First International Congress of School Hygiene, Nuremberg, 4th-9th April, 1904.

Limitations of time and space forbade the presentation of the results of important investigations that bear more or less directly upon this subject; noteworthy among these are the studies of Binet, *Nouvelles Recherches sur la Consommation du Pain dans ses Rapports avec le Travail Intellectuel*, L'Année Psychologique, 1899. Paris, 1900. Vol. VI, pp. 1-73. Also Vol. IV. I take this opportunity to thank those superintendents, teachers, and students who generously contributed the answers to my questionnaire.

²See Billhardt: *Die Lehrer Leipzigs*, Leipz. Lehrerzg. Nr. 32, S. 317 f.

that teachers are specially subject to diseases of the throat and respiratory organs,—catarrh, throat troubles, tuberculosis, and the like; and the investigations by Wichmann corroborate common observation and experience that a very large percentage of teachers suffer from nervous diseases. At least as regards throat and lung diseases and nervous disorders, teaching is an occupation hazardous to health.

I.

In order to get definite information in regard to school conditions unfavorable to the health of teachers a questionnaire asking, "What conditions in the schoolhouse or its surroundings and in school instruction have you found injurious to your own health?" was sent to the teachers in several cities. Replies were received from a large proportion of the teachers in two New England cities, one Western city, and a few from other sources. A preliminary report based upon 500 answers to this question can be made.

As the schoolhouses in these cities as a rule are good and most of the teachers replying probably are located in good buildings, a negative answer from the majority was to be expected; and again, as American teachers are apt to be hurried with school work, many perhaps would answer such a question negatively without much reflection, when upon a little thought several injurious conditions would be reported. Further, certain conditions were evidently recognized as unhygienic although the writer had not found them injurious personally.

The result showed that 62.6% of the teachers answered "none" to this question. Of the other 37% who mentioned injurious conditions, more mentioned poor ventilation directly than anything else; namely, 10.8% of all the teachers who replied. Nervous strain was mentioned directly by the next highest number; namely, 7.4%; and two or three other things mentioned should be included under this head of conditions tending to produce nervous strain, namely, the over-crowding of classes mentioned by 2.6%, teaching too many subjects mentioned by 1.6%, too long a period of work without rest mentioned by 1.4%, and the outside noise mentioned by 2.8%. Thus we have in round numbers some 15% mentioning nervous strain or conditions that tend to produce it. Facing the light was mentioned over and over again; namely, by 7.2% of all the teachers, and poor light was mentioned by 2.4%; the standing required in the school was mentioned by 4%, and lack of cleanliness in the pupils by 2.2%; chalk dust by 2%.

The injurious conditions mentioned in answer to this question may be roughly grouped as follows:

1. Conditions in the building,—poor ventilation, poor light,

facing the light, coal gas, poor drainage, improper heating, working by gaslight, chalk dust, cold halls, cold floors, draughts, etc.

2. Conditions in the surroundings,—outside noise, nearness to railroad, nearness of out-buildings, dust from street, smoke from factories, nearness to swamps, nearness of tenement blocks, etc.

3. Conditions of the mental work,—correcting many papers, too frequent visitors, over-work, too large classes, crowded curriculum, too long period of work without rest, teaching one class with another in the room, length of session, excessive length of lesson periods, responsibility, extra work for absent teachers, too much supervision, etc.

4. Conditions of the physical work involved in teaching,—standing, climbing stairs, constant use of voice.

5. Special conditions,—contagion from colds, lack of pure drinking water, uncleanness of the pupils.

Incidentally a second question was asked, "Have you ever suffered from any acute or chronic disease as a direct result of such unhygienic school conditions?" No trustworthy results of quantitative value were obtained in answer to this. Teachers seemed often afraid to answer, unless they could give a negative reply, lest the admission of ill-health might work to their detriment. One writer suggests that no teacher would dare to give her honest opinion in answer to this question, as, if it were found that she suffered from disease, it would be "her death warrant as far as a position goes;" and she adds, "the nerve strain is terrible. I have taught sixteen years, beginning at 20 years of age a healthy, happy American girl. Now (and in fact at the end of my third year in the schoolroom) I am a complete wreck during the vacations. This is not from society but from school work, and there are many more in the same condition."

Plenty of concrete diseases, however, were mentioned; among these, nervous prostration, disease of the eyes, indigestion, headaches, constipation, irregular action of the heart, bronchitis, tonsillitis, grippe, chronic cough, and other throat diseases.

If the same question were asked teachers in the rural districts probably somewhat different results would be obtained. The investigation has not yet been extended to any large number of such teachers, but the questionnaire has been presented to the rural teachers in one county in Indiana. In all 55 teachers answered. The main results were as follows: in answer to the first question 11 or 20% gave a negative reply, 44 or 80% mentioned injurious conditions. Among the injurious conditions mentioned, poor heating and ventilation led, being mentioned by 24 or 43.64%; bad location of the building, bad water, un-

pleasant rooms, and the like, were mentioned by 23 or 41.82%; improper lighting by 7 or 12.73%; nervous strain, over-work, confinement in school, and the like by 7 or 12.73%. In answer to the second question, 13 or 23.64% mentioned diseases caused or aggravated by such unhygienic conditions. As might be expected, conditions injurious to health are found apparently by a much larger percentage of rural teachers than by those in the best city schools.

These results are apparently typical for cities in the United States having the best schools, at least for cities in New England and the Middle West. The number of replies is not large, but as a control experiment the same question was asked a group of superintendents and teachers of all grades gathered from different parts of the U. S. during the Summer School at Clark University in 1903. The answers of this group gave substantially the same results.

If we may trust these results, it appears that, while the majority of teachers in our best city schools do not find the conditions directly injurious to health, there are many avoidable conditions injurious to the teacher, especially as regards ventilation, lighting, cleanliness and the surroundings of the schoolhouse; and that the injurious conditions most frequently noted by teachers, *i. e.*, lack of ventilation and conditions producing nervous strain, are the ones that tend to produce or aggravate the diseases to which teachers seem especially liable, namely, throat and lung diseases and neurasthenia.

II. HYGIENIC CONDITIONS IN NORMAL SCHOOLS.

In the course of this investigation the importance of studying the hygienic conditions of normal schools was suggested, and later on emphasized by the results of Wichmann's¹ investigations among male teachers. This latter investigator found that 47% of the cases of nervousness occurred in the first five years after the teachers' examination and nearly half of these in the first year.

Accordingly, another questionnaire was sent to normal school students asking the following questions:

"1. What conditions in the normal school building and surroundings and in the methods and course of instruction have you found beneficial or injurious to your own health?"

"2. What changes in your physical condition, such as increase in height or weight, or loss of weight, improvement in health or loss of health, or special illness, or the like, have you noticed since you entered the normal school?"

"3. Please give a full account of your day's programme,—

¹ Zeitschrift für Schulgesundheitspflege, 1903, No. 11, S. 787 f.

amount of time devoted to study, to exercise, to recreation, to sleep, etc., and mention at what time in the day you feel best able to study, and when most fatigued."

This investigation is now in progress, but more than 500 students have already replied, and the answers given are as a rule full and carefully written; hence a preliminary report in regard to some of the points mentioned can be presented, and although further investigation will somewhat change the figures and correct some inaccuracies, still the results already obtained are probably typical.

The schools included in this report are all State normal schools. One is in New England, three in the Middle West, two in the Middle States. These schools are co-educational, but most of the students are girls. As in some cases the sex of the writer was not mentioned, the answers for the boys could not be studied separately. In most cases the answers were given by seniors or at least by those who had been in the school for one year.

Of the total of 569 pupils who answered, 407 or 71.53% mentioned conditions beneficial to health, while 347 or 60.99% mentioned conditions injurious to health. And 145 or 25.48% reported improvement in their own health since entering the normal school, while 112 or 19.68% reported impairment of health.

As these students were in the later stage of adolescence, improvement in health under the regular life of the normal school should be expected; that 20% report impairment of health is a very noteworthy result. It is true that in some cases this was only trouble with the eyes; but, as recent studies indicate, this is not only serious in itself, but likely to be a symptom of general impairment of health. Besides those included in this number who report loss of health, others mention the fact that they suffer from special diseases,—colds, trouble with the eyes, severe headache, nervousness, and the like, as the direct result of conditions of the normal school work, although stating that in general their health has been improved. The answer of one student is noteworthy, she writes: "The past year my health has improved, but I do not credit the school for it. In fact, I become very nervous at times due to the great strain and nervous haste of my daily surroundings."

The results as regards these points are given in the accompanying table for each school separately.

Many conditions injurious to health were mentioned. Among those most frequently noted were poor ventilation, the climbing of stairs, and over-pressure and nervous strain from too many studies, lack of recreation, and the like.

No. and location of school.	No. of Students.	No. Answering.	No. who mention beneficial conditions.		No. who mention injurious conditions.		No. who note improvement in health.		No. who note loss of health.	
			No.	%	No.	%	No.	%	No.	%
No. 1. (Middle States) A school with over-crowded curriculum.		297	220	74.08	186	62.63	68	22.90	31	10.44*
No. 2. (New England) Almost a model school, . .	28	28	23	82.14	21	75.00	8	28.57	7	25.00
No. 3. (Middle West), . . .	96	76	37	48.68	45	59.21	15	19.74	15	19.74
No. 4. (Middle West), . . .		26	21	80.77	23	88.46	5	19.23	16	61.54
No. 5. (Middle West) Has recently put in new system of ventilation, . . .	120	107	81	75.70	53	49.53	38	35.51	32	29.91
No. 6. (Middle States), . .		35	25	71.43	19	54.29	11	31.43	11	31.43
Total,		569	407	71.53	347	60.99	145	25.48	112	19.68

The details for the school sending the largest number of replies are shown in the following table :

STATE NORMAL SCHOOL NO. 1.

(Middle States. 297 papers examined.)

I. A. Conditions beneficial to health:

1. Work in the gnasium,	134
2. The regularity of school life,	99
3. General comfort of the school home,	21
4. The skating pond,	7
5. Voice culture,	3
6. The athletic field,	1

B. Conditions injurious to health:

1. Exposure in passing from dormitory to	
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* These figures would be much larger were a large number reporting merely eye trouble or nervousness included.

	recitation hall, or from one recitation room to another of different temperature, or from a warm study to a cold hall, etc.	73
	2. Too many studies with attendant hurry, strain, worry,	48
	3. Poor ventilation of recitation rooms,	22
	4. Poor ventilation of students' rooms,	19
	5. Uncomfortable seats in recitation rooms,	15
	6. Too little sleep,	15
	7. Poor lights (electric) in students' rooms,	14
	8. Too long from breakfast (6:30) to dinner (12:40),	14
	9. Lack of outdoor exercise,	13
	10. Gymnasium work excessively fatiguing,	8
	11. Lavatories unsanitary,	7
	12. Food improperly cooked or lacking in variety,	6
	13. Climbing stairs,	5
	14. Worry over examinations,	5
	15. Unclean rooms,	2
II.	Height. Increased,	108
	Weight.	
	Gain,	156
	Loss,	36
	Health.	
	Gain,	68
	Loss,	31
	No change,	56
	Special Illness,—dizzy spells, boils, back-ache, indigestion, hives, tonsilitis, sore throat, felon, nervous prostration, grippe, mumps, rheumatism, headache, stomach trouble, heart pains, <i>colds</i> (epidemic of).	
	More nervous than before coming to normal school,	23
	Suffer from excessive fatigue,	14
	Have trouble with eyes,	26
III.	Average number of recitations per student,	6.36
	Average time spent in recitation (class period 45 min.),	4.77 hrs.
	Average time spent in study,	4.17 "
	Average No. of hrs. in students' working day,	8.94 "
	Average time for exercise,	55 min.

Average time for recreation,	1.4 hrs.
“ “ “ sleep,	7.89 “
Best able to study,	
Early morning,	205
Afternoon,	4
Evening,	41
Most fatigued,	
11:45 A. M. 2 P. M. (Last period before and first after dinner),	74
3-5 P. M. (Late afternoon),	97
8-10 P. M.	74

The conditions in this school are in the main typical.

The features reported as distinctly beneficial to health are the gymnastic exercises and the regularity of school life. The conditions specially injurious to health are poor heating and ventilation, and over-pressure resulting from too many studies with attendant hurry, strain, and worry, and too long hours of work.

Although the curriculum of this school is unusually congested, and a long day's work is necessary, it appears that, as a rule, students in other normal schools devote as much time to recitation and study taken together, and in individual cases the total time devoted to school work amounts to 12 or 13 hours daily.

Each school has an individual character and is likely to show some individual features beneficial or injurious on account of local conditions. This was strongly shown in the case of School No. 2, which is almost a model as regards hygiene; over 70% of the pupils from this school mention the climbing of stairs as injurious to their health. Again in the case of School No. 5, a new system of heating and ventilation had recently been installed and the benefits from this were again and again mentioned by pupils, *e. g.*, a diminution of headache, and the like.

It is probably true that these results are typical also of the work in the normal schools in other countries. At the Twelfth International Medical Congress, Dr. Baranowsky reported on over-pressure of pupils in the normal schools, and according to his estimate the number of hours per week in the Austrian seminaries is 28 to 30; in some provinces, 30 to 40; in the Italian seminaries, 30 to 33; in the Swiss, 33 to 40; in the French, 30 to 35. He estimates, also, that from 4 to 5 hours a day are spent in home study; a total of from 10 to 12 hours daily of mental work results.

The aim of this study has been to determine certain general principles in regard to the hygiene of normal schools, not to gather health statistics; and the results are quite sufficient to

show in general outline the hygienic rules to be specially considered in arranging a normal school building and planning the methods and course of instruction.

The injurious conditions which should especially be guarded against, as indicated by this study, are poor ventilation, imperfect heating, draughts, and the climbing of stairs. As far as the work and methods are concerned,—an over-crowded curriculum, too early breakfast hour, too little opportunity for leisure, the monotonous routine, the strain upon the eyes, too long a period of daily work, haste, worry, etc.

III. CONCLUSION.

It is desirable that further investigations in regard to the hygiene of teaching should be made. In regard to the details of morbidity among teachers, we have no satisfactory data; to what extent the prevalent diseases are caused by conditions of the teacher's work, we do not know; whether it be true, as Moebius suggests, that students of neurotic heredity are drawn into the teaching profession, or whether the numerous cases of nervousness found among teachers are caused by the conditions of the teacher's work, we do not know. From the results of the few studies that have already been made in Germany and in America, certain general inferences seem to be warranted, and they are strongly emphasized by the investigations here reported.

1. It appears that teaching is an occupation hazardous to health; throat and lung diseases and nervous disorders are specially prevalent. The prevalence of tuberculosis among teachers is a menace to society because of the danger of contagion by the pupils. Hardly in less degree, perhaps, the prevalence of nervousness among teachers is a social menace for a similar reason.

2. Special care should be taken in arranging school buildings for the utmost degree of cleanliness, good ventilation, and lighting with regard for the teacher.

3. Special care should be taken to reduce to a minimum the causes that tend to produce nervous strain; most needed of all, perhaps, is a reduction of the number of pupils allotted to each teacher. The school day, for the sake of the teacher as well as of the pupils, should not be more than five hours in length and suitably broken by recesses and brief pauses after each period of recitation.

4. The key to improvement in the health of teachers is to be found in the normal schools.

5. The aim of normal school training should be to develop habits of healthful activity and to prepare teachers to adjust, if necessary, to unhygienic conditions and protect themselves

against the inevitable dangers connected with the teacher's calling.

6. The normal school students should be taught personal hygiene, especially with regard to the hygiene of the throat and lungs and proper use of the voice; and also they should be trained to habits of mental hygiene,—proper habits as regards sleep, alternation of periods of work and rest, avoidance of worry, and the like.

7. The essentials of school hygiene should be taught in every normal school. It seems strange that this subject,—almost the only branch of pedagogy which has been studied by scientific methods—should be usually omitted from the normal school programme or inadequately taught. A reform in normal school training in this respect, and the introduction of this subject with instruction by competent teachers, should be imperatively demanded by this Congress.

8. Instruction in school hygiene should be given by example in the normal school, as well as by precept, in order that the students may learn by direct experience of the benefits of hygiene. Specially is this true as regards matters of cleanliness, ventilation, lighting, care of the voice and the eyes, etc.

9. Special care should be taken in the normal school for training in mental hygiene. The special reform needed is the introduction of an eight-hour day and a lessening of the nervous strain by simplification of the curriculum and a better distribution of the periods of work and rest during the day.