Address.

MEDICAL PROBLEMS IN EDUCATION.
THE RESPONSIBILITY OF THE MEDICAL PROFESSION.*

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In a paper, "Medical Supervision Versus Medical Inspection,"¹ read before this society in February, 1907, I tried to point out some of the medical problems in education awaiting the active coöperation of the physician and the pedagogue. In the fall of that year, the Boston School Committee took the initiative in the matter by establishing a department of school hygiene, the first of its kind in this country. Today, forty-two states are doing something for the physical welfare of the children. Twenty states have medical inspection laws. Eight hundred cities have organized medical inspection, while one hundred and fifty cities have trained nurses in the schools to "follow up" the work of the medical inspectors and secure for the children appropriate relief. Sixty colleges and institutions have established special clinics for the psycho-educational study of school children.

In Massachusetts, the yearly medical examination of all pupils in the public schools is mandatory. In Boston, the health and the educational authorities are carrying out this statute to the letter. Much of the material for this paper is based upon the results of the coöperation between these two departments.

The educational department has had the assistance and counsel of an advisory committee of physicians and laymen, each a specialist in some division of the work embodied under the school department of hygiene.

I have been requested to present some of the problems met in this field of public health and to point out the responsibilities of the medical profession in their solution.

The first problem that I would present is that resulting from the false assumption that children are little men and little women. To this error much of the failures, misfits, and mental shipwrecks are due. That each child is an individual peculiar to itself is such a fundamental in medical practice that its reiteration before this audience would be out of place were we not considering the relation of the fact to school life. Here it has not received any considerable degree of recognition.

School curricula are arranged with a certain degree of elasticity within the bounds of which the majority of children are expected to fit. Daily experience, however, testifies conclusively that even perfectly normal children vary greatly in the time as well as in the order of sequence of mental development and faculty unfoldings.

These variations, as shown in difference in mental acuteness, sense perception, muscular-neural condition, and in physical and mental stamina, are so evident in all groupings of pupils that it is surprising that many present day school customs seem to ignore their significance.

Lately, the findings of medical inspectors have been interpreted as indicating that the physical defects revealed by the examinations are the causes of mental deficiency, juvenile delinquency, and moral obliquities more or less prevalent among school children. The associated physical and sensory defects have a certain rating as contributing factors only; they are not the cause. This lies deeper; it is traumatic, environmental, racial, hereditary, or sexual in origin, and antedates, in the great majority of cases, the school life of the child.

This problem is of great importance today on account of the attention it is receiving from sociologists, economists, jurists, and criminologists. The physician and the trained psychologist have a very important duty in this problem in order that the public may know the true facts: That the problem is pre-school age in origin can be demonstrated by the most cursory examination of any group of 100 children entering school life. Here will be found 1 feeble-minded child, 2 mentally defective, 15 or 17 mentally slow or backward, 2 or 3 who lisp, stutter, or stammer, 5 or more who have badly decayed teeth, 7 with faulty posture due to lack of adequate nerve control, and 18 or 20 who are poorly nourished and below par physically. In other words, fully 50% of the medical problems in child life exist when the child is registered for the first time.

In a recent study of more than 7000 pupils referred to the department of child study in Chicago, it was found that only 8% are school problems because of defective vision, and only 6% required special training because of defective hearing; whereas over 40% were nervously depleted, ill nourished, weakened power of resistance, uneducated in the fundamental bodily activities, apathetic in voluntary initiative, and lacking in bodily control.²

The Westminster (England) Medical Inspection Centre for children under school age gives some interesting data on this problem. It was found that the percentage of defects in children under school age was as follows:—

	One Year of Age.	Two Years.	Three Years.	Four Years.
Bad teeth	2.6%	18.1%	34%	33.6%
Diseased tonsils	7.8%	16.9%	24%	26.9%
Adenoids present.	10.4%	22.9%	38%	33.3%
Rickets	25 %	9.6%	8%	3 %

Closely associated with this problem is that of communicable diseases among children prior to school attendance. The mortality from these diseases shows the following³:—

Whooping cough	11.4%
Scarlet fever	11.6%
Mensles	12.3%
Diphtheria	21.4%

* Read at meeting of Suffolk Medical Society, Boston, Oct. 31, 1914.

The death-rate from whooping cough is 57% under one year of age, 23% under two years, 8% under three years, 4% under four years, and 2.5% under five years. That the mortality of these diseases decreases with the age of the patient is shown thus:—

	Years. 5 to 9.	Years. 10 to 19.	Years. 5 to 19.
Measles	2.8%	0.9%	1.6%
Scarlet fever	8.2%	1.8%	4.1%
Whooping cough	1.3%	0.1%	0.5%
Diphtheria and croup.	15.3%	2.6%	7.1%

The point I would make here is the necessity for the medical profession to unite in a campaign of public education on the seriousness of these communicable diseases, and to emphasize the fact that even when the diseases do not kill, they are very likely to collect a heavy penalty later in life at a most promising and useful age. The willful exposure of children to these diseases, as practiced by so many families, is nothing short of criminal.

The problem of communicable diseases among school children is reduced to the same basis as among children of pre-school age, namely, avoid *contact*, especially by sputum, droplet infection from sneezing, coughing, kissing, mouth-swappings, and from ear discharges, remembering also that "carriers" and "missed cases" are the real source of many school epidemics.

When the child enters school life, the medical problem becomes increasingly more and more mental and psychologic, and less and less physical and direct contagion. Many of these problems have received little or no scientific study in this country. A summary of these so-called pedagogical problems shows at a glance the inter-relation of each with the fundamental facts of psychology, physiology, biology, and modern psychiatry.

Time allows mention of the more general of these problems only, viz:—At what age should the school life of the child begin? At what age should the child be given different studies? What is the physiologic way to teach spelling, reading, languages, *i.e.* whether by the auditory image and auditory presentation, or by visual presentation and by use of motor ideas, or by all methods combined? How far does group work stimulate or retard the individual? What is the real test for intelligence? Is intelligence acquired or inherited? Can it be measured? Is the Binet-Simon scale a measure of special talents, capabilities, and adaptabilities, or does it give general limitations only? What is a safe fatigue index in childhood? How tested? What is fatigue? What is the fatigue content of each study in the curriculum? What is the physiologic sequence of studies in daily program? Should daily sessions be single or double? What size type, and shade of paper conserves eyesight best? At what age should writing and sewing enter the daily life of the child? How far is open-air treatment beneficial and adaptable to ordinary classes? What is bad air? How

ventilate best a class-room? What is the best class-room temperature and humidity for a group of children? What is cardiac disease in childhood? Should pupils with cardiac affection be placed in open-air rooms? Should all enlarged tonsils be removed? What is the relative normal growth and weight for the various ages? Is the chronological age the best guide for grading pupils? Are tests, examination and competitions healthful or harmful to the average child? What is the relative enervating effect of oral and of written tests? Do academic tests, athletic competitions, public exhibitions, etc., affect the ductless glands? Is the effect favorable or unfavorable? Is the prevalence of thyroid enlargement among high school girls an age coincidence or the result of school life? Is status lymphaticus detectable early in school life? Should the mentally slow be kept in regular classes or segregated? These and many kindred problems are awaiting solution in education. They exist in every grade from infant life to college graduation.

The more select the school, the more prominently stand out some of the more serious of the groups. The school is a great human laboratory awaiting physician and psychologist.

THE WORK IN BOSTON.

The medical problems in education are met in Boston by the joint authority of the health and the education departments. Medical inspection is carried out by physicians appointed by the Board of Health. The school nurses, who "follow up" the findings of the medical inspectors and secure appropriate treatment or a remedy, are under the School Committee's department of school hygiene. This department has supervision and control of all matters affecting the physical welfare of pupils and teachers. These matters are grouped as follows: 1, School nursing. 2, Physical education. 3, School athletics. 4, Military drill. 5, Playgrounds. 6, Testing of hearing and vision. 7, Open-air classes. 8, Classes for the mentally defective. 9, Classes for speech defectives. 10, Classes for hearing mutes. 11, Classes for the semi-blind. 12, Classes for the tuberculous hospital cases. 13, Health of pupils preparing for the teaching profession. 14, School sanitation. 15, Heating, lighting, ventilation. 16, Seating of pupils. 17, School luncheons. 18, The teaching of physiology, hygiene, and kindred subjects required by the course of study.

Ill Health Among School Children. On the institution of the work in 1907, the first step was to learn, if possible, the size of the medical problem rather than its variety. A survey of more than 90,000 pupils by medical inspectors, teachers, and school nurses showed that at least 5.5% of the pupils were anemic, glandular, undersized, choreic, or had been recently ill, and that this number should have some modification of the routine class organization to meet their

debilitated state. The percentage of these illnesses was as follows:—

	GRADES.								Total.
	Kgn.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Anemic	86	550	470	381	496	438	384	246	170
Choreic	5	40	40	40	35	29	42	31	12
Glandular	8	63	89	67	81	69	52	43	27
Undersize	21	68	51	39	74	61	50	34	23
Recently ill	30	96	82	60	59	55	39	33	32
	150	817	732	587	745	652	517	389	264
									4853

In other words, 65% of the group had anemia, 10% were glandular, 10% were suffering from recent illnesses, chiefly contagious diseases, 8.5% were undersized, and 5.5% were choreic. These illnesses were distributed throughout the grades as follows:—

Kgn.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
2%	16%	14%	11%	15%	12%	10%	7%	5%

The social work by the school nurses gave us some interesting and unlooked for data relative to these ill children. It was found that contrary to the general impression, the great majority of these children came from so-called "good" homes, i.e. 3531 children, or 70%; while only 1512, or 30%, came from what were classified as "poor" homes. It was shown that 90% of the choreic children in the group came from good homes.

On the problem of under-feeding, our findings were at variance with many published reports. The school nurses reported that 3375 of the children had a good breakfast, while one-third,

or 1664, had a poor breakfast before coming to school. A good breakfast was fruit with bread and butter, or eggs and milk, or cocoa, or cereal with milk or cream. A poor breakfast consisted of some picked-up made-to-order breakfast food without milk, and usually included tea left from the wage-earner's breakfast earlier in the day. The surprising and unexpected fact, however, was that 69% of the children who came to school without any breakfast, or with only a very light meal, came from good homes, while 513, or 30%, came from poor homes. Few, if any, of the latter pupils were without money, which was spent usually for candy, pickles, cheap fruit, etc.

Following these selected pupils into the classroom, it was found that 3009 were in rooms where a room temperature of 69° F. or over was the rule, 321 were in rooms with a temperature of 68° F., while only 235 children of the group were in rooms between 64 and 67° F., inclusive.

Fresh Air and Room Temperature. With these data at hand, the School Committee established open-air classes for the anemic, glandular, and non-tuberculous children of the debilitated type, and regulations were made that 67° F. should be the maximum class-room temperature. It was further provided that windows should be kept open on at least one side of the class-room, weather conditions of rain and storm permitting.

The far-reaching value of this health education is beyond dispute. Already the conditions are markedly changed for the better in the classroom. A recent survey of 1065 different classrooms showed that during the months of February, March, and April of this year, 1004 had open windows and 61 had closed windows; 947 rooms had a temperature of 60 to 70° F., while 611 rooms had a temperature of 64 to 68° F., inclusive.

It is interesting to note in this connection that at the State School for Cripples at Canton, Mass., the substitution of fresh-air rooms, night and day, has almost entirely superseded surgical interference for adenoids and enlarged tonsillar affections.

The children and school nurses carry into the homes the instruction and precept on the value of fresh air, and the room teacher periodically calls for reports from the children on practices in the homes relative to open windows.

Normal Growth. There are no reliable data today on this great problem. Prof. William T. Porter, of the advisory committee, prepared a plan for the monthly weighing and measuring of pupils of different ages. The School Committee supplied scales and measuring rods. The school nurses weighed and measured, each month, all the pupils then five years of age. This has been continued and this year we are weighing and measuring all pupils nine years of age. The work is to go on until a monthly norm is obtained for all children of school age—five to eighteen years, inclusive.

Tuberculosis Among School Children. Many varying reports from different localities have been made on this subject. A report to the Boston School Committee from a committee of physicians, in 1906, says: "Your commission believes that 5000 is a conservative estimate of the total number of tuberculous children in the public schools of Boston." The question arises at once as to a definition of tuberculosis of childhood. The following data, furnished by Dr. Thomas B. Shea, gives the real situation in Boston.

I have no hesitation in saying that there is no city where this problem is so well appreciated and followed as it is by the Boston Health Department. This department has a record of 7000 cases of tuberculosis involving 1340 families. The number of children of school age living in these families is 2131. Of this number, 304 are positively tuberculous. The Hospital School at Mattapan cares for 44 and the Holy Ghost Hospital for 11. The remaining 259 are under physician or hospital care in the homes.

The school nurses have followed up 2087 children exposed in tuberculous families, and report as follows:—

In public schools—not tuberculous.....	1228 children
In private schools—not tuberculous.....	248 children
Working or under school age, not tuberculous	380 children

There are 525 non-tuberculous children in open-air classes in the public schools.

A list of 196 pupils, diagnosed as suspicious or positive tuberculosis, was referred to the school nurses for further examination by family physician or hospital. The result was that 92 were pronounced negative, 40 were deferred for further examination, 14 were questionable, while 11 were positive. The remaining 39 refused re-examination.

Cardiac Problem. Another distinctly medical problem about which little definite data seems available is the prevalence of heart disease in childhood. The medical inspectors in Boston reported 3091 children with heart disease among the 118,781 examined. It is the custom of the Department of School Hygiene, when a case of heart disease is recorded by the medical inspector, to cause the nurse to make a personal visit to the home rather than to send a written notification, as in affections of the eye, ear, teeth, skin, etc. The result of this follow-up by the nurses shows that out of the 1997 pupils in the public schools recorded as having cardiac affections, 1064 were diagnosed as organic and 933 as functional. These pupils were investigated further, and 793 were placed in care of the family physician, 419 were under treatment at the hospital, 706 were pronounced free from cardiac disease, while 79 parents deferred further treatment. Special arrangements are made at the school for each positive case, in order that

the daily program of school life may not derange a compensating heart.

Mentally Defective. The problem of the mentally defective child is without exception one of the most important in the long list of medical problems in education. It is accepted generally that 2% of the school children are mentally defective. A large proportion of this class is of the *moron* type, i.e. border line cases or between five and twelve years mental age development.

In Boston this work has been under the special care of Dr. Arthur C. Jelly, to whom all credit is due for its organization and systematization. There are at present 42 classes, each with one or more units of 15 pupils under a teacher specially trained in the work. The pupils are first selected by the grade teacher. The feeble-minded and low-grade mentalities are easily recognizable. The higher types require time and repeated observation. Three years' retardation without any obvious cause, e.g. illness, migration, recent immigration, is accepted as *prima facie* evidence that there is something present more serious than backwardness or slow mentality. These children are referred to Dr. Jelly for study and classification.

The special classes have done a great good and are indispensable as a clearing house for all retarded children. But they do not diminish mental deficiency nor prevent feeble-mindedness. Mental defects are not remedial nor removable. Once mentally defective always mentally defective is an accepted axiom today. The idiot never reaches school age; the imbecile barely reaches five years of age mental growth; the moron never exceeds the twelve-year-old standards. Many imbeciles and nearly all morons may be made self-supporting in community life. Whether the training of these pupils should be undertaken in the same schools with normal children is a very important problem. Whether they should mingle freely with the general public when they reach the age of procreation is the basic problem in the prevention of crime, pauperism, insanity, and allied conditions. Compulsory laws on school attendance hold the child until the age of puberty only.

All authorities agree that from 65% to 80% of feeble-mindedness is hereditary. The reduction of insanity and the elimination of feeble-mindedness will be possible only when the medical profession recognizes the importance of combating these evils as we see them in the public school. Today the greatest interest centers about the *moron* type. Many of these are border line cases that the Binet tests do not diagnose. This is made much more difficult if the child has been trained in school work in the special classes. Here the Binet tests should be regarded as corroboratory only of the clinical and school history of the child. In these morons, however, we must remember that the difference is one of degree only and that each has its true mark of imbecility if searched for.

Health of Teachers. This is the key to many of the health problems in education. The health of the teacher is of paramount importance. Healthy teachers mean much for the class-room. In Boston, health is a *sine qua non* for entrance into the Normal School. The physical examination of these candidates begins in the high school, second year, and is carried out personally by the director of school hygiene. The parent of each pupil is required to be present.

The pupil-teachers in the Normal School are given instruction in vision and hearing tests, and each group is shown cases of common ailments of children, *e.g.*, scabies, impetigo, tinea, pediculosis, enlarged tonsils, rickets, malnutrition, anemia, chorea, mentally defective.

The Problems and the Medical Profession. The prevention, as well as the eradication, of many of the medical problems in education rests directly upon the medical profession. These problems differ somewhat from those that are due to communicable diseases chiefly; they affect the individual primarily and the community secondarily. The education of the public, however, is fully as essential as in the campaign against communicable diseases.

Some one has said that the people of today are forty years behind the medical profession in their knowledge of the causes of diseases and the possible means of prevention. The same condition prevails in a still greater degree concerning many medical problems in school life.

Several of our medical schools are equipped today to furnish trained leaders competent to point out the way. The chief responsibility, however, rests with the family physician; he has opportunities and influences far in excess of any public authority; he can bring support and confidence into the work more easily and effectively. It is a duty he owes to the medical profession as well as to his patient. Unless the medical profession makes these problems its own, the present state of affairs will continue.

Philanthropists, sociologists, economists, and lay organizations are consulted today by national, state, and municipal authorities when such problems as tuberculosis, pure milk, better housing, infant morbidity and mortality, juvenile delinquency, degeneracy, pauperism and crime, are under consideration. These are medical problems almost wholly. The public is anxious for authoritative education on them all.

In Boston alone there are forty well organized associations of parents with a membership of fully six thousand in addition to a corps of more than 3000 class-room teachers. They are vitally interested because each person has a personal and intimate relationship with the children in the schools. If this meeting brings about active coöperation between these groups and the medical profession, much progress will result in combating medical problems in education.

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- ² D. P. MacMillan, Fourth Inter. Con. on School Hygiene, Vol. iii.
- ³ United States Census, 1910.

Original Articles.

NOTES ON THE SECOND ANNUAL CONFERENCE ON THE MEDICAL AND SOCIAL WORK OF THE PSYCHOPATHIC HOSPITAL, BOSTON, MASSACHUSETTS.

- I. The Duty of the State to the Psychopathic Hospital. Walter Channing, M.D., Chairman, Boston State Hospital Trustees.
- II. Progress of the Psychopathic Hospital on the Prophylactic Side of Mental Hygiene. E. E. Southard, M.D., Director of the Psychopathic Department, Boston State Hospital.
- III. The After-Care Program and Results of the Psychopathic Hospital, Boston, 1913-1914. A. Warren Stearns, M.D., Assistant to the Executive Officer, State Board of Insanity.
- IV. Further Notes on the Economic Side of Psychopathic Social Service. Mary C. Jarrett, Chief of Social Service.
- V. High-Grade Defectives at the Psychopathic Hospital During 1913. Thomas H. Haines, M.D., Ph.D., First Assistant Physician.
- VI. Genetic Factors in 100 Cases of Psychoneuroses. Donald Gregg, M.D., Assistant Physician, Out-Patient Department.
- VII. The Point Scale: A New Method for Measuring Mental Capacity. Robert M. Yerkes, Psychologist to the Psychopathic Hospital; and J. W. Bridges, formerly Interne in Psychology, Psychopathic Hospital.
- VIII. Variations in the Sensory Threshold for Faradic Stimulation in Psychopathic Subjects: First Note. G. Philip Grabfield, Interne, Psychopathic Hospital.
- IX. Experience with the Lange Colloidal Gold Test in 125 Cerebrospinal Fluids. H. C. Solomon, M.D., Interne, Psychopathic Hospital; and H. O. Koefod, A.B., Interne, Psychopathic Hospital.
- X. Cases to Illustrate Symptomatic Psychoses of Cardioresenal Type. Frankwood E. Williams, M.D., Secretary Massachusetts Society for Mental Hygiene.
- XI. The Margin of Error in Psychopathic Hospital Diagnoses. E. E. Southard, M.D., Director Psychopathic Department, Boston State Hospital; and A. Warren Stearns, M.D., Assistant to the Executive Officer, State Board of Insanity.
- XII. On the Systematic Control of Salvarsan Therapy, Based on the Rapidity of Arsenic Excretion. H. M. Adler, M.D., Chief-of-Staff, Psychopathic Hospital.

I.

THE DUTY OF THE STATE TO THE PSYCHOPATHIC HOSPITAL.*

BY WALTER CHANNING, M.D., BROOKLINE.

THE Boston City Hospital has just held its fiftieth anniversary. The chairman of the trust-

* Being Contributions from the Psychopathic Hospital, Boston, Number 51 (1914.17). This paper was read (with the eleven following papers) at the Second Annual Conference on the Medical and Social Work of the Psychopathic Hospital, held June 26, 1914. (Bibliographical Note.—The previous contribution was by H. M. Adler, entitled "A Note on the Increase of Total Nitrogen and Urea Nitrogen in the Cerebrospinal Fluid in Certain Cases of Insanity with Remarks on the Uric Acid Content of the Blood," published in the BOSTON MEDICAL AND SURGICAL JOURNAL, Vol. cxxx, No. 21, November 19, 1914.