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THE HEALTH OF SCHOOL CHILDREN

CONTRIBUTIONS FROM AMERICAN MEDICAL JOURNALS
JULY, 1913, TO JULY, 1914

Compiled by W. H. HECK
PROFESSOR OF EDUCATION, UNIVERSITY OF VIRGINIA

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, January 21, 1915.

SIR: Our public-school system imposes upon school officers and teachers a heavy responsibility in the care for the health of the millions of children congregated in large groups in schoolhouses throughout the school hours of the school year and for suggestions and directions in regard to the care of the health of children out of school. In many schools principals must assume the responsibility for the health of pupils, both day and night, from the beginning to the end of the school year. To enable them to assume these responsibilities intelligently, school officers and teachers need all the assistance that can be gained from those who have given special study to the means of preserving and establishing the health of children. Much of the best of this material appears only in medical journals not usually accessible to school officers and teachers. I have therefore asked Dr. W. H. Heck, professor of education in the University of Virginia, to prepare for the Bureau of Education summaries of the best articles on this subject appearing in the standard medical journals each year. The accompanying manuscript contains summaries and selections made from journals of this kind in the year ending June 30, 1914. I recommend that the manuscript be published as a bulletin of the Bureau of Education.

Respectfully submitted.

P. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

THE HEALTH OF SCHOOL CHILDREN.

INTRODUCTION.

W. H. HECK, PH. D., *Professor of Education, University of Virginia.*

Medical journals are not often accessible to students and practitioners of education, and therefore the wealth of material in these journals regarding the health of school children is mainly lost to the educational world. The present bulletin is the result of a desire to put this material at the disposal of superintendents, principals, professors, students in normal schools and colleges, and even medical inspectors who may not have access to all the journals here represented.

The purpose has been to select, from the many articles studied, paragraphs of those articles only that add to the literature of school hygiene new data, new points of view, or noteworthy statements of current opinion. Some of the selections are not strictly within the limits of school hygiene, but are suggestive for the general health propaganda of the schools. Although difficult technical discussions have been omitted, several technical terms had to be included; in fact, there is no reason why, for the main hygienic needs and pathological conditions of school children, the educational world should not learn and use the exact terms of medicine, rather than inexact popular terms. The number of articles selected on the different subjects corresponds fairly to the proportion of varied and useful material available, some phases of school hygiene having been discussed little or not at all in the medical journals. Of course, only the authors themselves are responsible for the opinions expressed by them; and the conflicting opinions of different articles are of special interest.

The files of journals and references in the Surgeon General's library at Washington have been searched for contributions. The period from July to July is probably the most convenient for an annual selection from medical literature. (One article here given is dated June 21, 1913.) The kindness of the publishers in allowing these selections to be reprinted is greatly appreciated.

No articles were chosen if they were known to have appeared also in educational journals, State health bulletins, or reports of two recent international congresses (Hygiene and Demography, Washington, 1912, and School Hygiene, Buffalo, 1913), as this material is widely accessible to students of education.

MEDICAL INSPECTION OF INFANTS AND CHILDREN UNDER SCHOOL AGE.

DAVID FORSYTH, M. D., *Physician to the Evelina Hospital for Sick Children, London.*

(*From Pediatrics, October, 1913.*)

A significant fact bearing on the health of children, though hitherto hardly appreciated beside the more conspicuous facts relating to infant mortality, is now beginning to claim attention. I refer to the widespread physical deterioration that overtakes children during the first four or five years of life. This fact is well established by the medical inspection of elementary school children, the majority of whom prove to be physically unsound, most of their defects, moreover, being preventable. Clearly, therefore, it is to these earlier years, before schooling begins, that attention must be turned, if this deterioration is to be averted. The conditions can not be adequately met by postponing action until the children reach the minimum school age, by which time much suffering and not a little permanent damage will have been inflicted. What is needed is some form of medical supervision, together with facilities for remedial treatment, extending over the whole of the first lustrum.

But with this problem only now unfolding itself, little or nothing has been done as yet by way of a solution. True, there are infant consultations in many parts of the country, but these, owing their inception to the movement against infant mortality, are concerned only with infants under one year. Since, however, as will be seen below, it is not until the second year at earliest that the physical defects of the future school entrants show themselves in any number, preventive measures limited to the first year are unlikely to have much influence in warding off these later troubles. In a word, a gap, at present unbridged, stretches from the first year, when the activities of the infant consultation [1] come to an end, to the fifth, when the school medical inspection begins.

How, then, is the medical supervision of children under school age to be dealt with in present circumstances? Perhaps the most practical answer I can offer to this question is to submit for your consideration and discussion the plan adopted in this city of Westminster. Some two years ago the Westminster Health Society pre-

[1] "Consultation" is the name given to the centers where parents bring infants for medical advice.

pared a scheme for the medical supervision of these children, and in January, 1912, opened a medical inspection center for children under school age to serve the population in the north half of the city. The lines on which the center is conducted can be briefly summarized. With the cooperation of the public-health authorities, information is received of all births recorded under the notification of births act, and, with the help of a staff of health visitors, the society at once gets into touch with every family where a child is newly born.

In addition to these new-born infants, the center secures the attendance of older children up to 5 years, the same plan being followed as before. In this way the attempt has been made from the outset to include the whole of the under-school-age population of the district. The essence of the scheme, however, is to keep every child under medical supervision from the time of its birth until the end of its fifth year, and then to hand it over, sound and healthy, to the school authorities, together with the medical record of the material facts in its life for the information of the school doctor.

The results of the first year's work are probably of sufficient interest to warrant their inclusion in this paper. Altogether, 374 children have been examined, excluding reinspections. Of these, 131 were under 1 year of age, 77 under 2 years, 83, 50, and 33 under 3, 4, and 5 years, respectively. The outstanding feature of an analysis of the medical record cards is the rapid rise in the tide of disease with each year of life. For, while the large majority of the children in the first period are found to be healthy, only a small minority come through to their fifth year without at least one physical defect of some kind or another. This is most strikingly seen in cases of dental caries, a condition which is, probably, responsible for more ill health among children than any other. The increasing percentage of these cases in successive years is shown in the table below. It should further be added that, as a rule, the more advanced the age, the more extensive was the disease. A very similar rise is seen both with enlarged tonsils and with adenoids, while the proportion of these cases in urgent need of surgical operation increases yearly, indicating, of course, the aggravation of the condition when left untreated. With rickets, on the other hand, the incidence reaches a maximum in the second year, thereafter rapidly declining; this disease, therefore, so often the cause of lifelong deformity, has inflicted its damage long before school age.

Altogether, the 374 children presented 332 defects. In addition, the feeding in a large proportion of the cases in the earliest years required some modification, great or small, and in almost one-half the cases under 1 year old needed revision in one way or another. The table following, showing the percentage of children affected in each year, summarizes the incidence of the most important defects.

Physical defects of 374 children examined, by ages.

	Under 1 year.	1 year.	2 years.	3 years.	4 years.
Teeth	.....	2.0	18.1	34.0	63.6
Tonsils	.....	7.8	16.9	24.0	26.9
Adenoids	1.5	10.4	22.9	38.0	33.3
Rickets	13.0	25.9	9.6	8.0	3.0
Diet modified	49.6	22.8	6.0	.....	.....

The practical conclusion from the point of view of prevention and curative treatment hardly needs stating. Suffice it to say there is no reason to suppose that the children examined at the center differ materially from other children of their class, at any rate in urban areas, and it is highly probable that, as similar inspection centers are organized elsewhere, the results will be, in the main, similar to those in Westminster. In other words, large numbers of children, healthy in all respects at birth, become within five years the physically defective entrants whom the education authority is required, at no small cost, to restore, so far as possible, to their original state of health. Yet most of these cases are preventable, or, if taken in time, can be remedied more speedily, and therefore more cheaply, than if left until school age, by which time not a few will have received permanent damage—physical or mental. The problem of the defective child largely resolves itself into the problem of the under-school age child, and seems hardly likely to be solved by any scheme short of a national one insuring to all children regular medical supervision from birth to school age. And this, to be fully successful, must run side by side with educational measures for instructing the mothers themselves who, from ignorance far more than from willful neglect or even from indigence, are unable to safeguard their children's health.

MEDICAL INSPECTION OF CHILDREN IN RURAL SCHOOLS.

WILLIAM M. JONES, M. D., *Health Officer of Guilford County, N. C.*

(*Southern Medical Journal, March, 1914.*)

Guilford County contains 672 square miles, with more than 100 schools and 200 white teachers. The objects that we have worked for and are working for are two—education and prevention. Education of the masses, particularly the children, and the prevention of disease with the consequent conservation of life.

Education: By means of lectures and talks to the children, by pamphlets and bulletins, by press articles and notices, by illustrated lectures with lantern slides, dealing in an interesting and instructive way with such subjects as typhoid fever, malaria, the fly, the mos-

quito, smallpox, etc.; by clinics, such as hookworm demonstrations, and in every way possible we bring before the schools and community the gospel of good health.

Prevention: We have a large map of the county, on which is located every school. The doctors of the county report all dangerous diseases to the county board of health, giving the name and address of the parent and the school attended. As soon as the report is received, the teacher of that particular school is notified that the child has a dangerous disease, and that the other members of the family must be kept out of the school until further notice. A colored pin (different colors representing different diseases) is placed in the map at its proper location and is allowed to remain as long as there is danger of the disease being communicated.

Then for the school building and grounds per se. Upon visiting the school (and we endeavor to go to each one during the session), we record on a card the condition of the grounds, whether well drained or not. Next the privies, the number and condition. (Here, by way of parentheses, we will say that so far as the so-called sanitary privy is concerned, it is impractical with us just yet, and, in fact, is more insanitary than the common outhouse. All we strive for is prevention of infection from fecal matter, and privacy.) The water is next considered—its location, whether on the grounds or at a residence, and whether pump or bucket is used, and whether dispensed in a common or individual cup. The building is considered—the roof and chimney, heat and ventilation, and, when a structure of two stories, if a fire escape is handy or not.

Of all this a record is kept, and also on this card may be seen what recommendations were made the previous year, and whether these recommendations have been carried out.

We now enter the classroom, and refer to our card, whereon are recorded the names of those who were examined the previous year and found to be defective, and to whom individual cards were given, naming the special defect and advising parents or guardians to consult the family physician for treatment. The physician is asked to sign this card and mail it to the county board of health. This is a long journey for a little card to travel, and many are lost en route, so on our permanent card, whereon we have the record above mentioned *in re* the school, we also have the individual record of all defective children at the school. This is referred to and the children called up privately and asked if a card was not last year given them; if so, did they carry out the instructions, and if so, what was done. This is recorded on the card, and we then examine all new pupils and all who have not previously been examined. This examination includes the eyes, ears, nose, throat, teeth, skin, and special defects.

The eyes are to be examined first by the teacher, who keeps a record of all that are found defective, and when the examiner visits the school he examines only those that the teacher reports. This is to expedite the work.

The ears are examined by the teacher, who, if observant, soon notices any impairment without any set test. These are more fully examined by the examiner.

The nose and throat are examined by means of direct sunlight and wooden tongue depressor. We examine every child in the primary and intermediate grades, and those in the high school who wish it. The teeth are examined at the same time with the throat.

The skin is examined for impetigo contagiosa, scabies, etc. Also special defects, such as hookworm and anemia, are looked for. Those found defective are given a card, and a record is made, containing the name, address, and the particular defect.

By these means we hope to relieve to some extent the country boy and girl of a part of their handicap in the attainment not only of an education, but of a better and happier life.

THE AGE AND SEASONAL INCIDENCE OF DISEASES OF CHILDREN.

CHARLES HERRMAN, M. D., *Chief of Department for Diseases of Children, Vanderbilt Clinic, New York.*

(*Archives of Pediatrics, October, 1913.*)

The patients were those who presented themselves for treatment from 1906 to 1910, inclusive, at the pediatric department of the Vanderbilt Clinic and the Lebanon Hospital dispensary, making a total of 32,000 new patients during these five years.

Comparing the percentages for the different ages of the total number of children in New York City under 13 years with the percentages of new cases at the different ages, we find the following:

Percentage of child population and morbidity in New York City, by ages.

	Population.	Morbidity.
	Per cent.	*Per cent.*
Under 1 year of age	9.2	20.6
At 1, 2, 3, and 4 years	8.3	9.5
At 5, 6, 7, 8, and 9 years	7.3	5.6
At 10, 11, and 12 years	7.0	4.3

The higher morbidity under 1 year is immediately apparent. It is still distinctly above the average under 5 years, and after that age it diminishes decidedly.

The relative percentages of male and female patients under 13 years show that the sexes are nearly equally divided. Of the total number, 52 per cent were male and 48 per cent female. The sexes

therefore show an equal morbidity in each disease, and any marked discrepancy would indicate that one or the other sex is especially predisposed.

[The charts show, for 179 cases of chorea, the largest numbers in July and June and the smallest numbers in October, November, and September; for 170 cases of acute rheumatism the largest numbers in March, May, and July, and the smallest numbers in September, December, and August; for 378 cases of acute follicular tonsillitis the largest numbers in November, March, and May, and the smallest numbers in February and January. In regard to several contagious diseases the statistics for New York City as a whole during 1910 and 1911 were combined. The charts show, for 30,655 cases of diphtheria, the largest numbers in May, April, and March, and the smallest numbers in September, August, and October; for 34,943 cases of scarlet fever the largest numbers in March, April, and May, and the smallest numbers in September, August, and October; for 61,238 cases of measles the largest numbers in May, April, and March, and the smallest numbers in September, October, and August; for 12,294 cases of varicella (chicken pox) the largest numbers in May, March, and January, and the smallest numbers in August, September, and July; for 5,056 cases of pertussis (whooping cough) the largest numbers in March, May, and January, and the smallest numbers in October, November, and August.]

SHALL WE CLOSE THE SCHOOLS DURING EPIDEMICS?

FRANCIS GEORGE CURTIS, M. D., Newton, Mass.

(*American Journal of Public Health, February, 1914.*)

One factor necessary in checking an outbreak quickly is a knowledge of the cases at the earliest possible moment, in order to eliminate possible foci of infection by removing and isolating infected or suspicious cases, and the whole matter resolves itself into the answer to the question whether the board can best do this when the schools are open and the children under supervision or when the schools are closed and the children scattered.

It seems to be almost a truism to say that the best work can be done under the first set of conditions.

Another point which I fear is often overlooked is that, other things being equal, the work of the board should be done with as little disturbance of normal conditions as is compatible with efficiency. In other words, if the outbreak can be checked as quickly and efficiently without closing the schools as by closing them, the former alternative should be adopted.

In Newton, in two instances lately where the outbreaks were due to missed cases that were in the school for some time before discovery, the first cases found were not children who sat near the infecting cases, nor were they in the same grade, but were their playmates and companions out of school.

Thus, in an outbreak of scarlet fever due to a missed case, the first case reported was a child in another grade in the school, but living at the end of the same street with and a playmate of the infecting case; the second case was a child in another school, but living next door to the infecting case; the third, fourth, and fifth cases, reported simultaneously, were a brother and sister of the infecting case and a playmate living across the street, none of them in the same grade. All of these cases, together with others, were traced to the infecting case, but of 11 cases due to this one, only 2 were in the same room at school.

More recently, in an outbreak of diphtheria, the cases were similarly infected, the majority being found among the children in other rooms than the one in which the infecting case sat, but all living near and playing with him out of school.

Of course no conclusions of any value can be drawn from so few instances; they are given for what they are worth, in the hope that further observations by others may confirm or disprove them, but so far as they go they seem to show that infection is not contracted in the schoolroom as frequently as is usually supposed.

If the schools are closed when an outbreak occurs, the children are turned loose from supervision; they mingle freely with one another in the streets, on playgrounds, and in each other's houses. They are having an extra vacation and enjoying themselves thoroughly and are unwilling to admit that they feel ill, lest they be kept at home and prevented from having a good time. For this reason they will not say they feel ill until the disease is well advanced, and they may be active sources of infection for some time before it is discovered that they are ill.

If the schools are kept open and the children continue in the classrooms as usual, they are under strict observation and examined daily by the school physician, suspicious and infected cases being sent home for observation or treatment.

In this way many children are sent home before they have had an opportunity to infect others, thus reducing the probability of spreading infection. Further than this, the attention of the parents is called to the fact that the child is feeling ill and he is brought under treatment earlier.

It seems, therefore, that keeping the schools open offers the best chance of safety for the scholars, both collectively and individually.

Instead of closing the schools and allowing the children to be scattered and removed from supervision, when an outbreak appears the schools should be kept open as usual and the children urged to attend. The school physician and nurse should be detailed to the school where the outbreak has appeared and instructed to examine every child daily, excluding such as appear ill or suspicious. This can be done with very little disturbance of the school work. A note must be sent to the parent stating that the child seems, or is, ill and must be seen by the family physician. Suspicious cases must be ordered to remain at home until further notice, and, if necessary, must be visited later in order to settle the diagnosis. Absentees must be rounded up and examined in order to find out why they have been kept at home. If they are ill, they must be isolated, and, if well, urged to return to school.

Such a method of dealing with an outbreak may seem to entail a large amount of work and require a specialization which the ordinary board of health can not carry out, and it does entail more work than closing the schools and waiting for the outbreak to stop itself, but in reality it is not difficult.

In a large city the necessary force is at hand and ready to start work; in smaller cities the number of cases to be handled is small and will probably be confined to one school, and the school physician can be detailed to the affected school during the outbreak, leaving the other schools in his district to be covered by one of his colleagues.

Even if extra help should be required, a condition which will rarely occur, the extra expense incurred will be more than offset by the shortening of the duration of the outbreak and the lack of disturbance to the schools.

When the schools are closed, certain expenses, such as salaries, etc., continue without any return, and there is also an added economic loss from the lessening of the time for instruction, so that the children in the affected school or schools are behind others in the same grade in the unaffected schools.

One practical difficulty which tends to lessen the value of keeping the schools open will be found in the fact that many children will be kept at home by their parents through ignorance of the facts or fear of infection. This can be met by a frank explanation of the reasons governing the action of the board in keeping the schools open. In the writer's experience it has often happened that after a frank explanation of this sort to a disturbed parent the result has been that the inquirer has sent his children back to school the next day, being convinced that they were fully as safe there as when they were kept out.

THE PROPHYLAXIS OF MEASLES.

JOHN RUHRAH, M. D., *Professor of Diseases of Children, College of Physicians and Surgeons, Baltimore.*

(*New York Medical Journal, Apr. 25, 1914.*)

As measles is so easily spread, and as almost every child sooner or later has the disease, many parents, and in fact many physicians, pay little or no attention to its prevention. Much can be done to prevent the spread of measles, also to prevent fatalities. One of the greatest factors in lessening the mortality is to prevent children under 5 years of age from contracting it. In place of trying to shield young children, one often sees them purposely exposed to the disease in order that they may get it and have it over with. Many parents feel that if a child is eventually going to get measles, it might as well be allowed to have it early; but I have already pointed out the greater mortality of early childhood, which is an all-powerful incentive to prevent infection in the very young.

The prevention of the disease is perhaps not as difficult as we imagine. If a child is isolated promptly in what is real isolation, measles is not particularly liable to jump its boundary. The fault usually is that the isolation is not carried out in a satisfactory manner. In some of the newer hospitals where infectious diseases are treated, it has been found that measles may be isolated in box compartments in which the partitions do not reach the ceiling in the room, but in which a strict medical asepsis is carried out by conscientious nurses and physicians. With our shocking disregard of the so-called "minor" diseases in this country, and with little or no municipal provision for their care in properly constructed hospitals, the problem becomes one for the individual physician and the individual family. One reason for failure up to the present time is the fact that measles can not be properly isolated in apartments, especially where there is overcrowding; but while this is true as regards any individual family, much can be done by keeping out children of other families, and adults as well, on the principle that the fewer persons that come in contact with a contagious disease the fewer are liable to contract it.

The second point in the prophylaxis of measles is the closing of schools in the face of threatened epidemics. This protects the young child indirectly in that it lessens the danger of the older children in the family becoming infected and so bringing the disease back to the home to start a new focus of infection. In an epidemic in London, Raffle made a study of the effect of closing the schools, with the following results: In this epidemic 4,470 children were exposed to infection; of these, 2,180 were susceptible to the disease; of these, 853 were infected, 638 cases occurring during the time that the children were at school and 140 during the period of 14 days after which the school was closed; that is, 778 cases which might have been infected

either at school or in home life. Thus, at the time the schools were closed, there were still more than 1,400 children who were susceptible to measles, but only 75 of these children actually contracted the disease. These figures show quite conclusively the enormous value of closing the schools in combating epidemics of measles.

In order to be of any service the isolation should be started early, and in order to do this it is necessary to make at least a tentative diagnosis. The problem of diagnosis will depend on whether the child is under the supervision of a physician or not. In schools and in institutions for children in which there is anything like adequate medical inspection, the early cases of measles may usually be determined by a number of diagnostic methods, if not with certainty at least with sufficient accuracy to isolate the child pending further developments.

The prophylaxis of measles will be seen to depend on the isolation of cases, particularly in preventing well children from associating with those who are ill until a diagnosis has been made, upon the closing of schools in the face of severe epidemics, and in the hospital treatment of the contagious diseases.

VACCINATION.[1]

GEORGE W. GAY, M. D.

(*Boston Medical and Surgical Journal, Apr. 2, 1914.*)

As the direct result of wise legislation, Massachusetts has been practically free from the dreadful scourge of smallpox for 40 years. The present generation knows little or nothing of it. Only those who remember the last severe epidemic in Boston in 1872–73, when nearly 4,000 were attacked and over 1,000 died, can begin to realize the terror, the distress, and the demoralization of the daily activities of the community in consequence of its presence. The outside world shunned us. Business fell off to a marked extent, and the attention of the people was focused chiefly upon the state of the epidemic.

This disease is preventable, but not curable. The chief factor in its prevention is vaccination. Its value has been incontestably demonstrated in all civilized countries for more than a hundred years. Time is wasted in arguments on this question in well-informed circles. Vaccination properly done and attended to is one of the safest surgical operations known to the medical profession. For nearly 10 years Massachusetts has prepared vaccine virus for distribution to its citizens free of expense. About half a million doses have been sent out and used with no known ill results. No purer or more reliable virus has ever been made anywhere.

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[1] General title of letter: "Antivaccination and the legislature."

No one claims that accidents never occur after vaccination, as they occasionally do after the most trivial injuries. Within eight years the writer has seen one death from the prick of a pin and one arm amputated for the scratch of a needle, yet pins and needles have not been given up, nor has any legislation been sought to prohibit their use as yet. The risks of our everyday life far exceed those from vaccination, while the benefits derived from the latter surpass our comprehension. The accidents are preventable. They are so rare that they are a negligible factor in the question.

Vaccination is favored by the medical profession all over the civilized world, by the sanitarians, health officers, and all others having to do with health problems, together with a very large proportion of the intelligent public everywhere. The alacrity with which the general public resorts to vaccination in times of danger shows their confidence in the measure. The evidence in its favor is so overwhelming that one is lost in amazement that its value can be questioned in these enlightened days. Is it reasonable to suppose for a moment that the great mass of intelligent people the world over is wrong on this matter and that the few persistent agitators are right? If the wonderful benefit of vaccination has not been proved, then nothing in the world is susceptible of proof.

CUTANEOUS AFFECTIONS OF CHILDHOOD.

ALFRED SCHALEK, M. D., *Professor of Dermatology, University of Nebraska.*

(*Journal of the American Medical Association, July 19, 1913.*)

Skin diseases, especially of the acute type, occur proportionally more frequently in children than in adults. The reason for this is not far to seek. Local and general conditions combine to reduce the normal resistance of the skin and to increase its susceptibility to pathologic changes. Exposures to injurious external agencies of mechanical and microbic nature are more common in childhood. Lack of proper hygiene influences the condition of the skin considerably. Keeping the skin clean and soft is the best prophylaxis against trouble, but unfortunately there are wrong conceptions about this matter even among intelligent people. Harmful extremes are seen repeatedly. There is no need of speaking of the fact that quite a number of eruptions are due directly to dirt. This acts on the skin mechanically and chemically, producing dermatitis and eczema and by harboring pus cocci, induces secondary infections such as impetigo and furunculosis. On the other hand the modern tendency to carry the use of water too far also does a great deal of mischief. Hebra, the Nestor of dermatology, used to say that he observed more skin

troubles in people who were overactive bathers than in those who were too sparing with their ablutions. The too frequent washing of the skin removes the natural lubrication without giving the fat-producing glands a chance to accomplish their duties. The skin grows dry and irritable, especially when an inherited tendency in that direction is present, and easily becomes a prey to skin diseases. The matter of soaps is quite important in this connection. Inquiries about them will often clear up the obscure cause of some obstinate skin trouble. Only the purest and mildest soaps should be employed for the skin of children, which is very tender and sensitive. There is no call for admixtures of chemicals or drugs in them. If these are needed, they can be applied more properly and accurately in other ways. At times the infantile skin does not tolerate water and soap at all. Trying to remove the scales and crusts with still more scrubbing is responsible for a vicious circle resulting in severe and apparently incurable skin eruptions.

A great factor in the prevalence of skin diseases in older children is the public school. Childhood is the only age at which a great number of persons come into promiscuous and intimate contact during the greatest part of the time. It would be interesting and instructive to learn the percentage of skin diseases originating in the schoolroom. Disseminated here are syphilis, tuberculosis, scabies, trichophytosis, impetigo, the acute infectious exanthems, and others. Is this not sufficient reason that wherever medical inspection of schools is obligatory the examining physician should have more than a smattering knowledge of dermatology?

The instability of metabolism and elimination in childhood are frequently contributing factors toward cutaneous affections. Their direct connection with urticaria is well known. The association of indigestion of fat and sugar with acute inflammatory eczemas has recently been pointed out by Towle and Talbot. Whether we believe skin eruptions to be purely local or not, the regulation of gastro-intestinal functions is always an important item of our therapeutics.

The diet of older children needs careful supervision. The mistake of allowing them to partake indiscriminately of whatever food is served to adults is commonly made. When it is considered how often they are fed on sausage, cheese, pickles, sweets, and other indigestible food up to the limit, it seems remarkable that no more harm is done. The control over the eating is still more important when the children are affected with skin diseases, and at times a plain milk diet becomes imperative.

Disturbances of the nervous system have more to do with causing skin diseases than is generally appreciated. The connection of dentition and eczema is probably due to such a cause. Rest and

sleep are essential for the cure of acute skin diseases in children. Too much handling and petting of the sick child makes it irritable and restless and interferes with the efficiency of the treatment. It is a common experience to see children recover in a hospital under the same treatment which, applied by the mother at home, has proved a failure.

Another feature which distinguishes the cutaneous affections of children is their deviation in symptomatology from that of adults. The lesions differ both in degree and in type. They assume a more acute and inflammatory character. To one who has not given a special study to the skin diseases of children, a diagnosis may become extremely difficult at times. The rule observed in adults, to depend for the diagnosis on some characteristic primary lesion, does not always hold good in children. It will be necessary not only to consider the existing cutaneous manifestations and the general symptoms, but also to study closely the developments and changes due to the peculiarities of childhood.

In regard to the therapeutics of cutaneous affections of childhood, two general rules might be laid down:

The first is the correction of any causative or aggravating complication. This point has already been partly referred to. A few words may be added in regard to the internal administration of drugs. It is better to do too little in this direction than too much. There are only a very few drugs that have any direct action on the skin. Those used for adults, such as arsenic, mercury, iodids, etc., must be used with great caution, partly on account of their general effects, partly because the child's skin is much more liable to drug dermatitis which might complicate or disguise the original trouble. The drugs usually needed are simple and indicated by the internal complications. An occasional purge with calomel or some other laxative, some iron tonic, and possibly a diuretic is usually all that is necessary. Antipyretics and opiates should be avoided as much as possible. The second general rule applies to the local management. It should be rather conservative than aggressive. The natural tendency of the skin is to recover to a normal condition if given a chance. Protection of the diseased skin is of the utmost importance. This means avoidance of irritations of whatever nature, exposure to air, water, heat or cold, scratching, the action of physiologic and pathologic secretions, from old and dried-up applications, etc. The number of the local applications which are necessary is limited. The tender skin of children does not tolerate and does not need any strong and stimulating action. The efficiency of the treatment does not depend so much on the knowledge of a great many different remedies as on the skill to recognize the indications and the proper method of application.

GENERAL SYMPTOMS AND SIGNIFICANCE OF HOOKWORM DISEASE.[1]

C. M. FAUNTLEROY, *Passed Assistant Surgeon, United States Public Health Service.*

(*American Journal of Tropical Diseases and Preventive Medicine, April, 1914.*)

Inasmuch as the disease presents a very variable picture according to the severity of the infection, the length of time the infection has existed, and the amount of resistance shown by the patient toward the infection, it is manifestly impracticable to designate a list of symptoms as being characteristic of all cases of hookworm disease. When the disease is acquired prior to puberty, development, both physical and mental, is retarded, such persons having the appearance of being considerably younger than they really are, because of the evident lack of development. Anemia, more or less marked, is a prominent symptom, and such cases usually show the circulatory and respiratory symptoms of anemia. An apathy and lack of energy are very commonly associated with hookworm disease, so that in some sections of the country the condition has received the name of "lazy disease." Many persons who harbor hookworm infection continue to attend to their daily affairs, and to all appearances are enjoying good health. However, if a careful inquiry be made as to the general health of such persons extending over a period of several months, it will be found that in the majority of cases there will be a history of a considerable amount of minor illnesses and more or less physical incapacity. In women sterility and delayed menstruation are commonly met with. Many persons complain of epigastric discomfort or pain. There may be anorexia and a craving for unusual articles of food. Constipation is exceedingly common, but diarrhea occurs once in a while.

"Ground itch" is the local lesion usually found upon the feet or hands, very commonly between and beneath the toes, through which the parasites enter the body. There is an eruption of vesicles, followed by pustules and a sticky exudate. The adjacent skin becomes red and swollen. The dermatitis usually subsides within 12 days; the vesicles and pustules become dry and are exfoliated.

A person who harbors hookworm infection may possibly remain more or less infected for a period of 10 or 12 years, excluding any reinfection. Hookworm disease is responsible, directly and indirectly, for an enormous number of deaths, illnesses, and incapacity among the poorer classes in heavily infected areas. It is probable that a large number of the deaths certified as due to anemia, dropsy, and malaria, in some hookworm infected areas, are in reality due to unrecognized hookworm disease.

In the United States, in the South Atlantic and Gulf States, containing about 20,000,000 people, the degree of infection is very heavy,

[1] General title of article: "Ankylostomiasis (or Hookworm Disease)".

and the general efficiency of the laboring classes is markedly impaired. It is estimated that in this section of our country the loss of money by reason of the direct and indirect effects of hookworm disease will reach several millions of dollars per annum, aside from the loss to the country in the degenerating effects produced by the disease, and the consequent delayed development of the various industries throughout this section of the country. Stiles has shown that more than 12 per cent of cotton-mill employees in the Southern States are infected. The loss to this industry alone must be great, because of the incapacitating effects of the disease. In the mines of California the general efficiency of the workers is noticeably impaired, many of the men being compelled to discontinue their work because of the disease. A loss of 20 per cent in efficiency in those infected is considered a conservative estimate. Nearly all of the gold mines of California contain the infection, as well as a goodly number of the agricultural laborers of the State, so that this one State must suffer a great loss in various ways by reason of the disease.

In the infected communities it is common to find whole families showing a marked degree of illiteracy, which is traceable to the disabling effects of the disease, and in many instances it is learned that for several generations none of these people have so much as entered a school. A proper appreciation by the general public of the incalculable importance of this disease in all its manifold bearings upon the welfare of the Nation is certainly urgently needed. Hookworm disease bequeaths a pernicious legacy to the infected communities, its work being done in a subtle, insidious manner, weakening the race generation after generation, always tending to produce a condition of physical, intellectual, economic, and moral degeneracy.

The most essential factor in spread of the disease is the pollution of the soil by the fecal discharges of infected persons. The prevention of soil pollution by hookworm-infected persons means eradication of the disease, and a marked improvement in the general health and prosperity of the community. Inasmuch as there is an abundance of indisputable evidence to show that this disease and many other parasitic diseases are spread broadcast over the country by soil pollution, causing many deaths, much sickness, poverty, and expense in the affected communities, there should be strict compulsory laws prohibiting pollution, and any failure to comply therewith should be punishable by heavy fines and imprisonment. In many rural districts the sanitary condition which obtains with respect to the disposal of human excreta is, from a sanitary standpoint, not one whit better than that of the dumb animals in the community. The deposition of all human excerta in sanitary privies, and the proper disposal thereof, is the sanitary reform most urgently needed in the infected

districts. All fresh human fecal material should be regarded as a virulent poison and disposed of accordingly.

The hookworm ova are discharged mixed with the feces of the infected person, many thousand escaping from a single person in the course of 24 hours, as a rule. Under favorable conditions the eggs develop into worms, some of which are almost certain to find their way back to the human host. This process goes on and on, from person to person, until a widespread infection results.

RULES FOR PREVENTING TYPHOID FEVER.

EDWIN O. JORDAN, *Professor of Hygiene and Bacteriology, University of Chicago.*

(Journal of the American Medical Association, June 6, 1914.)

For the individual:

1. Keep away from all known or suspected cases of typhoid.
2. Wash hands thoroughly before meals. Do not use "roller towels."
3. Use drinking water only from sources known to be pure, or if this is not possible, use water that has been purified by municipal filtration or by hypochlorite treatment or by boiling in the household.
4. Avoid bathing in polluted water.
5. Use pasteurized or boiled, instead of raw, milk.
6. Select and clean with the greatest care vegetables and berries that are to be eaten raw.
7. Avoid eating "fat" raw oysters and, in general, oysters and other shellfish whose origin is not known.
8. Be vaccinated against typhoid in all cases in which any special exposure is known or feared.

For the community:

1. Insist on the hearty cooperation of all persons with an efficient health officer.
2. Require notification and a reasonable degree of isolation of every known or suspected typhoid case.
3. Exercise strict control over the disinfection of known typhoid excreta.
4. Insist on pure or purified water supplies.
5. Require pasteurization of milk supplies.
6. Regard all human excreta as possibly dangerous and control their disposition in such a way as to prevent contamination of food or drink.

CARDIAC DISEASE IN CHILDHOOD, WITH SPECIAL REFERENCE TO PROGNOSIS.

CHARLES HUNTER DUNN, M. D., Boston.

(*American Journal of Diseases of Children, August, 1913.*)

In 1906 I reported the results of an investigation of certain clinical aspects of rheumatic fever in childhood, which was based on a series of 300 consecutive patients admitted to the wards of the Children's Hospital. Of these 300 patients, 209 were discharged from the hospital with signs of organic valvular disease of the heart. The after history of these cases appeared to me to be a point of great interest, with a practical value bearing directly on the question of prognosis, and on certain aspects of treatment. I determined at the time to keep in communication, as far as possible, with all of these discharged patients, and at the same time the scope of the investigation was extended beyond the limit of cardiac disease of rheumatic origin, by including all other patients of cardiac disease admitted to the hospital during the period from which the original series was taken. Cases of patients who subsequently died from intercurrent infection were thrown out.

One of the features of greatest interest in such an investigation is the amount of disability carried into adult life, or at least young adult life, by these patients. It was therefore necessary to follow the after history of these patients for a period sufficiently long to afford evidence on this point. The period in which the cardiac patients of this series were admitted to the hospital was that of a number of years previous to the summer of 1903. I resolved to follow the cases discharged from the hospital until all of them should have entered at least young adult life, taking the age of 14 years as the termination of childhood. All of these patients have now passed this limit, the youngest survivor having reached the age of 15 years.

ETIOLOGY.

The series of cases included in this investigation numbers 304 cases of cardiac disease. It throws a certain amount of light on the relative frequency of occurrence of the various etiologic factors.

Causes of cardiac disease in 304 cases.

Causes.	Cases.	Per cent.
Rheumatic fever	264	87
Congenital lesions	21	7
Some recognized infection other than rheumatic fever	9	3
Unknown etiology	10	3

[Then follows a discussion of the specific cardiac diseases.]

CONCLUSIONS.

1. Rheumatic fever is very much the commonest cause of cardiac disease in childhood.

2. Cases with acute rheumatic infection localized in the heart are commoner than cases suffering from chronic endocarditis.

3. Cardiac symptoms are due to two causes: First, acute infection localized in the heart: second, broken cardiac compensation. Of these two causes the first is the commoner.

4. The liability of children to recurrent attacks of acute rheumatic infection, in any of which the heart may be involved, is very great.

5. The immediate mortality of rheumatic cardiac disease is about 20 per cent.

6. The subsequent mortality of patients with endocarditis of rheumatic origin, followed for at least 10 years, is about 50 per cent.

7. The final mortality of rheumatic fever, followed for at least 10 years, is 60 per cent.

8. The mortality is seen chiefly during childhood. The mortality after young adult life is reached falls to only 7 per cent.

9. The cause of death is heart failure. The cause of the heart failure may be either acute cardiac infection or broken compensation. In childhood the former cause is far the more common. After adult life is reached, the latter cause is more common.

10. The particular valvular lesion present has little or no relation either to the mortality or to the amount of disability in adult life, except that aortic disease appears to be a particularly fatal lesion in childhood.

11. The causes of the great mortality of rheumatic fever in children are, first, their greater liability to this infection; second, their greater liability to recurrent attacks; third, their greater liability to cardiac involvement.

12. Patients who escape the dangers of childhood and who enter adult life are apt to show a remarkable freedom from disability. The majority of such patients can lead normal active lives.

13. The probable cause of this freedom from disability lies in the fact that the cardiac damage occurs during the period of growth, and during this period a particularly perfect adaptation can take place between the heart and the patient, which enables the heart to meet the demands made upon it. This adaptation is more perfect than can be attained in the adult.

14. The earlier in life the cardiac lesion is acquired, the better is apt to be the result in adult life, as concerns ability to lead an active, normal existence, provided that the patient escapes the dangers of childhood.

15. Treatment should be directed toward favoring the adaptation of child and heart. While guarding against overstrain we must avoid too great limiting of the normal activities of childhood.

16. In congenital cardiac disease open ductus arteriosus is a favorable lesion.

SYMPTOMS OF RHEUMATISM IN CHILDHOOD.

H. P. DAWSON, M. D., *Pediatrist to St. Margaret's Hospital, Montgomery, Ala.*

(*Southern Medical Journal, April, 1914.*)

Rheumatism is one of the many diseases that illustrate the considerable difference which may exist between the manifestations of one and the same disease—when it occurs in an adult and when it occurs in a child. Rheumatic inflammation of the fibrous tissues is a common affection in early life. In childhood, indeed, there appears to be a peculiar tendency to rheumatism, and in children the disease may assume many different phases.

The conception of rheumatism as essentially a joint disease is based on its occurrence in adolescent and adult life. The wider and almost certainly more accurate conception of rheumatism as a general disease, probably of infective origin, is based chiefly on its manifestation in childhood.

The symptoms of rheumatism in childhood differ from those in adults chiefly in the much slighter character of the joint manifestations and in the much greater prominence and frequency of the heart affections.

Clinical experience shows that pains referred to the limbs, as distinguished from the joints, may be just as significant of rheumatism in children as swollen, red, and tender joints. This is proved by the fact that it is quite common for children with only such vague "pains in the limbs," for example, in the calf or thigh, to show other symptoms of "acute rheumatism," such as endocarditis and pericarditis or subcutaneous nodules; moreover, definite swelling and tenderness of the joints may immediately precede or follow these pains in the limbs. The practical importance of recognizing the significance of these slight pains in the limbs of children—"growing pains" as they are too often called—can hardly be overrated.

In connection with the joint symptom I may mention that Sir Thomas Barlow has called attention to the frequency of affection of the hip joint in the rheumatism of childhood. Rheumatism, in some instances, remains limited to one joint for several days, and when it affects the hip joint may easily suggest commencing tuberculous disease or may lead to stranger errors, owing to the very indefinite localization of pain in children. About one year ago I was called in

consultation to see a supposed case of intussusception, which a few days later was followed by definite symptoms of rheumatism elsewhere.

Another symptom which is of importance because it may be the earliest manifestation of rheumatism in a child is stiff neck. This may seem a trivial affection, but, like the vague pains and stiffness in the limbs, it may be followed or accompanied by severe cardiac rheumatism.

The frequency of cardiac affections is one of the most characteristic features of rheumatism in childhood. Sir George Still reports, in 170 as far as possible consecutive cases with rheumatic manifestations, 128 had cardiac bruits, which in 93 cases were certainly due to endocarditis.

But endocarditis and pericarditis are by no means the only results of cardiac rheumatism, and in children, probably to a greater extent than in adults, cardiac dilatation is a frequent result of rheumatism, an important point to which Dr. Lees has specially drawn attention.

It may not be out of place to mention here the wasting which so often accompanies cardiac rheumatism in childhood. I have had two cases brought to me with this only complaint, the mother not suspecting rheumatism or cardiac disease. However, on inquiry there was a history of vague pains in the limbs for many months past.

In England great stress is laid upon the rheumatic nodule as a manifestation of rheumatism in children. These nodules may occur also with chorea without other clinical evidence of rheumatism, a point which is worthy of note in considering the relation of chorea to rheumatism.

Amongst the symptoms of rheumatism in children, as in adults, must be reckoned sore throat. Tonsillitis so frequently occurs just before the onset of rheumatic pains in children that it is difficult to escape the conclusion that it bears some direct relation, possibly as medium of infection, to rheumatism. Its occurrence also is sometimes followed by an exacerbation of rheumatism.

There are certain minor symptoms, which, although not usually described as symptoms of rheumatism, seem to have a very close connection therewith, for example, "pain in the stomach," which is usually referred to the epigastrium. Another symptom which I have noticed is pain in the side, usually in the lower part of one axilla. A common trouble in rheumatic children and in the children of rheumatic parents is headache. The rheumatic child is par excellence the nervous child.

The frequency of rheumatism is also seen in association with "night terror," somnambulism, habit spasm, and lienteric diarrhea.

The importance of early recognition of rheumatism in children will be realized by those who are familiar with the frequency of heart

disease in the rheumatic child. I suppose there are few more pitiful conditions than that of the child dying with cardiac rheumatism, and it is by paying attention to "the day of small things," the apparently trivial aches and pains, and the various associations which make up the picture of rheumatism in childhood, that we may hope, in some cases at least, to prevent these terrible results which are too often seen from neglected rheumatism in children.

A STUDY OF THE CHILD IN THE TUBERCULOUS MILIEU.

MAURICE FISHBERG, M. D., *Physician to the United Hebrew Charities, New York.*

(*Archives of Pediatrics, February and March, 1914.*)

This investigation was made of all the children of tuberculous applicants for relief to the United Hebrew Charities in New York City during the three months, March, April, and May, 1913, taken as they came, without any selection. After ascertaining that either the father or mother was tuberculous, or both of the parents, we proceeded to investigate the social, economic, and hygienic conditions of the family, and all the children under 15 years of age were examined medically and the cutaneous tuberculin test applied. About four months later each child was reexamined, and those who reacted negatively to the first tuberculin test were again tested according to the Von Pirquet method.

The children in 217 families, in which the father, mother, or both parents were found tuberculous, were investigated. They were found living under conditions greatly favoring the dissemination of the disease. Of 274 consumptives found among these people, only 112 slept in a separate room, and 136 slept in beds by themselves. The rest shared their rooms, or beds, or both, with other persons. Their economic condition can be summed up by saying that they were at the end of their resources, otherwise they would not have applied for relief. Inasmuch as these children were burdened by both a deleterious environment and a tainted heredity, they should offer splendid material for the study of the effects of the tuberculous milieu on children.

Of the 1,129 persons comprised in this group of families, 792 were under 15 years of age. Nearly all of these children were reared on breast milk, only 5.5 per cent having been brought up on artificial feeding. The proportion reacting to tuberculin was not found to have been influenced by the manner of feeding during infancy. Some mothers suffering from active tuberculosis were found suckling their infants, and the latter apparently thrived as well as others of their class; many, however, infected them with active tuberculosis.

The weight of the infants was fairly normal, but the children over 4 years of age were deplorably short in weight when compared with others of their class. At the age of 8 they lacked 3.67 kilograms, and at 14 even 7 kilograms of the average. During the six months they were kept under observation, one-half remained stationary in weight, 40 per cent had lost and 10 per cent had gained in weight.

The form and shape of the chest was normal in 62.5 per cent of the children; 27.5 per cent had flat chests; and 10 per cent rachitic chests. The large proportion of flat chests is not necessarily an indication of the habitus phthisicus, because Jewish people are known for their flat chests.

In 8 per cent of the children enlarged superficial thoracic veins were found. In children in whom a diagnosis of tuberculosis was made 37.5 per cent showed these enlarged veins and three-fourths were unilateral. Of the children showing signs of latent tuberculosis, 25 per cent had enlarged thoracic veins.

The cervical glands were swollen in 67.8 per cent of the children; swollen glands in the axilla, groin, etc., were exceedingly rare. Only one child was found with enlarged supraclavicular glands, and it had other symptoms and signs of tuberculosis.

Hyperplastic conditions of the nose, throat, and pharynx, such as enlarged tonsils, adenoids, chronic rhinitis, etc., were found in 58.6 per cent of the children. Scrofula was rather infrequent. Our investigation tends to confirm the opinion that these hyperplastic conditions, as well as scrofula, have nothing in common with tuberculosis. The external stigmata of tuberculosis, such as scrofuloderma, tuberculides, phlyctenula, glandular blepharitis and conjunctivitis, keratitis, etc., were exceedingly rare among these children.

The cutaneous tuberculin test, applied twice and three times to those who reacted negatively to the first application, was found positive in 7 per cent of infants between 1 and 6 months of age. Between 6 months and 1 year of age 21 per cent of the infants reacted positively. The percentage of positive reactions keeps on increasing with advancing age, and at 14 years 83.79 per cent were found infected with tuberculosis. When compared with the results obtained by others who reported the application of the tuberculin test to a large number of children, it appears that the tuberculous milieu has not materially increased the number infected with tuberculosis among the children over 6 years of age. In other cities it was found that about the same percentage, or even more, react positively. But among the infants under 4 years of age the proportion infected is considerably higher among those who live in a tuberculous milieu. Comparing our results with those obtained in rural districts, where but few consumptives come in contact with the children, we find that children in cities, especially those who live with tuberculous parents, are at a great disadvantage, and that infection is inevitable among them.

Among the 692 children, 65 were found to be suffering from active tuberculosis. Of these, 13 had tuberculosis of the bones and joints, 4 Pott's disease, 2 spina ventosa, and 1 tuberculosis of the glands. With active pulmonary tuberculosis 19 children were found, and 25 with tracheo-bronchial adenitis.

The mortality of children under 14 among these families was rather high. Of 188 children under 6 that died, 30 succumbed to meningitis; i. e., 16 per cent of all the deaths of children under 6 years of age were due to meningitis, which is enormous when compared with the 2 per cent of deaths due to this cause among the general population. While only 17, or 7.3 per cent, of all the deaths were said by the mothers to have been due to pulmonary tuberculosis, it must be borne in mind that in 79 cases the parents stated that the deaths were due to unknown causes. Many of these were undoubtedly due to tuberculosis, which, during infancy, is not always diagnosed.

The opinion entertained by many authors that infants under 1 year of age when infected by tuberculosis do not survive the disease is only partly supported by our investigation. We have seen among these children many who were undoubtedly infected during the first few months of their existence, yet they survived and even present a healthy appearance. However, it appears from our observations of the child in tuberculous milieu that the prognosis depends largely on the age at which infection takes place, and that the danger of tuberculosis as a fatal disease among children is in an inverse ratio to the age at which they are infected. Those infected during the first two years of life are in grave danger of succumbing to hematogenous tuberculosis, notably tuberculous meningitis. Children over 5 years of age when infected show only signs of latent tuberculosis, and chronic phthisis is rather rare among them.

Massive infection, such as we found among these children, is the most potent factor in the propagation of tuberculosis. Prophylactic measures taken against the spread of tuberculosis to be effective must be directed with a view to protection of infants against any contact with tuberculous persons and older children against massive infections such as have been met with in the families we found living in a tuberculous milieu.

TUBERCULOUS BRONCHIAL GLANDS IN CHILDREN.[1]

JOHN B. HAWES, 2D, M. D., Boston, Mass.

(*Interstate Medical Journal, March, 1914.*)

Tuberculosis in childhood is primarily a disease of the lymphatic system. By the time the lung itself is involved, the process is a

[1] General title of article: "Intrathoracic Tuberculosis in Infancy and Childhood, including Bronchial Gland Tuberculosis."

well-advanced one, and one that offers no difficulty in diagnosis. In this article, therefore, I shall confine my remarks to the diagnosis of the disease in its early stages, when the bronchial lymph glands are affected and little or none of the lung itself is involved. Here, as in adults, the importance of constitutional signs and symptoms can not be given too much emphasis. Only in the rarest of instances, even with X-ray evidence, is it possible to decide definitely from the examination of the chest alone that tuberculous bronchial glands are present, and, of still greater importance, that they are *the cause of the symptoms.*

These constitutional signs and symptoms above referred to may be as follows: (A) Loss of weight, or, of greater importance, failure to gain weight; (B) malnutrition, despite what seems to be adequate and proper nourishment; (C) continuous fever, or a constantly subnormal temperature associated with a high pulse; (D) anemia; (E) debility, languor, undue fatigue, irritability, loss of appetite, or a capricious appetite.

It is true that any or all of these symptoms or conditions may be due to causes other than tuberculosis. These should be carefully borne in mind and eliminated if possible. Such conditions, however, as rickets, chorea, endocarditis, improper feeding, etc., if present, are usually strikingly evident. When these symptoms exist without apparent cause, even if the signs in the lungs are slight or absent, it is safe to make at least a provisional diagnosis of a tuberculous infection as the cause of symptoms. When, in addition to these, there are present certain signs and symptoms referred to the lungs, the diagnosis is conclusive. Such signs and symptoms referred to the lungs may be:

(A) Cough, usually dry and throaty, often of brassy quality and paroxysmal in nature, sometimes closely resembling whooping cough. There is usually no sputum and no obvious cause for such a cough, such as enlarged tonsils, etc.

(B) Impairment of resonance at the level of the second intercostal space in front and in the interscapular region behind.

(C) Bronchial breathing and bronchial whispered voice heard on auscultation over the vertebræ below normal limits.

(D) Signs of intrathoracic pressure, such as enlarged veins on the chest, unequal pupils, hoarseness, paroxysmal "brassy" cough, and a peculiar strident or sibilant quality to the breath sounds.

(E) Enlarged tuberculous glands in the neck or elsewhere, suggesting the possibility of similar glands at the root of the lung.

It is in the case of children that the tuberculin test finds its greatest field of usefulness. The Von Pirquet, or cutaneous, test is by far the best one to employ. The technique of this is already well

known, and is so simple as to require no description. In this test a negative reaction is of more value than a positive one. A negative skin tuberculin reaction in a child of 10 years or under, carefully performed, is as good evidence as can be obtained that tuberculosis is not the cause of the child's condition. This statement of course assumes that none of these conditions, such as advanced tuberculosis in the lungs or elsewhere, a recent attack of measles or other acute disease, which have been known to cause a negative reaction, is present.

A positive skin tuberculin reaction, while of great importance, by itself is not enough on which to base a diagnosis of clinical tuberculosis. It simply means that somewhere in the child's body there is a tuberculous focus. If, in addition to a positive reaction, constitutional signs and symptoms are present, even without any of those referred to the lungs as mentioned above, a definite diagnosis of tuberculosis, requiring prompt and aggressive treatment, is justified.

The X ray, like the tuberculin test, in my opinion is of far greater value in children than in adults. While it is only in comparatively advanced cases that tuberculous bronchial glands are of such size as to cause marked dullness or other very striking signs in the chest, a careful X-ray examination, made and interpreted by an expert, will show such glands long before they have attained great size, although quite capable of producing marked constitutional symptoms. It should also be borne in mind that the X ray after all shows only shadows and gives absolutely no indication as to whether any given process is old or recent, active or inactive. X-ray evidence alone never justifies a definite diagnosis of what we know as clinical tuberculosis.

RESULTS OF JOINT TUBERCULOSIS IN A SERIES OF 200 CASES UNDER OBSERVATION FOR FIVE OR MORE YEARS.

FRANK D. DICKSON, M. D., and DE FOREST P. WILLARD, M. D., *Instructors in Orthopedic Surgery, University of Pennsylvania.*

(*Pennsylvania Medical Journal, June, 1914.*)

Our statistics are based on a series of 200 cases collected from the records of the orthopedic department of the University of Pennsylvania and the Orthopedic Hospital, from the services of Dr. Davis and the late Dr. Willard. Of these cases 71 were tuberculosis of the spine, 82 of the hip, 33 of the knee, 14 of the other joints. The two points which were considered essential in the collection of the series were that the cases should have been under observation for five years from the time that treatment was started and that the diagnosis of joint tuberculosis was well proved.

The treatment throughout has been distinctly conservative and was practically identical in the two services. In the main this falls into three classes—treatment in bed, treatment by plaster cast, and treatment by brace. By bed treatment we mean rest in bed with absolute fixation of the diseased joint.

General results of treatment.

	Number of cases.	Per cent.
Quiescent	142	71
Under treatment	45	22½
Deaths	13	6½
Total	200	100

CONCLUSIONS.

1. The results of the present combination of conservative and hygienic treatments may be considered as satisfactory.

2. There can be no doubt that the early institution of treatment has a marked beneficial effect on prognosis, both as to deformity and as to ultimate recovery.

3. Our results would indicate that the earlier in life the onset the more favorable is the prognosis.

4. In the acute stages treatment in bed is the most effective.

5. Prolonged sinus formation with mixed infection markedly favors the general distribution of the tuberculous process from the localized focus and increases the danger of a fatal termination.

6. The strict enforcement of hygienic measures during the whole course of the disease and the supervision of the patient after leaving the hospital are essential points in the treatment of joint tuberculosis.

THE STATE CARE OF CRIPPLED CHILDREN.

WALLACE BLANCHARD, M. D., *Assistant Clinical Professor in Surgery (Orthopedic), Rush Medical College, Chicago.*

(*Chicago Medical Recorder, March, 1914.*)

It has been declared in the legislatures of the three States of New York, Minnesota, and Nebraska that it costs much less to correct the deformity of a destitute crippled child and make it a future self-supporting and upbuilding factor in the State than to leave it to be a public beggar, or to remain in some other way a burden upon the people of the State for its natural lifetime. Acting upon this policy, which it may be assumed is well proven, the above-named States have established State orthopedic hospitals, with orthopedic surgeons of good reputations in charge.

Modern methods of orthopedic surgery are reducing the helpless and bedridden cripples to an exceedingly small proportion.

Nothing gives more joy to a bedridden, crippled child than the prospect of standing alone and becoming able to walk, with a further prospect of being able to do its share of work in the world. The best and only time to perfectly correct most deformities is in childhood.

A large share of the severe deformities are the inheritance of poverty, and, if corrected at all, the work must be done in charity hospitals, either sustained by private charity or by municipal and State appropriations. For over 20 years the Home for Destitute Crippled Children, Chicago, has been doing a great work in restoring the deformed to normal symmetry, and that usually stands for future ability to earn a living. The annual report for 1913 showed 811 house cases and 1,559 dispensary out-patients treated.

About one-third of all the deformities corrected are tubercular, one-third congenital or acquired paralytic, and one-third rachitic.

The rachitic deformities, consisting usually of knock-knee, bow-legs, and anterior bent tibias, are expeditiously corrected by the modern method of rapid and bloodless osteoclasis. No time and expense are lost upon antiseptic dressing and precautions. The bloodless corrections are made in a Grattan osteoclast in eight seconds. The parts are held in plaster of Paris for five weeks, and in six weeks the patient is walking on symmetric legs and is ready for discharge.

Unfortunately, the other classes of deformities require more prolonged treatments. The tubercular joints frequently require from one to three or four years of treatment. It is hoped that the Albee operation may shorten the course of treatment necessary for Pott's disease of the spine.

The congenital clubfoot can be quickly corrected by tenotomy and forcible straightening, but requires from four months to a year of close observation to prevent a relapse.

The paralytic clubfoot deformities, whether corrected by tenotomies, astragalectomy, or tendon transplantation, require prolonged care and attention.

It is hoped that the Abbott method of treating scoliosis may shorten the period of treatment and give improved results.

The congenital hip dislocations require eight months in plaster of Paris to get good results. We are doing Prof. Lorenz's new manipulative replacement, which is a vast improvement upon the forceful method he employed when he came to Chicago 12 years ago. It will be remembered that when Prof. Lorenz came to this country he would not attempt to reduce a congenital hip in a child over 5 years of age. By the more improved modern methods we frequently succeed in getting good replacements in children up to 8 and even 10 years of age.

We frequently receive paralytic children with a history of having lain helpless on the bed for several years. * * * Frequently after a month's treatment the child will be found walking on a pair of crutches around the ward. After a time braces are applied in place of plaster. Thus a bedridden case becomes an ambulatory patient, with a hope of still further improvement.

An improvement in the mentality of the child immediately follows the correction of its deformities. Increased confidence and force of character can always be seen in the faces of the second pictures of the cases.

To give little cripples straight and symmetric bodies and limbs, so that they may enter life's work with a good chance of becoming self-supporting and self-respecting upbuilders in the community, is not only a charity, but has been shown by the experience of at least three States to be a good financial investment for the State. Certainly this great work should not be left entirely as an over-heavy financial load to be carried by generous and self-sacrificing philanthropists.

EARLY HISTORY OF THE CARE AND TREATMENT OF CRIPPLES.

DOUGLAS C. MCMURTRIE, New York.

(*Bulletin of the Johns Hopkins Hospital, February, 1914.*)

The first glimmer of hope for the welfare of the cripple began to appear in the eighteenth century, though the progress in this direction was very slow. The first measures did not in a strict sense mark the beginnings of care for cripples, but they operated to the ultimate advantages of those who, by reason of their infirmity, were cast upon the pity of their fellow men. The actuating motive of provision in many cases, however, was utilitarian in character. One object was that all cripples might be confined, so that they should not annoy the community by their deformed appearance.

Some of the many monasteries which had not been utilized since the time of the Reformation were thrown open and converted into orphan asylums, madhouses, or penitentiaries. In the establishment of the various institutions the cripple was frequently considered.

Those handicapped by deformity were best provided for at a hospital for wretched and pauper invalids established at Pforgheim in 1722 by Count Luitgard, of Baden. This was later transformed by Count Charles Frederic, of Baden, into an orphan asylum, but made especial provision for young and old cripples. Of those capable of instruction it is noted merely that they should be sent to the school of the orphan asylum "when they could stand it." The cripple department was abolished in 1808, probably because the room was needed for the insane.

Such provision for cripples, however, gave them asylum only, and did nothing in a constructive way to better their condition, but the rise of the science of orthopedics was responsible for the ensuing improvement. It is true that one of the earliest Hippocratic treatises was orthopedic in character, but the attention which had been given to human deformity by the medical profession had, up to the time of which we are speaking, been inconsequential. One of the first to give extensive consideration to such work was Andry, of Paris, who published in 1744 a two-volume work on orthopedics, illustrated. He encountered much skepticism. For example, Siebold in his *Chirurgisches Taschenbuch* (1792) claimed that the cure of clubfeet was impossible.

Another advance was made in 1780, when J. A. Venel, who was versed in both mechanics and medicine, founded an institution for the deformed at Orbe, Switzerland. Several other surgeons also did valuable work. The most complete books on the subject were by Jörg (1816).

The theories of the various orthopedists were best put into practice in an institution, and a large number of these were founded in the first decades of the nineteenth century; as, for example, those located at Paris, London. Leipzig, Lubeck, Berlin, and Vienna. One at Wurzburg, established by Dr. Heine, gained especial fame, being the first of its kind in Germany.

The first institution for the deformed in Prussia was established at Berlin in 1828, by Dr. J. G. Blömer. This was designed for pay patients from among the upper classes, but indigent crippled children were also admitted. Between the years 1823 and 1827 he treated no less than 1,179 cases of deformity, of which he claimed to cure 651. Blömer had a workroom for making apparatus, bandages, and artificial limbs. It is not known how long his institution lasted.

A similar institution was founded in Stockholm, Sweden, in 1827 by Dr. Ackermann. There was much difficulty encountered in overcoming public suspicion and distrust. Dr. Günther maintained an institution in Hamburg during the years 1832–1837. While visiting Hamburg, Dr. Zinc, of Vienna, became acquainted with this establishment, and upon his return to Vienna founded a similar one, May 1, 1838. This latter much resembled the institute of Blömer, at Berlin.

In the meantime, however, there had been founded in Munich, in 1832, the first comprehensive institution for the care and education of cripples. The Königliche Bayerische Zentralanstalt für Erziehung und Bildung krüppelhäfter Kinder was brought into being by an eminent philanthropist, Johan Nepomuk, and the principles then exemplified have in general been followed by most of the modern institutions which have since been established. A description of sub-

sequent work, however, is outside the scope of the present article. In Denmark, England, and Italy, as well as in Germany and the United States, extensive systems of care have been built up, and in almost every civilized country of the world there is made some provision for the welfare of the cripple.

WEAK FEET AND POSTURAL DEFORMITY IN CHILDREN.[1]

CHARLES OGILVY, M. D., New York.

(*New York Medical Journal, Sept. 6, 1913.*)

WEAK FEET.

Note the term "weak feet," and not "flat feet;" for the condition of weak feet should be recognized long before the flattening or lowering of the long arch of the foot has developed. The importance of the care of the feet can not be overestimated. Seldom is a weak foot recognized before flattening has developed and a long train of symptoms has followed in its wake.

The body weight normally passes through the center of the knee joint, a little to its inner side, down the leg through a line represented by the crest of the tibia, through the center of the ankle joint and over the dorsum of the foot to the second toe. When we find the foot everted (rolled outward), this relationship is immediately changed, and the body weight no longer passes over the dorsum of the foot to the second toe, but down to the inner side of the foot, to a point corresponding to the astragalo-scaphoid articulation. Just as soon, then, as this abnormal relationship is established, just so soon is there demanded of the long arch of the foot the sustenance of the body weight bearing down upon its highest point. It is then simply a matter of time before it gradually gives way. Symptoms of discomfort, and subsequently pain, develop (sometimes associated with backache), and later there presents itself to us a typical flat foot. This could have easily been prevented by the recognition of the eversion and its correction.

Treatment.—The proper treatment of weak feet, or even flat feet, is by no means an insertion of plates or foot supports, which the patients are usually advised to procure at some near-by shoe store. Such arch supports do more harm than good. The proper foot plate is one which supports the foot anteroposteriorly and also laterally when the foot is performing its function of weight bearing. Such a plate can only be made from a plaster model of the foot, which plaster cast is further remodeled to complete the correction of the deformity desired. Furthermore, the employment of any arch support

[1] General title of article: "Orthopedics in General Practice."

is detrimental to the well-being of such feet unless the eversion, which has already been noted and which is always present, is first corrected. This is really the most important point in the treatment of weak feet. It can be corrected and controlled by elevating the inner side of the heel of the shoe and extending the heel forward on the sole some three-quarters of an inch. This should be done in every case.

In the milder cases this alone will be found all that is necessary, provided the shoe chosen is built on proper lines—with a straight line on the inner side of the sole, etc., to obtain proper foot balance. In addition, we must, by foot exercises, strengthen the muscles which control the position of the foot in its relation to the leg, and so enable us to retain our corrected position.

ANTEROPOSTERIOR POSTURAL DEFORMITY.

The subject of anteroposterior postural deformity is one which, up to the present time, has not been sufficiently emphasized.

If we could but have these cases recognized early we would not see so many of the marked deformities of rotary lateral curvature which are constantly being referred to us. The class of patients which are here referred to are characterized by very definite and constant peculiarities. They are those who lack muscle tone. These are the children whom you see lagging behind in their romp and play, tiring very easily, refusing to continue the game with the other children, hanging back when any active exercise is being enjoyed. They run clumsily, they walk with an ungainly gait—with rounded shoulders and head forward. In the standing posture the abdomen is prominent, the shoulders are rounded, the chest is sunken (retracted), and the head is protruded. When sitting down they may best be characterized as those who "flop over," either upon their book or upon the table before which they are seated. . . . The condition is found more frequently among girls than boys, the reason for this being that boys are naturally more inclined to the muscular activities of outdoor sports and games.

The difficulty of diagnosis from the indefiniteness of the symptoms is counteracted by the ease with which the condition is recognized when the clothing is removed and the patient is made to stand before the examiner. One recognizes at a glance the abnormal posture, and the diagnosis should immediately be made.

There is no structural change in this deformity. The position is entirely due to habit. This postural deformity can be voluntarily corrected by the patient. The condition can be cured by properly directed breathing exercises, light calisthenics, and good hygienic and dietetic care.

FLAT FOOT IN CHILDREN.

ALBERT EHRENFRIED, M. D.

(*Boston Medical and Surgical Journal, Apr. 8, 1914.*)

A study of the records of 1,000 children under 12 years of age applying consecutively for treatment at the out-patient department of the Children's Hospital in 1912, showed 440 having some static disability of the feet. These cases could readily be divided into three classes—congenital (18), idiopathic (95), and secondary (327).

First. The diagnosis of weak, pronated, or flat foot should not be made inconsiderately. In 327 of the 440 cases the foot symptoms were secondary to some other condition which required treatment. Continued observation in many apparently simple cases showed mild rickets or unsuspected infantile paralysis, and less frequently such conditions as tuberculosis of the knee, hemiplegia, or lead, post-diphtheretic, or spastic paralysis.

Second. Eighteen of the primary cases were congenital. These, the result of mechanical influences prior to birth, are more properly classed with clubfoot; they belong to the type to which I have given the name of potential calcaneo-valgus.

Third. A study of the other primary cases, 95 in number, shows evidence of muscular insufficiency resulting from physical debility as the leading factor in causation. This debility, as shown by the records, is frequently the sequel of an infectious disease, and is particularly apparent when the child has been the victim of a series of infectious in close succession. Other static disabilities, such as relaxed knees, functional scoliosis, and gastroptosis are likely to be present.

Fourth. The secondary cases, which were in the majority, were the result of rickets or of rhachitic deformities in approximately 200 cases, of infantile paralysis in 107, and of other conditions in approximately 20 cases. In many of these the foot disability was a minor incident.

Fifth. Prophylaxis of foot disabilities consists in combating the two important causes therefor—rickets and the infectious diseases of childhood. Both of these should yield to hygiene. Measures to lessen substitute nursing of infants by means of proprietary foods or improper milk mixtures, and to control the spread of contagious diseases through schools, which at the present time are probably the chief agents in the dissemination of infections among children, will result in the important diminution in the incidence of these conditions.

Sixth. The treatment is usually effective.

CARE OF THE EYES OF SCHOOL CHILDREN.

(*Editorial in New York Medical Journal, Dec. 20, 1913.*)

One way in which the growing interest in school hygiene is shown is the increasing demand that the eyes of the children shall be con-

served by proper glasses whenever they appear to be causing trouble. This is as it should be, but the decision to do the proper thing does not always include provision of the ways and means. It is one thing to say that a child needs proper glasses; it is another to see that he gets them.

Thousands of children are directed each winter to have their eyes examined. Some of these consult specialists in their offices and receive adequate treatment. Others consult opticians or optometrists, who, for the sake of selling a pair of glasses, undertake to solve the intricate problems involved with a deftness and celerity which would be remarkable if successful. The majority, perhaps, arrive almost simultaneously at the eye clinics, which are overwhelmed by this sudden and temporary increase of the most difficult and time-consuming part of their work. A certain number of these children, but a comparatively small number, are set aside for the purpose of teaching and these receive proper attention; but in our large clinics the time of the expert is fully occupied by attending to the diseases and operative conditions of the eye that present themselves. The great majority of these refraction cases have to be intrusted to the junior assistants, who attend the clinics for other reasons than to devote their entire time to the correction of the tiresome, patience-trying errors of refraction and seldom have the skill to cope successfully with the task; so that only a small proportion of these children receive the painstaking, accurate attention to which they are entitled. The appointment of a city ophthalmologist, who prescribes from a single examination after the eyes have been placed under atropine by a school nurse gives no better results, if indeed as good.

The problem then, that grows more and more perplexing with the increasing demand for the conservation of the eyes of school children, is how to secure a means by which they may be properly examined, and it may be well to consider the solution adopted in London, as detailed by Dr. Samuel Horton Brown in the Ophthalmic Record for October, 1913. [See next article.]

This plan may not be ideal—the first attempt to solve a problem of such magnitude seldom is—but it presents three salient features which we believe must form a part of any plan that is to prove successful, viz, employment of competent ophthalmologists with adequate facilities, reasonable payment for a reasonable amount of work, and protection against overcrowding. Nothing in this militates against the use of material for instruction; on the contrary, the junior assistants, who now often have to work out their problems unassisted, would then work under the direct personal supervision of an expert and learn more quickly how to solve them accurately. Nothing except the prospect of some reward will keep the expert down to the grinding, laborious, and usually thankless task of refraction work; he

will leave it for easier, more interesting, and indirectly more profitable branches of his specialty. No man can do more than a certain amount of work in a day and do it well. The crowds at the clinics at certain seasons are enough to make the most skillful despair; he can not attend to all, often not to a majority, as they should be attended to, yet if a single patient complains of lack of attention, an investagation is in order, and if the expert works overtime, he soon feels that he is not gaining the approbation of the authorities; hence the limitation of the work given him to do each day to the amount that a skillful man can accomplish successfully in the prescribed time enables him to perform it accurately and conscientiously.

Too much hurried, slip-shod work is to be seen in the refraction rooms of our metropolitan clinics. Under the circumstances we can not see how it could be otherwise, so if the eyes of our school children are to be conserved it would be well for the city authorities to take cognizance of the example set them by their confrères of London and to institute measures to secure for the children adequate expert care and attention.

CARE OF THE EYES OF SCHOOL CHILDREN AT MOORFIELDS, LONDON.

SAMUEL HORTON BROWN, M. D., Philadelphia, Pa.

(*The Ophthalmic Record, October, 1913.*)

The London County Council after much persuasion made an agreement with the Royal London Ophthalmic Hospital, at Moorfields, for the special and prompt treatment of the London County Council elementary school children who require glasses. The hospital equipped a model department, separate from the other clinics, where such children are treated apart from the other patients. This department has attracted considerable attention, as it is practically a school eye clinic. Five physicians are engaged in this department each week, and it also engages part of the time of the nursing, domestic, clerical, dispensing, and optical staffs. For neatness and dispatch this is the finest clinic of its kind in the world. The clerical work is done by a clerk, who employs a clean, practicable card-index system. Noise and confusion are absent. The rooms of the clinic are clean and very attractive.

The agreement between the hospital and the council is that the hospital will care for not more than 5,000 school children in the special department upon the payment by the London County Council of the sum of £1,000 ($4,800) annually, half of which the hospital retains for its expenses, dividing the other half equally among the five physicians. This yields to each physician £100 ($480) annually. The cost of examining and prescribing for each child is approxi-

mately 4 shillings (96 cents), of which the doctor in attendance receives 2 shillings (46 cents). Even in our land of high prices this would be quite a considerable item.

It is so arranged that each doctor sees not more than 12 new cases daily and such old cases as have been returned to his service. At the maximum an assistant can not consider his day badly spent when the hospital work has placed 24 shillings ($5.76) to his credit.

The school children coming to the hospital are not all exclusively refraction cases; they frequently present other conditions. These are referred back to the hospital proper. In order, however, to prevent confusion, duplication of records, etc., each day sees one of the chief surgeons of the hospital acting as medical officer for that day, and all the cases, other than refraction cases occurring in this special department, automatically belong to the clinic of the medical officer of the day and he treats them as such henceforth.

In 1912 there were 4,501 new cases of school children, with a total attendance of 11,860. There were 138 transferred to the regular outpatient department. Spectacles were prescribed for 3,878. The number of grants for spectacles was 1,156.

Regarding spectacles, the hospital neither manufactures nor sells spectacles, but arranges for the optician to attend daily at the hospital. The optician is authorized to charge prices ranging from 1s. 9d. (42 cents) to 3s. 6d. (84 cents), and, in the case of cataract patients, 5s. 6d. ($1.32). Those who can not pay these prices can, on application to the inquiry officer, be furnished with a paper stating the cost. This paper is signed by the inquiry officer, and is a certified statement in case the patient applies to some agency (there are about 800 such agencies available) toward the cost of the spectacles.

IS THE PERCENTAGE OF MYOPIC EYES DIMINISHING?

SAMUEL D. RISLEY, M. D., Philadelphia.

(*Journal of the American Medical Association, Sept. 27, 1913.*)

In my report of the examination of the eyes of the school children in Philadelphia, published in 1881, it was shown that the increasing percentage of myopia in the schools as the pupils advanced in age and school progress, as was set forth by the statistics of many observers both in Europe and America, was due not so much to the want of hygienic precautions in the schools as to the existing congenital defects in the eyes of the children. Many examples, it is true, were presented showing the baneful influence of inadequately lighted schoolrooms and other faulty environments over the eyes of all young children, but it was obvious from their collated statistics that the crux of the matter lay in the congenital visual defects.

The entire work was summarized in the following conclusion and recommendation:

That, given an emmetropic or normal eye, the probabilities are that no harm will come to it from the educational process. On the other hand, given an eye with an anomaly of refraction, especially astigmatism, the probabilities are, other things being equal, that the educational process will be fraught with pain and danger to the eye. Therefore, that before entering school the possible presence of defects of vision should be excluded, and any existing error of refraction corrected as soon as any trouble is experienced.

Briefly stated, it was shown by this investigation that the emmetropic eye, notwithstanding its relatively small percentage of the whole number, was to be regarded as the model or standard eye, since it passed through the stress and strain of school life with a minimum of pain and peril, and maintained a nearly uniform percentage through all the years of school life; that pain, lowered acuity of vision and disease in the eyes with defects of refraction, especially in astigmatic eyes, steadily increased as age and school progress advanced; that with increasing school age the percentage of eyes with hypermetropic refraction steadily fell, while the percentage of eyes with myopic refraction increased in a corresponding ratio, the increasing refraction being associated with a steadily increasing percentage of pain, lowered acuity of vision, and disease of the intraocular tunics. As a corollary growing out of these findings and conclusions it was recommended that no child should be permitted to enter on the educational process until the eyes had been examined.

While these statistics were in course of preparation, I published, and later presented before the American Ophthalmological Society, the history of a large series of cases, all taken from my private-case books, in which the eyes had passed while under observation from hypermetropic to myopic refraction through the turnstile of astigmatism. These cases were presented and published to fortify the claims made in the report of the school examinations.

Twelve years later, probably because of this work, I was requested by the late Dr. William F. Norris to write the article on "School Hygiene" which appeared in 1894 in the second volume of Norris and Oliver's "A System of Diseases of the Eye." While preparing this article it occurred to me that if the conclusions based on the school report and published in 1881 were true, some demonstration of their truth should be shown after 20 years, in a careful analysis of all cases applying in the routine of professional work for relief from asthenopia by the careful correction of existing congenital errors of refraction. In Philadelphia during the period from 1874 to 1893, inclusive, ophthalmic surgeons had habitually ordered glasses for the relief of

asthenopia. During this period many cases of rebellious headache and nerve storms, after Dr. S. Weir Mitchell's famous paper on their relation to eyestrain, were referred to the ophthalmic surgeon for consultation and treatment. It was therefore logical, reasoning a priori, to assume, if the conclusions of the school report based on the statistics there formulated were true, that such an analysis of the case as was proposed should show diminishing percentage in the relative number of myopic eyes and a lower degree of myopia. The work was undertaken, and the resulting figures were based on the refraction as shown by the glasses ordered for distance and constant wear. The work covered the correcting glasses for a total of 195,754 eyes, of which 8,736 were from my private-case books, all of the latter having been painstaking corrections under the use of mydriatics, pressed to the thorough paralysis of the accommodation.

This paper is a continuation of the study from 1894 to 1912, inclusive. The total number of eyes falling under the strict requirements of the analysis is 6,850.

At the present time it has been found possible to complete the analysis only for the group of cases in the first three years, 1894 to 1896, inclusive, and for the group in the last three years, 1910, 1911, and 1912, giving for these years a total of 2,297 eyes. In all of these, painstaking effort was made by every means at our command to determine the static refraction of each eye, the determination being made after the more or less prolonged use of the stronger mydriatics. Homatropin was used only for elderly persons, and then for its therapeutic effects over irritable and inflamed eyes.

A summary of the statistics shows that the percentage of myopic eyes for 1894 had fallen to 15.06 per cent, for 1895 to 13.4, and for 1896 to 13.86, giving an average for the three years of 14.07 per cent, as compared to 16.78 for the preceding three years, or 22.03 per cent, the average for the preceding 20 years. The diminishing percentage of myopia is made strikingly manifest by the figures shown in the last three years, 1910 to 1912, inclusive. In 1910 there was 13.45 per cent of myopic eyes, which fell in 1911 to 8.21 per cent, but rose in 1912 to 11.97 per cent, or an average for the three years of 11.21 per cent. The average percentage of myopia for each succeeding period of three years is shown by the steady fall from 28.43 per cent in 1874 to 11.21 per cent in 1913.

The percentage of high myopia, 10 D. or greater, during the first period of three years, shows a steady rise in the number of such eyes from 0.80 per cent in 1894 to 0.91 per cent in 1895, and to 1.86 per cent in 1896. In 1910 and 1911 not a single case of M.—10 D. was seen, reducing the average for the three years to 0.20 per cent, as compared to 1.19 per cent for the first period. The interesting fact

is set forth that while the percentage of the higher grades of myopia falls with more or less regularity with the succeeding years, the lower grades less than 3 D. steadily advance, not in actual numbers but in relation to the whole number of myopic eyes.

SQUINT AND ITS CORRECTION.

JOHN J. O'BRIEN, M. D., Schenectady, N. Y.

(*New York State Journal of Medicine, January, 1914.*)

To advise the parents of a child who has just commenced to squint "to wait till the child is 10 or 12; that nothing can be done till then; that the child will grow out of the squint," is wholly bad. It is true children do grow out of squint, but always with a blind eye. Could parents' prevision see the sequence of procrastination there would be little danger of such counsel being accepted. In its consequence, neglect is but a step removed from destruction of the eye as a visual organ. Central vision in a neglected case of squint is seldom better than one-tenth of normal and the ability to read utterly lost. When these facts are familiar to the public, there will be no more likelihood of a child with beginning strabismus being neglected than if he had appendicitis or gall-bladder disease. Yet, as you know, it is but a short time since the public was educated to take care of the latter. The change was wrought by frequent discussion.

The younger the child the more rapid is the decrease in vision. A delay of months in a 4 or 5 year old child may not be fatal to vision, while a like delay in a child a month or two old would spell irretrievable disaster. In very young infants the deterioration of the macula is very rapid. The rule, therefore, should invariably be to institute treatment within a week of the manifestation of the squint.

The first step in the treatment is to correct, under atropine, the error in both eyes within from a quarter to three-quarters of a diopter of the full correction. The less the error the nearer should the prescription call for the full correction. This should be constantly worn. Children are never too young to wear glasses when glasses are indicated. The proper correction of the refractive error in a surprisingly large number of cases of both convergent and divergent squint will be all that is necessary to effect a permanent, complete cure. When this fails we have recourse to the other agents. These in order of importance are: Atropine to be instilled in the fixing eye; occlusion of the fixing eye; training the fusion sense and operation. The objects of treatment are to arrest the diminution of and bring back the vision to the squinting eye and restore the visual axes to normal. In cases where the above remedies fail, operation is indicated, and the one giving the best results is advancement with or without tenotomy of the opposing muscle.

With care, an abundance of patience, and some skill the vision of the eyes of these little squinters can be, if promptly treated, saved with lasting benefit to the patient and some credit to the profession.

WHAT THE STATE CAN DO TO PREVENT BLINDNESS.

WILLIS O. NANCE, M. D., *Ophthalmic Surgeon, Illinois Eye and Ear Infirmary, Chicago.*

(*Journal of Ophthalmology and Oto-Laryngology, February, 1914.*)

Every oculist and most general medical practitioners know that 40 per cent of the blindness of the world is preventable; in other words, that of every 10 persons who are sightless, 4 of them need not have been so. The question that presents itself in this connection is, has the medical profession been awake to the extreme importance of the subject to the extent that it should have been and has the public been sufficiently impressed with the gravity of the situation and properly informed as to the possibilities of what cooperation might accomplish toward materially improving these figures?

We all know that at least 10 per cent of all blindness is due to ophthalmia neonatorum, and that 25 per cent of all preventable blindness is attributed to this disease. There is no use arguing as to the efficacy of the Crede method of prophylaxis. Everyone admits its value. No physician can consistently object to its use. If some physicians do not employ it because it is not convenient for them to do so, the State should make it easy for them by furnishing it gratuitously in a convenient form, as is now being done in several States.

Ophthalmia neonatorum should be made a reportable disease, as is scarlet fever, diphtheria, tuberculosis, and other contagious diseases.

We all know that if cases are seen early and intelligent and active treatment is immediately instituted and continued it is rare that an eye is lost. What an appalling thing it is for us to meet, as is not at all infrequent, with a little patient whose corneæ are ulcerated and perforated, forever blind, and to consider what could have been done by intelligent treatment but a few days or weeks sooner. Early reporting of these cases to the health authorities will prevent many such catastrophes.

Trachoma is responsible for about one-tenth of all blindness in Illinois. This percentage could undoubtedly be cut down by a better understanding as to the contagiousness of the disease and the adoption of a better hygienic regimen on the part of the people at large. Patients and parents of children suffering from trachoma must be better advised of the danger of contagion and the easy conveyance of the disease by towels, handkerchiefs, bedding, and the like. The "common" or roller towel must be banished from public places by legislative enactment, as has already been done in the city of Chicago. This ordinance, as most of you know, was passed by the city council

at the instance of your chairman. Its enforcement and the publicity given to its consideration has doubtless been the cause of preventing many cases of serious ocular infection and consequent blindness.

At least 5 per cent of blindness results from ocular injuries. The greater number of these injuries are preventable, many of them being due to carelessness and ignorance. How frequently we see children blind or partly so as a result of an injury of the eye by scissors, knife, or other similar instrument placed in their hands by thoughtless parents or friends. The air rifle, for which there is no earthly excuse for existence, annually claims a harvest of blind eyes. Even the water core golf ball has contributed its share to blindness as a result of its dissection by the inquisitive modern youth. Most of these injuries, as also others caused by supposedly harmless toys, could have been prevented had the guardians of these victims appreciated the dangers of such devices. A campaign of education is needed in this direction.

Industrial accidents are not occurring with the same degree of frequency as they did in years gone by. Manufacturing and railroad corporations in Illinois are keeping an even pace or better, I believe, with those of other States in the protection of their employees against eye injuries. In many of the shops and factories, however, and let it be said, frequently against positive orders to the contrary, the custom of removing foreign bodies from the eye by fellow workmen is still persisted in. Every eye surgeon knows the positive iniquity of such procedure and has seen dire results following the custom. Shop foremen and workmen must be better advised as to the dangers of such practice, and those in authority must see to it that the custom is abolished.

Wood-alcohol blindness has become of sufficiently frequent occurrence to demand better regulation of the use of the drug in industrial pursuits and in its sale to the public. Both employers of labor and the public generally must be warned of the poisonous nature of this preparation and of its influence in the production of blindness. There is opportunity in Illinois for legislative enactment restricting its use commercially and requiring proper and comprehensive labeling.

There is opportunity for improvement in the school system of our State in so far as it relates to the illumination of schoolrooms, the size and position of desks and seats, the size and character of the print of books, the kind of paper used, etc. When it becomes generally known by school authorities and the public that the beginning of much serious eye trouble, sometimes leading to blindness, has its inception in the schoolroom, more attention will be paid to ocular hygiene as it particularly relates to this aspect of the subject.

PREVENTABLE BLINDNESS—A CHALLENGE TO THE PROFESSIONS.

HENRY COPLEY GREENE, B. A., *Field Agent for the Conservation of Eyesight, Massachusetts Commission for the Blind, Boston.*

(*Journal of the American Medical Association, Sept. 27, 1913.*)

CONCLUSIONS.

The problem of unnecessary blindness, which has so largely baffled and sometimes even disgraced the professions of medicine, business, statecraft, and social service, demands for its solution the following measures:

1. A campaign of medical and lay research and education, Government action, medical treatment and social work carried on, wherever possible, to limit and to remedy ocular disease, especially the more prevalent and damaging diseases and defects.

2. In the work of public education, special stress to be laid on the importance not only of ophthalmia neonatorum and trachoma as causes of blindness, but also of glaucoma, syphilis, and ocular injuries.

3. Medical schools to emphasize the interrelation of ocular and general disease, to teach their students the importance of consultation with ophthalmologists, and a high sense not only of human service but also of the physician's duty to uphold the health laws, both National and State.

Hospitals and clinics urged to provide ophthalmologists with every possible facility for the diagnosis and treatment of obscure cases, including the help of pathologists, syphilologists, brain specialists, Roentgen-ray specialists, and others.

4. The prevalence of blindness studied in each State in relation to its more prevalent causes, on a basis of reports of cases of blindness to State commissions or other central agencies.

5. To promote such intelligent study of the prevalence and results of eye diseases, a committee of the American Medical Association to request hospitals and ophthalmologists to include in all their eye records the following data: Age; sex; single, married, widowed, or divorced; birthplace; birthplace of parents; occupation or school grade; in possibly syphilitic cases, the number of children still-born, dead, or living, and in traumatic or possibly traumatic cases, the tool or machine used, and the manner of injury.

6. To facilitate the comparison of results, the following standards of vision officially adopted: For blindness, the German standard, vision fingers 1 foot or less; practical blindness, vision less than 20–200 with glasses; partial disablement, vision 20–200 to 20–50, inclusive, with glasses.

7. Making it the duty of the State boards of health or of special private agents to study the needs of all localities; and in cooperation

with medical schools and hospitals, to bring to the notice of young ophthalmologists opportunities for work in places especially requiring their services.

In remote districts, where peculiar conditions require it, such clinical expeditions as those of Dr. Stucky in the Kentucky mountains.

In large cities, self-supporting evening clinics, with paid ophthalmologists in attendance, organized to compete with charlatans and inefficient practitioners and to provide self-respecting patients on low wages with facilities for expert treatment otherwise hard to secure.

In clinics and hospitals, the specialist's work made more efficient by insisting on proper treatment of diseases underlying local eye symptoms and by keeping patients under treatment long enough to get results.

8. Paid social workers made part of the regular staff of all eye clinics, so as to increase their efficiency in the prevention of blindness from glaucoma, uveitis, etc., and to economize the work of the physicians in charge as fast as the necessary funds can be secured.

9. In schools, the pupils' eyes regularly examined, preferably by trained physicians; records kept showing the effect of the school curriculum on eyesight, and parents induced or compelled to furnish necessary eyeglasses or treatment for the eyes. If necessary, the State "neglect law" amended to make this possible. In the management of institutions, State and local authorities to set a standard of work for the preservation of eyesight.

Especially in reform schools and prisons in which the inmates are shut away from the usual medical facilities, ophthalmologists regularly in attendance; and close cooperation secured between ophthalmologists, general physicians, and the probation officers having oversight over discharged prisoners. All male gonorrheal and all syphilitic patients detained until cured.

10. Classes especially adapted for children with defective eyesight organized in all large cities, not only to provide education for children not properly inmates of institutions for the blind, but also to aid in the preservation of their sight.

School children with the vision of both eyes defective, or with one eye practically blind, guided toward occupation relatively free from ocular injuries.

11. State birth registration laws amended to secure birth notification within 3 days, and preferably within 48 hours; and warnings as to the danger of ophthalmia neonatorum sent to all mothers immediately on receipt of birth notices.

Obstetric clinics promoted to furnish adequate nursing and medical service to the poor in large cities. Midwives trained, registered, and supervised in cities in which their services are necessary.

A suitable prophylactic distributed free to all physicians and to midwives. The use of this prophylactic required at all births in lying-in hospitals or in the practice of midwives, and at least recommended strongly to physicians.

The symptoms of ophthalmia neonatorum defined by the American Medical Association as redness and swelling of the eyelids and unnatural discharge from the eyes, within 30 days of birth, and made reportable by physicians as well as nurses and parents.

Physicians, as well as midwives, prosecuted whenever necessary to secure observance of the reporting law; and physicians admonished by their State societies for failure to obey the law or to secure adequate treatment and nursing for serious cases.

Local boards of health given ample powers over reported cases, subject to the supervision and control of the State boards in requiring adequate standards of treatment Minimum requirements defined by the American Medical Association, as the attendance of an ophthalmologist, or of a physician experienced in the treatment of ophthalmia neonatorum, assisted in all but the lightest cases by at least one trained nurse.

12. Trachoma made reportable in all States in which it is prevalent, proper treatment insured under public supervision, and in case children are affected, special schooling provided.

13. Workers for conservation of vision to join with associations for sex education, etc., (*a*) in setting adequate standards of treatment for syphilis, congenital and acquired; (*b*) in raising the physical standards of marriage; and (*c*) in urging the Federal Government to extend syphilitic patients the system of exclusion at the port of embarkation, now applied to emigrants with trachoma.

14. Legislation against holiday injuries, etc., and popular education as to the dangers of nonindustrial injuries of the eye.

Cooperation with both employers and employees in the elimination of industrial injuries.

Teamwork with the American association for labor legislation to secure the enactment or amendment of factory inspection and workmen's compensation laws, so as to provide for study of industrial conditions affecting eyesight, protection from injury and disease, and special compensation not merely for "total and irrecoverable blindness" of either or both eyes, but also for practical blindness, defined as reduction of vision to one-tenth of normal with glasses.

15. A joint committee of the American Medical Association and the existing State organizations for the prevention of blindness and the conservation of eyesight to provide for interchange of information through periodic reports from each State, published in ophthalmologic journals and the Outlook for the Blind, and as soon as any vital demand is manifest, to promote a federation of all State committees and commissions actively at work for the preservation of eyesight.

THE ERUPTION AND DECAY OF THE PERMANENT TEETH.[1]

ROBERT BENNETT BEAN, Tulane University.

(*The Anatomical Record, May, 1914.*)

Data as to 2,221 school children, viz: 776 Filipinos—630 male (5 to 30 years), 146 female (5 to 30 years); 628 German—322 male, 306 female; 817 American—407 male (5 to 18 years), 410 female (5 to 18 years); total, 2,221.

ERUPTION OF THE TEETH.

The Filipinos are from one to four years earlier than the Germans and Americans in the eruption of the permanent teeth, and the Americans are slightly earlier than the Germans.

The females are more precocious than the males in the three groups, but this difference is very slight among the Filipinos, and a little less among the Germans than among the Americans.

The Filipinos are more homogeneous sexually (there is less difference between the sexes) than the Americans, who are more heterogeneous than the Germans.

The lower teeth erupt before the upper, except that the upper premolars erupt before the lower. The permanent teeth erupt at three periods, about the ages of 7, 10, and 18 years, in connection with the eruption of the three sets of molars, and the first two periods alternate with periods of rapid growth in stature.

The teeth erupt in the following order:

1. Lower first molars.
2. Lower median incisors.
3. Upper first molars.
4. Upper median incisors.
5. Lower lateral incisors.
6. Upper lateral incisors.
7. Upper median premolars.
8. Lower canines.
9. Lower median premolars.
10. Upper lateral premolars.
11. Upper canines.
12. Lower lateral premolars.
13. Lower second molars.
14. Upper second molars.
15. Lower third molars.
16. Upper third molars.

This order is followed by the Germans and Americans and also by the Filipinos except that among the Filipinos the canines erupt earlier than the premolars and upper lateral incisors, and the canines erupt from two to four years earlier in the Filipinos than in the Germans and Americans.

THE LAW OF ALTERNATION IN DEVELOPMENT.

A law of alternation in development has been deduced, based upon the alternation of periods of acceleration and retardation in the growth of the long bones (stature), upon the periods of acceleration and retardation in the development of the permanent teeth, as well

[1] Since this bulletin went to press, this article has appeared in extended form in The Pedagogical Seminary, December, 1914.

as from a general knowledge of development, especially from the researches of Donaldson, Jackson, and others. This law may be formulated somewhat as follows:

There are one or more periods of acceleration alternating with periods of retardation in the development of the structures of the body. The periods of acceleration in the development of one structure are synchronous with the periods of retardation in the development of another.

The law is not only applicable to normal development, but also seems to apply to abnormal development through a process of compensation. If one structure is unusually precocious in the periods of acceleration in development, its complementary structure will be backward in the period of acceleration, and vice versa. Thus the upper canines are precocious in the Filipino boys, and the upper later incisors are backward; and the upper lateral incisors are precocious in the Filipino girls, and the upper canines are backward. Other examples could be cited, but these suffice to illustrate the law.

DECAY OF THE TEETH.

The temporary teeth of the Americans are worse than those of the Filipinos which are worse than those of the Germans. The permanent teeth of the Americans are worse than those of the Germans which are worse than those of the Filipinos. The girls have worse teeth than the boys in all the groups.

MORPHOLOGIC FORM AND TEETH.

Those individuals with long faces, heads, and noses, and large occipital circumferences of the head have worse teeth than those individuals with broad heads, faces, and noses, and large parietal circumferences of the head; and the teeth of the former develop earlier than the teeth of the latter.

The relative number of the former is greatest among the Americans, least among the Filipinos, and nearly as great among the Germans as among the Americans. The former increases with age, and the latter decreases.

THE CAUSES OF DENTAL CARIES.[1]

EDGAR D. COOLIDGE, D. D. S., Chicago, Ill.

(*Dental Cosmos, February, 1914.*)

In a general way dental caries may be considered as having—first, an exciting cause, and, second, a predisposing cause.

Exciting cause.—The exciting cause is twofold: Acid-forming bacteria, active and fermentable carbohydrates, passive. The mouth

[1] General title of article: "The Etiology and Progress of Dental Caries."

always contains the first, and the environment is such as to produce growth in almost all cases where the second element is present, providing these bacteria be undisturbed. With the growth of these bacteria, there is a product of metabolism formed which causes the destruction of the tooth substance by a solution of the calcium salts of the enamel. The diastatic enzyme—ptyalin—and the product of metabolism of bacteria in the presence of carbohydrates have the power of converting carbohydrates into lactic acid. Lactic acid is considered as the force which attacks the enamel, producing the beginning of decay. ("American System of Dentistry," vol. 1, p. 805.)

Before considering the predisposing cause, let us recall the definition of that term. According to Gould, it is—

> that condition of the body in which causes that leave other persons unaffected call forth an attack of disease in individuals predisposed. The term at the present time refers especially to susceptibility to infectious diseases, and implies a peculiar condition of the bodily juices or cells, in which these are unable to repel the invasion of pathogenic microorganisms.

Predisposing cause.—There may be local and general predisposing causes. Local predisposing causes may be considered as those conditions of the surfaces of the teeth which lessen their resistance to the attack of the active force and the environment of the teeth, which may be favorable to the action of bacteria upon carbohydrates to form lactic acid.

General predisposing causes are those influences of heredity and of bodily condition which lower the resistance of the teeth to attacks of bacterial action. Some hereditary influences may have their expression locally, as the inherited tendency to defective formation, irregularities of alignment, etc. The age and bodily condition with regard to systemic disorders influence the local environment of the teeth.

The study of the cause of caries involves two lines of investigation, one dealing with the active force that is ever present and the other with the power or ability peculiar to the tooth and its environment to resist the attack of this force. Both these fields appear of equal importance in regard to the cause of caries and to the control of the disease. Whether the problem be solved by controlling the bacterial action, hastening the reduction of carbohydrates, or by increasing the resisting power of the teeth and their environment, matters little; the control of this condition is the goal sought for.

[Then follow discussions of the influence upon the progress of caries attributed to (1) uneven surfaces and composition of the enamel, (2) gelatinoid plaques or films as protected spots for the growth of germs, (3) the quality and quantity of saliva, (4) soft, carbohydrate food as lessening mastication and the flow and alkalinity of saliva.]

Summary.—(1) The active cause of caries is the presence of fermentable carbohydrates and acid-forming microorganisms.

(2) The predisposing cause is a lowered resistance due to conditions brought about by changes of habits which have affected the development of the teeth and the condition of their environment, together with habits which do not aid, and often hinder, the process by which nature attempts to preserve or protect its creation.

(3) Plaques are an important factor in the localization of caries, but there is still some difference of opinion as to their importance as causative factors, as well as to their structure and formation.

(4) The condition of the saliva, which is controllable in regard to the presence or absence of certain elements which, if present in proper proportions, might have a protecting influence upon the surface of the teeth or a resistance to the action of bacteria, is an important factor.

ORAL SEPSIS.

R. H. HALSEY, M. D., *Adjunct Professor of Medicine, New York Post-Graduate Medical School and Hospital.*

(*The Post-Graduate, May, 1914.*)

We are not discussing a disease distinctive in itself, but the location of the incubator and the portal of entry for bacteria and toxins which have produced a constitutional result by the destruction of blood cells and paralysis of the nutrition of the body cells. The incubator is a decaying tooth or teeth, or a tooth socket, in which the growth of bacteria and the production of toxins goes on uninterrupted. The size of the area may vary from a small cavity in which a filling may have been inserted to a dead root over which a cap has been applied, or to a more extensive combination of fillings and "bridge work." In other cases, the tooth in itself may be sound, but the location of the pus is in the tooth socket, from which the purulent discharge escapes along the side of the tooth or through a small sinus which has burrowed its way from the tooth socket through the bony alveolar process and the mucous membrane to the mouth cavity, or the pus may be contained in a circumscribed, slowly enlarging abscess in the bone substance. These destructive processes in or about the tooth may go on so insidiously as to accomplish extensive destruction even of bony tissue, before the attention of their owner is directed to the condition. This fact should be emphasized, for many apparently perfect caps or fillings, when removed, are found to conceal very foul conditions without there having been any preceding toothache or tenderness to attract attention to the process. It is readily understood, and it is a fact, that the situation of the pus focus in some cases may be evident on inspection of the mouth, or its discovery may require the removal of fillings or the carefully taken radiogram to demonstrate the concealed pus focus.

From the various suppurating points the bacteria or the toxins readily gain access to the general circulation directly through the lymph or blood channels. The purulent discharge from the cavities bathes the mucous membrane of the mouth, and the tonsils offer another portal of entry. From the mouth the pus is carried to the lungs or the stomach and intestines and may act directly upon the mucous membrane to impair its functions of absorption, secretion, or motility, or after absorption from these surfaces it may impair the action of the liver or pancreas in producing their proper secretions. Such changes in the processes of digestion permit putrefaction and fermentative changes to occur in the intestinal contents. These changes permit the formation from the food of more or less poisonous products, which add their effects to those of the pus to impair the general nutrition.

SCHOOL DENTAL CLINICS.

(Editorial in Boston Medical and Surgical Journal, Mar. 5, 1914.)

The recently published proceedings of the meeting of the International Dental Federation at The Hague, in 1913, show that there are in Germany over 200 school dental clinics; in Sweden, 40; in Norway, 10. Dr. Jassen, of Strassburg, chairman of the congress, announced the following outline of rules of dental care and conservative early treatment:

From the age of 2½ years it is desirable that children's teeth be inspected every six months in order to treat the deciduous teeth before they ache, and to allow the children to enter the public schools with healthy mouths. It is desirable that every child from this age have his own toothbrush and be practised in its use. The mouths of children who come at an older age to the school clinics should be treated as much as possible in a conservative way. Decayed teeth which can not be filled must be extracted. Dry roots of deciduous teeth must be left in the mouth till the permanent teeth appear. This will preserve the shape of the jaw. Decayed crowns with dry roots should be cut off and the roots filed smooth. The 6-year molars are to be saved if possible until the age of 12 and must be extracted only when they can not longer be saved or when there is not sufficient room in the mouth. Each child is to be treated individually, with methods suited to his age, constitution, and character.

THE CHILD'S HEALTH AND BEAUTY AS INFLUENCED BY THE TEETH.

HENRY C. FERRIS, D. D. S., *Chairman of Committee on Scientific Research of National Dental Association.*

(The Woman's Medical Journal, July, 1913.)

When the full set of baby teeth has erupted, if the child has had no obstruction in the nose and has not breathed through the mouth, the teeth will come together in their normal relation, provided the child is compelled to use the muscles of mastication. If they are fed on hard substances, dried crusts, instead of milk toast and predigested

foods, there will be a normal development of these bones, which results from increased circulation of blood by exercise of the part. You can not develop the muscles of mastication through this exercise without developing the bone; otherwise the muscle would become so strong that it would tear the bones of the face to pieces.

As the permanent teeth erupt back of the baby teeth, you will see the necessity of preserving every one of the baby teeth in its normal position. If they should decay, they must be filled. If they are lost, something must be substituted to maintain the continuity of the arch. (This may be a metal bar.)

Orthodontic operations are showing wonderful results by returning the parts to their normal position, but it is seldom that the earmarks of this lack of development are eradicated, even after the orthodontist's best efforts have been expended, unless these conditions have been detected in the baby set.

There is still a more important fact, and that is the upper jaw articulates or comes in contact with 13 bones of the cranium, and the under jaw in contact with 2 bones of the cranium; therefore, any mechanical interference with the development of the maxillary bones influences the shape of these structures, which form the brain case.

In order to prove this assertion Dr. Lawrence Baker, assistant professor of orthodontia of the Harvard Dental School, carried out an experiment with two rabbits of the same age. From one he extracted all the teeth on one side of the lower jaw. For a period of a few months the two rabbits lived together on the same food. They were then killed.

The normal or control rabbit's skull developed uniformly. The operated rabbit, being minus the functioning forces of mastication and the stimulus of muscle pull, had all the bones of the cranium on the defected side undeveloped; and there was a curvature of the central line in all the bones on the unaffected side. The ribs and breastbone of the animal also showed marked lack of development. The importance of this observation needs no explanation; it speaks for itself.

Delaying the treatment of these conditions of the teeth will have a lasting influence upon the development of the brain box. We can reasonably conclude that the brain of an individual type, from any species, should normally develop to a given size. If this growth is retarded by lack of development and function of the teeth, the brain box must be more or less influenced in the development. Being in possession of these facts, we are neglecting our children if we do not study their early growth.

Do not forget the message that I bring you: A perfect head and face for the type of your child can be developed through the exercise of the organ of mastication, and your child can chew himself into healthy development.

COMBINED DENTAL AND NASAL TREATMENT TO RESTORE NORMAL NASAL RESPIRATION.

JOHN A. THOMPSON, M. D., Cincinnati.

(*Ohio State Medical Journal, February, 1914.*)

The maxillary suture is present until middle life, when the union of the upper jaw becomes bony. Before bony union occurs this suture can be separated by a very simple appliance. A metal bar is attached to the lingual surface of the teeth on each side from the cuspid back to a molar. A tube is fastened to one of these bars and to the other a threaded bar with a nut adjusted to it. By turning the nut pressure is brought against the inner surface of the teeth. Dr. German, with whom I have worked, puts on two cross bars and nuts so we can regulate the amount of expansion better and get the widening either forward or back in the mouth as needed. The nuts are turned twice daily until firm pressure is felt but no pain experienced. In a period varying from four days to two weeks the jaws separate. The central incisor teeth previously overlapping in many cases will be found separated. As no pressure is applied near the incisors, they must be carried out by the separation of the bone in which their roots are embedded. Intranasal measurements show there is a distinct widening of the nares. While the increase in space horizontally may be only three-sixteenths of an inch the patient notes immediately the greater freedom of respiration. Two conditions explain the marked relief with so little widening of the nares. The first is the tendency of the septum to straighten. The opening between the maxillæ at the base of the septum relieves the pressure on it, and its elasticity causes an approach to the normal straight position. Dr. Black believes that, with the outward motion of the alveoli, there is a lowering of the palatal arch, with increased room for the septum. Dr. Brown does not agree with him. This force, the elasticity of the septum, which so often caused unsatisfactory results in the Asch and other septal operations, becomes an aid and not a hindrance after separation of the maxillæ. The passage of an increased amount of air relieves what Black calls the "static congestion" of the membrane. The turbinate bodies become smaller and this gives additional breathing room. In some cases removal of a spur is required, and in a few patients a submucous resection may be needed, but the amount of operative intervention required in the nose is very much lessened by the preliminary separation of the jaws. It may be remarked in passing that the amount of dental work necessary to correct malpositions of the teeth is also lessened. In children this is an important matter, because I have seen the health of a child seriously injured by the pain and by the sepsis of the mouth inseparable from ordinary orthodontic measures.

We, as rhinologists, are familiar with the wonderful improvements in health that follows the removal of tonsils and adenoids. Part of the improvement is due to restored nasal respiration and part to freeing the child from chronic septic absorption from the diseased organs. The same improvement, although in lesser degree, follows establishment of nasal respiration by widening the nose.

After a sufficient amount of space has been obtained the expansion apparatus can be removed and a simple retention plate of hard rubber used to prevent contraction. The space between the separated jaws fills with new tissue in three months. Whether this new growth is connective tissue cartilage or bone has not been determined.. My own belief is that the base of the septum drops into the space and aids in closing it. A good X-ray plate might aid in answering this question, but it is hard to get one without the shadow of the septum covering the part we wish to study.

With a method that has proven its worth, the question arises at what age should it be used. We rarely find this deformity before the seventh year. It is not often marked before the tenth year. At any age between 10 and 35 the work can be done. The earlier it is undertaken the easier it will be for patient, dentist, and doctor. If done early enough, we escape the chest deformities that result from obstruction of the upper respiratory tract and lower the vital capacity of the individual all his life.

It is claimed by dentists (Bogue and Davenport) that early examination of the deciduous teeth will show whether or not a normal eruption of the permanent teeth will occur. In normal growth of the jaws and nose there should be a separation of the temporary incisors when the child is 6 years old. If it is not present, the growth of the arch has been arrested and the child will have a narrow nose and irregular front teeth, because the permanent ones are much larger than the milk teeth and need a larger arch. Dr. Brown claims in a majority of cases the deciduous teeth are firm enough to permit of jaw separation and the prevention of future trouble in both nose and mouth.

The human voice is a compound tone with a fundamental note produced in the larynx and overtones produced in the pharynx, mouth, nose, and accessory sinuses. The normal development of the mouth and nose is essential to easy voice production and health of the larynx. When we secure normal nasal respiration through maxillary separation, we prevent many inflammatory complications in the lower respiratory tract.

HYPERTROPHIED TONSILS AND ADENOID VEGETATIONS IN PUBLIC-SCHOOL CHILDREN IN NEW YORK CITY.

S. JOSEPHINE BAKER, M. D., *Director of Bureau of Child Hygiene, Department of Health, New York City.*

(*Laryngoscope, February, 1914.*)

The department of health of New York City, through its school medical inspectors, supervises the health of 825,000 school children of this city. Since 1905 the system of school medical inspection has included the physical examination of each child on its entrance to school and on an average of every three years thereafter. School inspectors are all appointed from lists furnished by the civil service commission, and are all physicians licensed to practice in the State of New York. The majority are graduates of the New York City colleges.

During the early part of this work it was reported by those inspectors that approximately 30 per cent of the children in the schools were suffering from hypertrophied tonsils, with or without a form of obstruction to the nasal breathing which implied the presence of adenoid growth. It was the desire of the department to fix a standard, as far as possible, for the class of cases where operation would be advisable, and to this end a letter was sent to a number of eminent specialists in nose and throat diseases in this city, asking them what, in their opinion, were the exact indications for the operative treatment of enlarged tonsils. It was a significant fact that no two of these specialists agreed as to the exact details; most of them dwelt upon many features of this condition which, from the standpoint of the medical inspector, were not practical. The opinions expressed by them revolved about the following points: Size of the tonsil, adhesion to the pillars of the fauces, smoothness of the surface, or the presence of large and irregular crypts, the embedded tonsil, the pathological tonsil, the tonsil which was subject to frequent attacks of acute inflammation, the susceptibility of children because of this enlargement to infectious diseases, and the question as to whether the tonsil was hypertrophic or hyperplastic. There was no unanimity of opinion, nor was any statement made that was practical to apply to the work of medical inspection of school children. In fact, it could readily be gathered from the statements made by them that if a set of 100 children with enlargement of the tonsils was submitted to these seven specialists no agreement could be reached between them as to the indications for operation in these cases.

Realizing, then, the marked difference in opinion that must be considered even in the diagnosis of these cases, the Bureau of Child Hygiene established a standard as follows: That no case was to be considered as true hypertrophy of the tonsils unless the hypertrophy was such as to interfere with the nutrition of the child or to cause

secondary disturbances, interfering with its health and, incidentally, with its school progress. In other words, no tonsil was to be considered hypertrophic unless the medical inspector, considering it as his personal case, believed that its presence was a distinct detriment to the health of the child, and that, therefore, the tonsil should be removed. At no time has the medical inspector been allowed to indicate the character of treatment that should be considered advisable. The department of health has always taken the attitude in regard to the inspection of school children that its duties consist in ascertaining defects which interfere with the health of the children, calling the attention of the parents to the fact that the children are so affected, and making all possible efforts to see that the children in question are placed under competent medical care. The department does not feel that it should dictate the character of treatment to be obtained by the child, but holds that this is a matter which should be left to the attending physician. It also believes that its functions and efforts should not extend beyond seeing that the parents are made to realize their responsibility in regard to the welfare of their children and that the latter are placed under medical care. For this reason a certificate from a physician or surgeon, stating that a child is under his care, has always been accepted by the department as evidence of treatment, although the department realizes from extensive experience the futility of so-called "medical treatment" in the cure of either enlarged tonsils or adenoids.

In 1912, out of 287,469 children examined, 30,021 (or 10.4 per cent) were found to have hypertrophied tonsils. Of this latter number, 14,137 (or only 47.1 per cent) obtained treatment. The character of this treatment, according to the certificates of the physicians and surgeons who administered it, was as follows: Operations, 6,239, or 20.8 per cent; medical treatment, 7,898, or 26.3 per cent.

No attempt is made by the medical inspector to diagnose adenoids. It is not possible, in the ordinary school building, to provide facilities for a proper examination of the naso-pharyngeal vault, and therefore, for many years, the department has not used the term "adenoids" in its report of the physical condition of school children, but each child has been tested to determine whether or not its nasal breathing was occluded. In each such case a diagnosis of defective nasal breathing has been made, and it has been left for the family physician to decide whether or not this occlusion was due to adenoids, deflected septum, hypertrophied turbinate, nasal polypi, or other cause, and to provide appropriate treatment.

In the children's clinics maintained by the department of health all children are received the afternoon before the day of operation. They are kept there that night, regularly prepared for operation, and the following morning the adenoids or tonsils are removed under gas

and ether anesthesia. The child is then kept in bed during that day, remains in bed the following night, and is finally discharged 36 or 48 hours after entrance. Nearly 4,000 such operations have been performed since the dispensaries were opened, with one fatality.

From our experience with these children we believe that these operations should never be performed except under anesthesia, and that in each case the child should remain in the hospital for 24 hours after the operation has been performed.

FIVE HUNDRED EXAMINATIONS OF THE NOSE AND THROAT IN AN INSTITUTION FOR DELINQUENT BOYS.

MAX TOEPLITZ, M. D., New York.

(*Medical Record, Mar. 14, 1914.*)

The Hawthorne School, the first reformatory for Jewish boys, received the first boy on April 25, 1907, and at the end of 1912 had under its supervision 316 boys from 8 to 16 years of age.

After their commitment to the Hawthorne School by the judge of the juvenile court, the boys are examined with special reference to eye, ear, nose, and throat, as well as to their general condition, and are also vaccinated. In addition to this preliminary examination the boys, according to the rule of the board of estimate and apportionment, are examined twice a year. The special care of the ear, nose, and throat has been intrusted to me. Here I have paid particular attention to the most prevalent affections—adenoids and hypertrophied tonsils.

In summing up all 500 examinations, 351 cases were diseased, of which 106, or 21⅛ per cent, had enlarged tonsils; 89, or 17⅞ per cent, adenoids; and 116, or 23⅛ per cent, were combined cases; of these, 292, or 58⅞ per cent, required operation, 23 refused it, and 74 were operated upon; 149, nearly 30 per cent, were normal. There were different degrees in size and disease of adenoids; different forms, diffuse and lumpy; different consistencies, soft and hard. The faucial tonsils also showed differences in size and consistency.

Girard College, of Philadelphia, is the only other institution in the United States besides the Hawthorne School at which throat operations have been performed on a large scale. Among 1,500 boys of from 7 to 17 years of age, tonsil and adenoid operations were advised in 152 cases, hypertrophy of tonsils was under observation in 124 cases; operations for deformities of septum advised in 25 cases; catarrhal and inflammatory conditions were recommended for treatment in 89 cases; 125 operations for the removal of tonsils were performed under general anesthesia by Dr. Joseph S. Gibb.

Examinations of the nose and throat in any institution are useless unless they are systematically followed by the necessary operation,

and I claim that the removal of all faulty conditions of the nose and throat will place any institution on a more wholesome, nay, even on a well protected sanitary base. As a matter of fact, the most striking feature of the condition of the Hawthorne School at the end of 1912 was the remarkable improvement of its entire sanitary state, which was the direct result of the large number of operations in 1911. This proves not only the importance of this treatment for the Hawthorne School, but also the advisability of making it a part of the program of every juvenile reformatory.

A REVIEW AND THE PRESENT STATUS OF THE TONSIL OPERATION.

SHERMAN E. WRIGHT, M. D., Portland, Oreg.

(*Northwest Medicine*, November, 1913.)

We have spoken of the beginning of tonsil surgery when the finger was used, we have noted the progress and changes through the hundred years when the tonsillotome was the popular instrument, and we were satisfied with excising the protruding portion of the hypertrophied tonsil down through the past decade when the pendulum swung to the extreme, and we attempted to do tonsillectomies on every man, woman, and child who happened to come our way. Now there is a reaction, the pendulum is swinging in the opposite direction, and there is a feeling among many of our best men that too many tonsils are being removed.

The tonsil becomes pathologic only when its presence injures the individual, either locally or generally, not because someone discovers a pair of tonsils in that throat. By the age of 12 to 14 years the tonsil has completely disappeared or shows as a hypertrophied or cicatricial mass between the pillars. Any tonsil which is visible to any marked degree later than this may be considered as a morbid growth due to disease and should be removed.

Until very recently tonsils were judged by their size only, although we know full well that the submerged tonsil, which may be quite small, is more liable to be doing harm than the large, discrete tonsil. When examining a throat, it does not suffice to glance at the tonsils. The anterior pillars must be pushed back and the tonsil lifted from its bed, and in many cases the tonsil must be palpated.

I wish most emphatically to go on record regarding one phase of the tonsil. Children who do not present symptoms of obstructed breathing and who have not had any tonsillar disease should be left alone. Every tonsil that comes to us is not grist for our mill. Remember that it is not a question of large or small tonsils, but a question of their condition.

It is immaterial whether you use one instrument or ten in the removal of a tonsil. The point of main interest is that the operation

shall result in a complete removal of all the tonsillar tissue with the least amount of traumatism to the pillars.

A perfect anesthesia is not only essential to good tonsil surgery, but I believe we may go even further and say that perfect throat surgery is impossible without perfect anesthesia. Therefore, great care should be exercised in choosing the anesthetist for cases of throat surgery.

WHAT RELATION, IF ANY, HAVE THE FAUCIAL TONSILS TO PULMONARY TUBERCULOSIS?

E. FLETCHER INGALS, M. D., Chicago.

(*Journal of the American Medical Association, July 12, 1913.*)

I have in my files of histories of private patients over 25,000 carefully kept records, more than 10 per cent of which are of tuberculosis. In these cases careful examinations were made of the nose and throat, as well as of the chest, and the histories were carefully taken, for heredity, previous diseases, enlarged lymph nodes, general condition at the time of the examination, and indeed everything that might have any bearing on the origin or course of the disease. Dr. W. S. Bracken, one of my associates, employing all his spare time for several months and assisted by some of the other physicians in my office, has gone over these records carefully and analyzed the findings with a view to discover, if possible, a relation between the tonsils and laryngeal or pulmonary tuberculosis.

He took at random 100 cases (with no selection except to assure himself that the blanks had been thoroughly filled out), thus giving a fair average of the whole. From the records of nontuberculosis patients who consulted me for various diseases having no relation to tuberculosis, such as functional and organic diseases of the heart, asthma, simple bronchitis, pleurodynia, emphysema, pharyngitis, rhinitis, and laryngitis, he took at random 100 other records for control, thus making a fair analysis of my case records of about 25,000 different private patients. These records are far and away more complete and accurate than those of hospital patients. His analysis shows that 26 per cent of the tuberculosis patients had some macroscopic change in the tonsils varying from slight enlargement to marked hypertrophy, ulceration, or other evidence of disease. In only 4 per cent was there any record of cervical adenitis, and in only one of these was there any change in the tonsils, which were noted in that case to be slightly enlarged.

Among the control cases, 46 per cent of the patients had enlargement or other evidence of disease of the tonsils, nearly twice as many as in tuberculosis cases; and not one of them had cervical

adenitis. So far as these records go they show that affections of the tonsils are much more frequent among nontuberculosis than among tuberculosis patients; but that cervical adenitis, while comparatively infrequent (4 per cent only) in tuberculosis patients, is much less common in nontuberculosis patients. It is a matter of surprise to me to find that in only one of the cases of cervical adenitis was there even the slightest evidence of disease of the tonsils. Ten or fifteen years ago it was quite commonly believed that disease of the tonsils was a frequent cause of pulmonary tuberculosis; but subsequent research appears to have proved that tubercle bacilli may enter and pass through the tonsils and cause disease of the cervical lymph nodes, while the tonsils themselves may escape all injury; and this research has also shown that there is no direct connection between the cervical lymph nodes and the pulmonary lymphatics, and, therefore, that involvement of the lungs associated with cervical adenitis must be a systemic infection rather than a result of the disease of the lymphatics.

From a thorough study of the literature and from an examination of my records I am forced to accept as correct the consensus of opinion, which now fully sustains the personal views of Jonathan Wright, who wrote me in November, 1912, saying: "To tell the truth, I do not believe there is any relation between the tonsils and pulmonary tuberculosis."

HYPERTROPHIED TONSILS INTERFERING WITH THE ACTION OF THE PALATE AND CAUSING DEFECTIVE SPEECH.

G. HUDSON-MAKUEN, M. D., Philadelphia.

(*Laryngoscope, January, 1914.*)

One of the many objections offered to the removal of the faucial tonsils is the fact that the operation is liable to be injurious to the voice and speech, but little reference has been made to the fact that both the voice and speech may be impaired by not doing the operation or by leaving the tonsils intact.

I have previously called attention to the effect upon the palate of hypertrophied and degenerated tonsillar masses, the larger ones, by reason of their bulk and consequent pressure upon the pillars, interfering with the action of the palate, and the smaller degenerated and catarrhal masses, by reason of their sepsis and by the spread of their infection, appearing to so obtund the nervous mechanism of the palate as to cause a sluggish or paretic action of its muscles.

The effect upon the speech is similar to that of insufficiency of the palate from other causes, such as a cleft palate or other forms of paralysis.

My practice is to do a complete tonsillectomy only in those cases in which there is a marked degenerative and catarrhal condition of the tonsils, with thickening of the plica and capsule generally; but in those cases in which there is mere hypertrophy of the tonsillar masses I am of the opinion that a more or less thorough removal of the tonsillar tissue only, leaving the capsule intact, although the more difficult, is the more desirable operation so far as the speech and voice are concerned, because the resultant motility of the palate is better than it is in those cases following complete extracapsular tonsillectomy, in which we are liable to have cicatricial adhesions and contractions. This, however, is a subject for discussion, and a most interesting one, because it includes the whole question of so-called tonsillotomy versus tonsillectomy.

WHY DOES THE OPERATION FOR REMOVAL OF ADENOIDS FREQUENTLY FAIL TO RELIEVE MOUTH BREATHING?

H. M. McCLANAHAN, M. D., Omaha, Nebr.

(*Archives of Pediatrics, October, 1915.*)

The lay public has been taught that mouth breathing in children means the presence of adenoids, nothing more, and that certain relief will follow an operation for their ablation. This opinion prevails largely among members of the medical profession, and until beginning this study that was the belief of the writer. For many years I had noticed that the degree of relief from mouth breathing following adenoidectomy varied greatly in different cases—in some very slight, and in others prompt and decided. The following incident attracted my attention. On the 1st of August, 1909, I operated upon a boy 8 years old for adenoids. There was slight if any relief from the mouth breathing. Because the operation failed to give relief, the mother refused to pay the bill. While the mother's contention was correct, I was satisfied that the operation was thorough, that the vault of the pharynx was free from adenoids, and that the failure was not due to any fault of mine. To satisfy myself and to determine if possible the reason for the failure, I began a study of the effect of this operation in children coming under my observation, not only cases upon whom I had operated, but all who had received the operation.

I have examined 52 children who had been operated upon for the removal of adenoids. I am not able to give in all cases the date of the operation. These children ranged in age from 6 to 12 years. I purposely excluded all cases under the age of 6 years. Twenty-eight were girls and 24 were boys. There were more girls than boys for the reason that many of the girls were operated upon for the cosmetic

effect. Including my own cases, the operation had been performed by eight physicians. Four of these are personally known to me to be competent operators, men whose practice is limited to the nose and throat. I emphasize this point because the failure to relieve mouth breathing is often attributed to the lack of skill on the part of the operator. Almost without exception I found that the mother was disposed to criticize the operator in all the cases where the result was not satisfactory.

In 24 of the cases the operation was a failure in so far as nasal inspiration was concerned. Three of these cases had been subjected to two operations and one had been operated upon three times, in each case by a different surgeon. In 20 of these 24 cases I am satisfied that the failure to relieve mouth breathing was not due to faulty technique upon the part of the operator or to recurrence of the adenoids, but to anatomic conditions in the superior maxilla. In the other four there were adenoids in the vault of the pharynx at the time of my examination, due either to recurrence or faulty technique. In these cases mouth breathing was due to obstruction in the pharynx and not to defective development. In 6 of the 24 cases there was decided hypertrophy of the tonsils, but I do not believe these caused the mouth breathing. However, I may say in passing that the history was that all of these children snored during sleep. In all of the 24 cases there was bad coaptation of the teeth, as well as distinct evidence of the maldevelopment of the superior maxilla and the other bones in intimate relation to it, namely, the vomer, palatine, and turbinal bones. The type of malformation in 20 of the 24 cases was as follows: The hard palate was deep and either circular or angular. There was retraction of the mandible, due to its being drawn downward and backward, and consequent apparent lengthening and actual narrowing of the superior maxilla, and in all of this number the upper lip appeared short and could be brought in coaptation with the lower lip only by a strong muscular effort. This is the typical so-called adenoid face, but the appearance is due to defective development of the upper jaw.

As a result of this brief study the writer is entirely convinced that it is possible to determine in advance whether or not relief from mouth breathing will result from the operation of adenoidectomy. In a number of recent cases upon whom I have operated, and cases operated upon by other physicians whom I had examined, I have been able to say in advance whether or not the operation would give relief to the mouth breathing, and this opinion has been verified by an examination of the case after the operation. I do not wish to be understood as saying that children with defective coaptation of the teeth should be deprived of an operation if adenoids are present. There are other valid reasons for their removal aside from mouth

breathing, but in this class of cases the operation should be the preliminary step in the treatment, and in justice to these children the parents should be informed as to the nature of the deformity and of the probability of relief by proper treatment from an orthodontist.

WHY IS NASAL CATARRH SO PREVALENT IN THE UNITED STATES?

WOLFF FREUDENTHAL, M. D., New York.

(*New York Medical Journal*, Jan. 3, 1914.)

It is proved that dry air, if inhaled, will become saturated in the nose and nasopharynx—that is to say, the drier the air we inhale the more moisture will be given off by the nose and nasopharynx. The work of these organs will be so much greater with every particle of air we inhale. How long the mucous membrane of these parts will be able to furnish the necessary water supply will only, therefore, be a question of time. Consequently, we will, sooner or later, reach that point where the mucous membranes of these parts will be as dry as a well in summer. This will occur, for example, in very cold weather, only temporarily in perfectly healthy persons, or permanently, as we see it in so many thousands of cases, in pathological conditions.

Thus, a dry rhinitis or rhinopharyngitis develops, and I could experimentally produce the same conditions in anyone of you under like surroundings. This state of the nasal mucosa makes it often appear as though the patient had a coryza. For example, if he goes out in winter, his nose will discharge because the mucosa is unable to absorb moisture from the atmosphere, as its surface is either dried up or covered with scabs. On the other hand, every mechanical irritation will produce running of the nose or sneezing much more easily than in normal conditions, since the great protection of the nose, the epithelium, is gone. These symptoms often lead to a wrong diagnosis, and the patient is treated for an acute cold when he has nothing but a chronic rhinitis, for which just the contrary treatment is indicated.

As most of us are exposed to this excessively dry atmosphere for the greater part of the time, it is evident that the lack of humidity is the greatest factor in producing nasal and postnasal catarrh, with all its sequelæ. To the last-mentioned class belong, among others, the granulations or vegetations in the vault of the pharynx, etc.—this only apropos.

But there are other etiological factors to be mentioned here, dust, for example, and that may include all other mechanical or chemical irritations and repeated attacks of acute coryza, due to a "cold."

Dust.—I hope you will be convinced from the foregoing remarks that dust does not play that important rôle in the etiology of catarrh

which was attributed to it by many writers 30 years ago. But just walk down our avenues on a windy day and you will be convinced that it has some very pernicious effects. The dust developed in our city from the dry sweeping of the streets, from the tearing down of buildings, from the upheaval of roads, from the automobiles, from the dumping of ashes into uncovered ash carts, etc., all these remind one of a government of the Middle Ages and not of a civilized city of the twentieth century. A period of long drought in our dust-laden town is a calamity in winter or summer. Rain and snow are blessings that not only clear our streets, but our upper air tracts as well. Dust plays some rôle in producing catarrhal conditions of the nose; added to the lack of humidity, it becomes an important etiological factor. We omit here the other ill effects dust has on the organism.

Colds.—Is there really such a thing as the catching of a cold without an infection? I am firmly convinced that there is. In spite of the fact that the word "cold" has been and still is so very much abused by physicians and laymen, I can not believe that every coryza is of an infectious or contagious nature, and I shall never give my consent to the demand that every person who sneezes should be isolated and treated like a person dangerous to the community. That is what some overzealous medical men are advocating. True, there is an infectious coryza, especially of grippal origin. If one child in a family is stricken with influenza you will isolate it, whether it sneezes or not. In such a case the coryza is only the forerunner or herald of a general infection. On the other hand, take the following imaginary example: You suddenly expose several persons who were overheated to a low temperature and a strong current of air. One person will start in to sneeze; another will have an acute otitis; a third, an irritation of the bladder; a fourth, diarrhea; and in the fifth may develop a facial paralysis. Will any sensible person conclude that these five persons were affected simultaneously by the same bacillus in such different ways? And yet that is what some men try to make us believe. Is it not more credible that an exposure to the inclemency of the weather struck every one of these five persons at his *locus minoris resistentiæ?* Can anyone convince you that a man who commences to sneeze after walking barefoot through his room caught an infection? Indeed not. These cases are as plain as they can be, but not so their treatment.

Let me insert here a little humoral pathology for your consideration. It is not always the quantity of garments worn nor the lack of them, nor is it always the strength of a draft nor the current of air that counts in the production of these colds. Of much greater importance is the condition your entire organism is in at the time of exposure. For example, while bathing, rowing, running, etc., a person is in a state of constant and laborious activity, thereby setting in play those pro-

cesses by which animal heat is generated. This causes a vasomotor reaction that will protect the organism for quite some time, and in such a state you may expose yourself much more than when little heat had been produced and that without harm.

The therapy of these affections lies in their prevention. To prevent a coryza and other "colds" means restoration of the function of the skin to its normal physiological action. The skin is the one organ above all that ought to protect us against all thermal and climatic influences, but in this age it has been, so to speak, put out of commission. Our garments are so manifold that in many instances they do not allow the air to penetrate to our skin, and the latter loses its function; consequently, a little change in temperature, a little rain or draft, will upset the equilibrium of most persons, and they will present a coryza or some other form of "cold." The fear of "catching cold" is so paramount with many persons that they consider themselves wise in wearing too many garments, as a means of protection. When winter arrives, whether it be a cold season or not, people, whether healthy or not, wear fur coats; they wear skirts and underskirts, then vests, coats, and overcoats, sweaters, and sometimes rubber coats, to be sure that they are dressed "air-tight" or "waterproof."

The same fear prevails in regard to fresh air. Many people do not dare to go out if the wind blows, or if, perchance, it rains. The children are not sent out until their fond mammas, nurses, or fraulems are convinced that no rain or snow is likely to fall; and if a child so reared is accidentally caught in a shower and takes cold, the mother reproaches herself for carelessness, not realizing that it is the whole system of former coddling that is to blame.

People speak of the hardening effect of cold baths. Very true; I recommend them myself. But we can be exposed to a cold bath or a cold douche for only a few minutes, while we might use the fresh air for hours of each day. By bringing the fresh air in contact with the body the process of hardening will be much more effective than by the use of cold baths alone.

CONCLUSIONS.

1. In order to lessen the great prevalence of catarrh, our systems of heating should be changed so as to allow much more moisture to evaporate in each living room. That is especially important in schools or meeting halls of every kind—churches, theaters, concert or lecture rooms, and assembly rooms of every kind. A pail of water in front of the heater is ineffective. We have to employ other means in order to overcome the deficient humidity indoors.

2. In order to prevent colds we have to limit the amount of garments worn.

3. Exposure to drafts, rain, snow, and all inclemencies of the weather ought to be practiced by the youth in order to prevent the most preventable of all diseases—colds.

PREVENTABLE DEAFNESS.

WILLIAM HIBBS TOMLINSON, M. D., *Instructor in Diseases of the Ear, Polyclinic Hospital, Philadelphia.*

(*Medical Record, Sept. 27, 1913.*)

Summary.—(1) Middle-ear deafness comprises about 80 to 90 per cent of all forms of deafness. (2) Ninety per cent of the cases of middle-ear deafness have their origin in inflammatory conditions of the nasopharynx, with extension to the ear by way of the Eustachian tube. (3) Adenoid tissue in the epipharynx is the most frequent predisposing cause of middle-ear disease. (4) Systematic aural examination in adenoid cases disclosed the fact that a high percentage, probably 75 per cent, have some grade of ear involvement. (5) The findings of routine ear examination in children with adenoids confirms us in the belief that many cases of middle-ear deafness first noticed in adult life have their origin in inflammatory conditions of the nasopharynx, dating from childhood. (6) The milder acute forms of catarrhal otitis should receive appropriate treatment, for if untreated they are liable to assume the chronic form. (7) Routine treatment of chronic catarrhal deafness leaves much to be desired. More careful work is necessary if the best results possible are to be secured. (8) This is an age of preventive medicine. Possibly in no other field is there better opportunity than in the prevention of chronic middle-ear disease and its deafness.

SOME IMPORTANT FACTORS IN THE CONSERVATION OF HEARING.

C. M. HARRIS, M. D., *Ophthalmologist and Otologist to Conemaugh Valley Memorial Hospital, Johnstown, Pa.*

(*Medical Record, Mar. 14, 1914.*)

Diseases of the ear may be roughly divided into three classes—those affecting the parts concerned in the conduction of sound, those affecting the perceptive mechanism, and those acting on both. The external ear, external auditory canal, membrana tympani, Eustachian tube, middle ear with its contained ossicles and attachments, and the cells found in the mastoid process, are all of service in the conduction of sound from the outer atmosphere. Lesions in any one or more of these parts deserve attention on account of the primary or secondary effect they may have on hearing.

Sound waves are collected by the external ear, pass through the canal to the membrana tympani, causing it to vibrate. These

vibrations are then carried by means of the ossicles to the membrane filling in the oval window, which transmits them to the fluids and nerve endings of the internal ear.

Malformations or injuries of the external ear or canal should, if possible, be corrected with little delay. Plastic surgery may correct a deformed or injured auricle and even atresia of the bony canal. Tumors and inflammations deserve attention. Impaction of cerumen and the presence of foreign bodies are important on account, not only of obstruction and disordered hearing, but of the local irritation and even ulceration which may ensue, the membrana tympani frequently suffering injuries. Eczema of the canal may be caused by otorrhea, but in some instances no local cause is apparent. Scratching the parts with objects like toothpicks and hairpins can only do harm. Early treatment can accomplish much in relieving this irritating affection.

The membrana tympani is sometimes the subject of direct violence by penetrating objects and may be ruptured by the impact of air produced by explosions, the slap of a hand, etc. The practice of boxing ears should be condemned on this account. Careful aseptic treatment after such an occurrence will promote healing and prevent infection of the middle ear. The ossicles and internal ear may also share in injuries to the membrana tympani.

In considering the diseases of the middle ear, one is justified in saying that nearly all of them originate in the nose and throat; and further, anything which prevents proper physiological breathing is very apt to be a contributing cause. Ciliated membrane containing mucous glands lines the nose, the Eustachian tube, and anterior part of the middle ear. From that point to the limits of the mastoid cells, the mucous glands are absent; in this respect resembling the lining of the accessory sinuses of the nose, which is virtually an endosteum. This may explain the vulnerability of the mastoid to infection.

In my experience I have usually found chronic rhinitis in its varied forms to be secondary to diseased faucial or pharyngeal tonsils, sinus disease, and exostoses and deviations of the septum. Disordered turbinates are often only symptomatic. Obstructive tonsils not only cause poor nasal breathing, but tend to perpetuate it through mouth breathing. When the mouth hangs open, muscular action is not such as to cause the oral and nasal bones to spread, which produces a narrow face with corresponding nasal fossæ and a deflected septum. Obstructive elements of any consequence affect proper breathing, and while one impaired breath counts for little, many may count for much. The vascular control in the mucous membranes becomes affected, and this in a short time brings about derangement of the mucous secretion associated with swelling. Finally, the so-called catarrhal inflammation becomes demonstrable with its various objective and subjective

symptoms. When the nasopharyngeal membrane becomes disordered as described, pathogenic germs, which we always have with us, find an inviting field, and successive attacks of acute rhinitis occur, adding fuel to the chronic process. It can well be claimed that colds occur only when our nasal membranes are nonresistant, be it due to local or general causes. The Eustachian tube is virtually a part of the nasopharynx and is commonly involved when the previously described acute or chronic inflammatory lesions are present. This tube is but 1½ inches long, and its sides are almost in contact at one point. Instead of the middle ear being normally ventilated, with consequent suitable adjustment of the vibrating structures, a partial vacuum is created by the tubal obstruction, thus deranging the function of the entire ear.

It should be emphasized that a diseased faucial or pharyngeal tonsil, with or without the nasal changes to which I have alluded, frequently causes much chronic inflammatory change in the middle ear and tube, especially when adenoid tissue partly surrounds the tubal orifice.

Acute nonpurulent tubo-tympanic inflammation is very apt to complicate the ordinary cold, the symptoms being diminished hearing, a swollen stuffy feeling about the tubes and ears, possibly associated with tinnitus or slight pain. Such a process often becomes subacute, lasting for several weeks. Local and general treatment is of great importance, as each attack does some damage and may be one of the stepping stones to chronic deafness. Successive attacks should lead us to seek some local or general cause. In chronic nonpurulent tubo-tympanic disease hypertrophy, atrophy, calcification of the soft parts with ankylosis of the ossicles may occur, and owing to the inaccessibility of the parts, thorough success in treatment is unknown. I have already indicated the importance of intelligent nasal and pharyngeal surgery in the prevention and cure of ear disease. The term surgery is here used, as some corrective operation should not uncommonly precede local or general treatment. While I have nothing but commendation for the well-performed tonsil and adenoid operations in properly selected cases, I feel free to predict that within a few years otologists will be confronted with some more or less obscure and irremediable tubal disorders directly due to impaired action of the tensor palati and levator palati muscles which normally dilate and contract the tube in addition to aiding in speaking, swallowing, and breathing through their insertion in the velum palati. Reckless and inefficient operating, which is all too common, brings about actual muscular destruction, cicatrices, and contractures which are bound to affect physiological action. If every operator would take the trouble to study the fauces and pharyngeal vault of such cases subsequent to operation, he would frequently find conditions worthy of criticism, even though the operation had been well done.

It has been reported that nearly 25 per cent of the patients attending aural clinics are children under 14 years of age; of this number, 50 per cent are subjects of suppurative inflammation of the middle ear, and of this portion 10 per cent or more owe their origin to the exanthemata of childhood. Of the cases of deafness in the United States, 27 per cent are said to be due to suppurative middle-ear disease of childhood. After excluding measles and scarlatina, it has been estimated that 95 per cent of all discharging ears in children are due to adenoids, and in the fevers mentioned adenoids are usually predisposing causes.

Skillful attention early in the course of most of these affections would do much to conserve hearing. Many patients come to us too late, whereas a large majority could have been benefited and the disease arrested had they come before the development of permanent damage. Contributing causes should be treated early, and deafness, which is only a symptom, avoided. As much depends upon the actions of the patient as on those of the doctor. Cordial cooperation is necessary. Diet, hygiene, sanitation, personal habits, occupation, climate, and general health all have a vital direct or indirect bearing.

THE MEASUREMENT OF AUDITORY ACUITY.

WALTER A. WELLS, M. D., Washington, D. C.

(*Journal of the American Medical Association, Sept. 27, 1913.*)

Conclusions.—From this general review of the chief methods of measuring auditory acuity, it is very evident that, as at present employed, they fall very short of the perfection greatly to be desired. They are both defective and deficient; no one of them is equal to all the demands of a complete acoumetry, and in what they attempt they are erroneous and easily lead to faulty interpretations.

The difficulties with which we have to contend are of two kinds—those which arise from the nature of the function being explored and others connected with the various tests themselves and the manner in which they are conducted.

Strictly speaking, we can not really measure auditory sensation at all, because it is not a quantity divisible into equal units. We arrive at estimation of the power circuitously, by measuring the energy employed in producing a given sensation, on the ground that auditory power is in inverse proportion to the intensity of the stimulus. We take as the criterion or standard of measure the lowest energy which we find is needed to produce just an appreciable perception of sound. This we call the liminal value, or, from the standpoint of the ear, the threshold of excitation.

As we are obliged to depend on the interpretation and response of the subject, results will vary with degrees of intelligence and especially of aptness and attention. In testing with speech, for example, in which case the apperceptive faculties play an important rôle, education, training, and environment greatly influence the response. Expectation and suggestion are psychologic factors which may vitiate the validity of tests otherwise carefully carried out, and in children it is necessary to eliminate as far as possible fear, nervousness, and anxiety.

In some recent experiments I have shown that the ear, by being continuously exposed to sounds, readily shows fatigue, which, of course, markedly lowers the threshold of excitation. This was found to occur with greater readiness with sounds at the two extremes of the trial scale, but especially with those of the upper limit. It has been proved that general fatigue of the body will lessen the acuity of the senses, including that of audition.

With regard to the tests themselves, there are many and various sources of error. These should be well understood and carefully borne in mind, if we would avoid the fallacies of too implicit faith in their accuracy and reliability. Of all the sources of error, the one which is most carefully to be guarded against is that of depending on distance as a reliable means of estimating sound intensity. In the first place, if there is a relation existing at all, it is not a simple one, as might be inferred from the common practice of expressing auditory acuity by a fraction in which the normal hearing distance is taken as a denominator and the distance at which it is heard as the numerator.

The fact is the intensity of sound diminishes with distance geometrically and not arithmetically. Suppose, therefore, a loud watch which can be heard normally at 100 inches is heard at only 40, individual hearing power is not correctly expressed as 40 per cent, but as 16 per cent; while if the patient hears at only 30 inches his hearing acuity, instead of being 30 per cent, is really reduced to 9 per cent. But, unfortunately, when distance is used as a means of arriving at the intensity of the stimulus, the law of geometric diminution is upset by other disturbing factors. The absorption and reflection of sound waves, the influence of extraneous noises, and the participation of the other ear in tests made with loud sounds, especially when the latter are of high pitch, may each, singly or jointly, upset all calculations. Errors flowing from such causes enter especially into the commonly employed tests made with the tuning fork, the watch, the acoumeter, and speech, and, therefore, seriously affect the validity of the results which are obtained.

The errors arising from the lack of a uniform initial intensity are encountered in those tests in which this is depended on. It is one of the drawbacks in the use of the human voice, the intensity of which

can be only roughly gauged, and differs even with the choice of vowels and their arrangement, and also in the use of the tuning forks, whose intensity must be estimated by calculations that are complex and faulty. The presence of harmonics is a bad fault in many instruments used in acoumetry. They tend to cover the fundamental tones and so lead to erroneous conclusions.

Nearly all the tests which are in general use are open to the objection that they apply to only limited portions of the whole auditory field and can not therefore be regarded as giving a complete measure of auditory power. It is this that explains the observation which has been frequently made that a person may seem to have a good hearing for the watch and at the same time have great difficulty in hearing speech.

Tests used with the idea of covering a great part of the auditory field, including the upper and lower limits—the so-called qualitative tests—are often applied without regard to the function of intensity. As I have pointed out, the limits of sound perception might be extended and apparent hiatus disappear by merely employing greater intensity. It might be useful to know the amount of intensity necessary to get the threshold of excitation for different notes of the scale. A general survey of the subject of auditory mensuration leads to the inevitable conclusion that there is great need of a system that will meet the exacting requirements of otologic purposes.

The ideal instrument for testing audition, from an otologist's standpoint, would be one capable of producing all the notes of the scale, from the highest to the lowest, in pure tones free from harmonies and capable of giving these notes in intensities readily measurable and varying from a point below the threshold of excitation of the most sensitive hearing up to a degree necessary to awake sensation in persons suffering from the most profound deafness.

Moreover, in order that such an apparatus may deserve universal acceptance, it must be possible to construct as many others as are wanted of the same type, each constant for itself and precisely similar to the others. It is only then that we can hope to make it available for a uniform notation comparable among different observers.

TEMPERAMENT IN CHILDREN.[1]

MARY SUTTON MACY, M. D., *Assistant Neurologist, Demilt Dispensary, New York City.*

(*Woman's Medical Journal, March, 1904.*)

In the first place, there is the sanguine temperament whose characteristic is rapid and easy responsiveness to all impressions and interests. This is the characteristic mood of childhood, which lives

[1] General title of article: "Tears, Tantrums, and Temperament."

on in the temperament of the man or the woman who is something of everything and withal nothing much. The greatest strength of this temperament lies in its frank and ready receptivity and the promise therein contained of a pregnant contact with experience; but then it has its salient defects. It is wayward and infirm of purpose, with a terrible facility for skimming the surface of experience; it is incapable of devotion or even real affection, and, left to itself, will develop a butterfly emotionalism as its final type of existence. Such sanguine children, as they grow older, must be associated with those of more strenuous porpose; environed by those of a more intensive, purposeful temperament; their temperament must be deepened by struggle and self-denial; they must be convinced, not merely told, that something definite is expected of them; and in adolescence they must be yoked to more energetic colaborers, or enlisted in the active service of some great organization.

Of the choleric temperament—the one next most characteristic to the moods of childhood—the keynotes are precipitancy and persistence. There is no danger to such a one of flightiness or pursuit—the very intensity of interest precludes that, even though the volatile nature favors a pitiful fragmentariness of accomplishment. The danger is rather one of developing an obstinate narrowness; of ultimately attaining to that limitation of character which marks the man who is driven through life by some impulsive coercive proclivity. Of all types of temperament, this is the most refractory to train, since it usually happens that, if the parent proposes, the child disposes otherwise. The choleric individual can be led, but never driven; but he can only be led if the leader is most careful and the leading string does not show. When some salient proclivity is pronounced, it may still be judiciously modified; or even if some counterproclivity be available and trainable, a total reversal of proclivities may be produced. The temperament is, after all, worth humoring, for it is probably by these individuals that the world's hardest work is done; but the mother who would guide a choleric child to gain the most from its temperament must walk warily and with a sure grasp of the facts that "you may lead a horse to water, but you can not make him drink," and that a ruling instinct will indubitably, under flat contradiction, become a ruling passion.

A very different picture is presented by the nervous type of temperament. Unlike the sanguine, it has not the openness of outlook nor the ready responsiveness to environment; but it dips into moods instead of skimming the surface, and has also a tendency to brood over the things which touch its sensitiveness, even to the point of morbidity. The depth of its interests compensates for its want of readiness and flexibility. Unlike the choleric temperament, it has not the precipitancy or volatility of the intense interests. Whatever

the future that awaits it it will probably take life seriously, and it will be the very preoccupation with specific and definite interests and experiences which will hold the danger element for such a one. Because of this preoccupation many phases of life will pass by unnoticed; and because emotion, which should always be the prelude to expression, comes to be valued so much for its own sake that it quenches the practical impulses it should have vitalized, there is great danger that sentimentality will become the dominant characteristic. Such temperaments must be environed by energetic, active interests, by wholesome affections, broad outlook, and definite purpose in action.

The proverb states "that it is not a rearing but a dead horse that is hardest to drive," and so it appears that the phlegmatic temperament is the one which is truly the despair of the educator. This is probably the result of its marked stolidity and apparent unresponsiveness. The very slowness and deliberateness of thought and action argues a reserve of strength. If the nervous is the most refractory, this is the most aggravating; but, because of its virtue of steady contentment, individuals of this temperament may well quote Swain's verse:

> "Content is a vessel not built for display,
> Though she's ready and steady, come storm when it may."

Association with playmates of sanguine temperament is helpful—should be mutually so—but results must not be expected at once.

SOME FACTS RELATING TO THE HYGIENE OF NERVOUS CHILDREN.

MARY O'MALLEY, M. D., *Senior Assistant Physician, Government Hospital for the Insane, Washington, D. C.*

(*The Woman's Medical Journal, August, 1918.*)

To speak in broad terms there are two types of nervous children—the unrestrained, in which the emotional impulses are given sway, and the restrained emotional type. In the first class, the unrestrained type, the intellectual capacity is above the average as a rule. The marked essential features of this child are timidity and great restless energy. He is high-strung, discouraged on slight provocation, always looking for trouble, and worries over the most trivial matters, finds a great effort in meeting difficulties, very demonstrative and affectionate, etc., which is, however, due to selfishness. Such children demand sympathy and think that they are ill used if every one does not allow them to have their own way. They resent discipline and argue rather than obey. They are quick to learn, but forget facts easily. They are enthusiastic about their work, but lack judgment. They are sensitive and suffer agonies over trivial offenses. They work rapidly and energetically for a time, then are dull and lethargic, and meet failure in efforts of application. Sometimes these

Children have a keen sense of humor and are appreciative of the ludicrous, which is their salvation if they cultivate it. Some of these may be successful in art or literature in after life, but they frequently fail from lack of industry, application, and common-sense. The sanitariums and psychopathic hospitals find many recruits from among this class. The physical and mental signs of this type of children are familiar to the medical profession.

In the second type the restrained emotions are very deeply felt, but the powers of control are equally strong. Such children are observant, intelligent, often so reserved and retiring that they often pass as being dull, stupid, and obstinate. They are highly sensitive, shy, and vain. They seem to lack in affection, but really long for it and brood over slights or seeming neglect. Being slow to become offended, they are often shamefully bullied at home or at school, but suffer all with the utmost indifference, except for periodic outbreaks of fury, in which they show a revengeful spirit. They are solitary in habits, imaginative, and introspective. They take life seriously and are wanting in a sense of humor. This characterological disposition, with its suppression of external display of emotions, is as exhaustive to the child as is that of the other type, in which the emotional energy is unrestrained, and it is associated with many similar complaints. For instance, they are lacking in self-control, and it is apt to lead to dreamy states and later to mental disorders.

We have also in addition to these two classes in which the intellectual faculties are above those of the average person another type. In this the intellect is by no means keen or even up to the normal standard, and such children are aware of the fact; but they have the ambition to succeed and are jealous of their associates who are endowed with superior intellectual powers. Frequently by faithful striving they manage to keep up with or excel their competitors, but the energy required for this is often too much for them—they break down physically as well as mentally, particularly if in after life they are given much responsibility in a position for which they know themselves to be unqualified. As a rule we find this class, although not always, among the female sex.

Parents and teachers may often be able to recognize and trace nervousness in children by the discovery of a deviation from the normal of one or more of the special senses—taste, smell, sight, hearing, or touch. For instance, hypersensitiveness to taste may be regarded as one of the earliest manifestations of a nervous child.

Hypersensitiveness to sound, with accompanying fear and shock occasioned thereby, is perhaps the most common of all indications of a nervous temperament in infants * * *. There is little doubt that dread of noises often accounts for timidity and lack of sociability in many nervous children.

Hypersensitiveness to common sensations of touch, pain, and temperature are also important signs which show an abnormal impressionability of the mind and body to external and internal influences.

We will next consider the subject of fear in nervous children. Children show a great variation in their individual susceptibility for fear. In former generations fear was considered necessary to morality, and a child who displayed timidity was treated by frightening him to make him courageous. Plato's method of testing children's courage was by exposing them to the horrors of witchcraft. Whether fear is caused by the supernatural or from physical ill usage or from ridicule, it has the same serious influence on the mental and physical health of children. Much of the self-consciousness, depressions, and obsessions which are often observed in adults may be traced to the effects of fear in childhood. In young children, when indications of hypersensitiveness to fear are observed, they should be met with kindness, sympathy, explanation, and removal of the cause where it is possible. This is of all the emotions the one that produces the most lasting effects upon the nervous system of a child. Oliver Wendell Holmes speaks of a glover's sign, in the shape of a huge hand, that hung in the streets of his home village, which in his early life terrified him night and day. We are all familiar to a more or less degree with the result of fright. An excessive timidity in a young child is one of the earliest indications of a nervousness to come. It is often shown by starts and outbreaks of crying and tremblings at the sights and sounds which only create amusement in normal children.

Nervous children are very imaginative, and they are often attracted to and influenced by the supernatural. The possible effects of certain forms of religious teaching and moral training upon nervous children need careful consideration, and from a medical point of view it is recommended that only the most cheerful, most soothing, and restful side of religious faiths should be taught to children who are by nature imaginative or inclined to be superstitious. Exaggerated statements of any kind, extreme and biased views on any subject—such as the evils of alcoholic stimulants, coffee, tea, and tobacco—are in a high degree injurious to nervous children; although I am sorry to state that many men and women of good professional reputation show poor judgment in advancing these facts. Excessive remorse for slight misdemeanors is sometimes a characterological anomaly in neurotic children. Thackeray describes his great mental agony for having spent fourpence of his parent's money for a lunch while on his way home from school, even though famished with hunger. How many of us can recall the suffering and contrition for some trifling offense in childhood.

Often children are delayed in their progress in school by their constant terror of a whipping or punishment of some sort. This means of discipline should certainly be condemned in the cases of emotional children—it may harm a child both mentally and physically. Neurotic children are, as a rule, keenly alive to their shortcomings, which are often numerous, and the mental worry they undergo is often greater than they can bear.

Often those who are in authority do an irreparable injury to nervous children by shouting their commands and instructions at them. This has no effect upon the ordinary boy, but shouting parents or teachers are unfit to control or instruct neurotic children.

At one time disciplinarians dealt with children who were ill-tempered, peevish, dishonest, quick-tempered, untruthful, pugnacious, spiteful, and in any way immoral; but now the medical profession is frequently requested for advice in helping to decide whether such children are abnormal or criminal. At present the tendency seems to be to regard any bad conduct as evidence of ill health, and often it is the case that after a severe or exhausting illness—as typhoid fever, measles, scarlet fever, etc.—nervous children who have been well trained and previously well conducted often seem to lose to some extent normal control and show moral indiscretions. But one will find in the majority of these cases that these lapses are transitory; that health and morality under good management are restored in time. Slight moral irregularities are frequently observed in boys and girls at the age of puberty, and may only be an indication of nervous instability, and should not always be looked upon too seriously. In all cases we must take into consideration the age, inheritance, and environment of the child, together with the nature of the lapses in the moral sphere, and then the child himself. It is said that a child of 3 has no moral sense; at 6 it shows some consideration for its associates; at 8 it should have some definite ideas of right and wrong. It is of the utmost importance to take into consideration the history of such neuroses as hysteria, epilepsy, alcoholism, and insanity existing in the ancestry in the case of moral delinquencies occurring in a child upward of 8, whatever its home training or environment may be.

We must also keep in mind the psychic effects upon a child where we find the parents dull and narrowminded, intellectual but emotionally unstable, indifferent, inattentive, apprehensive, and well-meaning, but fretful. Some parents we will find too strict or rigid in discipline; others are too lenient. Some show a lack of sympathy, while others are too sympathetic. In most cases, however, you can find an explanation of the child's ill health or misconduct in the character of its parents, teachers, or associates.

I shall further enumerate a few traits which may appear in the neurotic child; but at this point I wish to say that a nervous child is

easily provoked by calling attention in public to its shortcomings, particularly when, as frequently is the case, it has made an effort to correct them.

(1) *Cruelty* in children, if persistent and induced by sheer delight in causing and witnessing pain, is evidence of a morbid neurosis. Neurotic subjects are sometimes fascinated by thoughts of pain and torture, and in some the sight of suffering produces a desire to cause it.

(2) *Fits of passion and fury* are very common in emotional children, and often call for medical advice. A baby that never cries is not always a healthy child. A husky, normal infant will cry with rage in order to make its wants known. It is only when children have come to a certain age, where they are expected to show some self-control, that fits of temper are considered morbid. Frequent outbreaks of violent temper are indications of nervous instability. Children vary greatly in their capacity for reacting to their emotions, and also in the degree of self-control to which they attain. Self-control may be cultivated in children by careful management, instruction, and display of judgment and common sense on the part of their parents and teachers.

(3) *Paroxysms of crying* without reason are very common in neurotic children. It is often unwise to seek for the cause of these episodic attacks. The children are usually aware that the cause is of little importance and not worth mentioning, and are ashamed of themselves for giving way to their emotions. If forced to give a reason, they will often prevaricate rather than be dubbed "cry baby," and thereby lead themselves into further trouble.

(4) *Jealousy in young children* is sometimes the cause of much unhappiness, but fortunately these cases are rare. An affection that is not reciprocated may be as upsetting to a child as to the adult; and if we regard the natural instinct of jealousy as indicating a malicious disposition not worthy of sympathy in a child, the foundation of viciousness, despair, sadness, and discontent may be sown with their depressing permanent effects upon the child's future health and happiness.

(5) *Dishonesty and untruthfulness* in children must be carefully considered. A child who steals apples or cakes is not necessarily a thief, nor does one lie make a liar. Timidity is frequently the cause of apparent untruthfulness. Some children have had the superior qualities of truthfulness so instilled into their young minds that they live in constant fear of telling a lie, and so, when the opportunity arises, they become frightened and say "no," when they really know they should answer in the affirmative. Others appear to falsify from absent-mindedness or because the question does not admit of a direct answer, although they are often too frightened to say so, and therefore seem to lie. These simple facts are important, for often a child may suffer greatly from a feeling that its word may not be believed.

(6) Much harm may be done by *teasing children* whenever they manifest an attraction for the opposite sex. The distressing shyness, blushing, and self-consciousness which is often observed in young people in company of members of the opposite sex may often be traced to this want of consideration by their elders for their infantile attachments. Freedom of social intercourse between sexes, under careful oversight, is advised, and especially the coeducation of sexes during school life is to the advantage of either sex.

In conclusion, just a word concerning *mental overstrain* as the result of educational overwork, for we can not lose sight of the fact that the results of emotional excitability can not be overlooked. Quite independent of the actual amount of study done, the fear of failing in his class work may in one case produce overstrain; in another, an actual ambition to excel his companions may lead by easy steps to exhausting emotions—such as jealousy, hate, and all uncharitableness toward his classmates—while in a third, disappointment on account of failing in success results in brain exhaustion. Girls are more liable to break down under such circumstances than boys.

NERVOUS CHILDREN.

THEOPHIL KLINGMANN, M. D., *Demonstrator in Nyurology in the University of Michigan.*

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In the majority of nervous children one is able to demonstrate a certain endogenous predisposition, the so-called psychopathic or neuropathic disposition. But in studying the personality of the father, or the mother and perhaps the several other children of the family, as well as the general environment of the child, the endogenous predisposition does not appear so prominent as a causative factor of nervousness. Many times the neuropathic disposition is an acquired complex of nervous manifestations, the result of environment. However this may be, it is true that the resistance of children to outside influences at the time of birth is just as variable as their external appearance. One child becomes easily nervous, another less so, a third under the most careful regulations is predestined to be a nervous child. Among the avoidable exogenous causes of nervous children are the mistakes of early training, involving the personality and situations created by those having this responsibility, in which the physician is frequently a prominent figure.

Faulty training of children begins immediately after birth. A child in the first days, weeks, and months of life requires a great deal of sleep, in the first week at least 20 hours in the 24, and for months after 16 hours. There are many conditions too numerous to mention here that prevent this, even in the best regulated homes, but all of

them avoidable. At this time these outward influences are only reflex, since, as already mentioned, there are no psychic impressions at this period of life. Later the usual method of amusing the child is unquestionably harmful. The small child should be lonesome and not subjected to the stimulation arising from the implements we choose to call toys.

The overstimulated child, the unusual child, or the wonderful child, frequently is a nervous child. It is often pathetic to hear the mother boast that her child can read at 3 or 4 years or can produce melodies after hearing them for the first time. Such children are frequently more or less exhausted by the time they reach the school age and are not equal to the demands made upon their neural resources. When the problems of the school curriculum become more difficult, there appear periods of exhaustion, irritability, disturbed sleep, etc.

Corporal punishment in childhood is a barbaric method of training. It is no longer permissible in punishing criminals; why should it be tolerated in the training of children? The normal child may survive with an amiable disposition, while that of the nervous child is surely not improved by such treatment.

The desire for freedom is an early manifestation in the child's emotional sphere, and any forced restrictions will invariably produce reactions or resentment. When it is necessary to apply force, there is always an error of training or in the disposition of the parent. It is therefore unnatural and unfavorable for the physiologic development of the child to be surrounded by and compelled to follow severe regulations in the home or in the school. An equilibrium can be established only by carefully observing the reactions of the individual.

Of the greatest importance in this connection are the physical and psychic trauma which not infrequently arise as a result of this form of applied force. The effect of a physical trauma and also of the psychic, to a certain extent, is the same as in the adult, resulting in a pathologic reaction in any psycho-pathologic individual. The majority of cases of hysteria in adult life have their origin in this period and from this cause.

In grouping nervous conditions of childhood the writer has chosen the plan of Cramer, who collects the symptoms under four heads, as follows: Neurasthenia, endogenous nervousness, complicated endogenous nervousness, and hysteria.

NEURASTHENIA.

In childhood, as in the adult, there is an exhaustion of the cortical nerve centers which occurs in children who are not necessarily of a neuropathic disposition, and is the result of strenuous mental effort without sufficient time for recuperation in rest and sleep, and which results in a chronic exhaustion of the brain centers. This type of

disturbance undoubtedly forms the smallest number of nervous children. In 200 cases of nervousness observed by the writer there were but 19 that could be thus classified.

ENDOGENOUS NERVOUSNESS.

This is a nervous exhaustion in a child with a marked neuropathic disposition and follows a moderate mental exertion in one who has the requisite amount of rest and sleep for a normal child. In other words, it has to do with a child with diminished resistance who has not the endurance of the normal child under normal conditions. This class was represented by 28 in 200 cases, the ages of the patients ranging from 6 to 13.

COMPLICATED ENDOGENOUS NERVOUSNESS.

This form of nervous affection is due to physical ailments in predisposed children. In this class belong the intensely nervous, sensitive, excitable, irritable, restless child ever prone to habit spasms, nocturnal incontinence, etc., yet who may show no actual evidence of nerve exhaustion. Among the more common causes are enlarged tonsils and adenoids, eye defects, diseases of the skin, disorders of digestion, constipation, and incipient tuberculosis. In the writer's series there were 93 belonging to this class.

HYSTERIA.

Here the child presents a marked neuropathic disposition which is most evident in hypersuggestibility, increased imaginative power, and inclination to lability and emotionalism. The physical stigmata are apparently not so numerous in childhood as in the adult. Anesthetic conjunctivæ are frequently met with, as well as areas of anesthesia and hyperesthesia. When these are demonstrated, they are sharply circumscribed and usually located on the back, thorax, and abdomen. Of the 200 cases recorded, 70 were classified as hysteria, the ages of the patients ranging between 4 and 14 years; 58 of these patients were girls.

Out of 200 cases of hysteria in the adult I was able to collect 178 cases that had their origin in a psychic trauma occurring between the ages of 4 and 10 years. In 90 per cent of the cases I was able to show a neuropathic disposition in one or both parents. In 200 cases of adult neurasthenia between the ages of 18 and 45 years there were but 12 per cent that gave a history of nervousness in childhood. In 42 per cent of all cases I was able to trace a neuropathic disposition in one or both parents. In all of the 12 per cent there was a history of nervousness in the parents.

CONCLUSIONS.

The conclusions one may draw from the analysis of the 200 cases of nervous children are that neurasthenia, pure and simple, is not frequent in the earlier periods of childhood; it is not as a rule hereditary, and neurasthenia of adult life is not a persistence of childhood neurasthenia; the most common causative factor in childhood is mental overwork without the requisite periods of rest, owing to the patient's surroundings.

In cases of endogenous uncomplicated nervousness a marked neuropathic disposition is prevalent and no doubt is the hereditarily weak child which has diminished resistance and is unable to cope with the more strenuous mental life. This form is not observed until the school age is reached and continues in adult life to form the group known as nervous men and women, and possibly may also include the cases grouped under psychasthenia. Complicated endogenous nervousness is observed much earlier in the child, the youngest in the series being 1 year old. It is the most frequent form of nervousness in childhood and shows the importance of physical disease in the production of nervous disorders.

Hysteria in the adult is a persistence of the disease in childhood in the majority of cases. The disease itself is not hereditary, but may to a certain extent be dependent upon a predisposition, either acquired or hereditary.

NEUROTIC, PSYCHASTHENIC, AND HYSTERICAL CHILDREN.

J. P. CROZER GRIFFITH, M. D., *Professor of Pediatrics, University of Pennsylvania.*

(*New York Medical Journal, June 6, 1914.*)

The treatment of any of these nervous conditions under consideration is a subject of great interest and of even greater difficulty, since every case must be handled individually and there can be only general rules to guide us.

Preventive treatment is to be first considered. In connection with this subject must necessarily be elaborated to some extent what has already been said in discussing etiology. From earliest infancy there should be caution against overexcitement and mental overstimulation of any sort. This applies to all infants, since no one can tell what nervous manifestations may develop later in young infants apparently entirely healthy; but it applies with especial force to those with nervous ancestry or who have themselves shown early neurotic manifestations. Abundant undisturbed sleep is of great importance. The presence in the house of a number of noisy older children is often a detriment in this respect; while many infants are kept up much too late in the day in order that father may see them;

and still others, especially the first-born of doting parents, are even awakened from sleep and perhaps brought downstairs to be exhibited to admiring friends. The baby suffers, too, from the constant desire of the parents and other relatives to have him evolve mentally in a manner superior to the babies of their acquaintances. This is all wrong. The infant should oftener be retarded than stimulated in his mental development.

As childhood is attained the same precautions must be taken not to strain the intellectual and emotional powers too greatly. Stories which are exciting should not be told to the child, and especially those containing elements which may be the cause of the develpoment of fear. Many of the old-time fairy and folk stories are very objectionable from this point of view. The beginning of school life requires careful supervision. Naturally, the child must be taught; but the teaching should, in my opinion, always be regarded as secondary to the maintaining of a healthy condition of the mind and body. The study hours are far too long for many children. In the case of those who learn quickly this does not apply, so far as the actual mental work is concerned; although the hours spent in school often take away too much from the time which should be occupied in play in the open air. With those, however, who find study somewhat of a burden, especially if they are of a neurotic disposition, too much school work is often the cause of the development of nervous symptoms of some sort.

A very important matter is the avoidance of too constant association of infants or children with excitable or nervous relatives, especially parents or older brothers or sisters. The entire household life is too strenuous for them; while the observation by the child of uncontrolled nervous or other exhibitions on the part of the parents is distinctly harmful. On the other hand, nothing is more productive of nervous peculiarities than the too careful rearing of an only child in association only with older persons. Often nothing is better for a "peculiar" child than having its rough corners polished off by mingling with playmates. The ruthless criticisms of these will often undo to some extent the evil influence of the too affectionate and considerate parents.

All that has just been said applies with increased force where infants or children have already decided nervous manifestations. In addition, other measures must be taken to bring about a cure. In the first place among these, the general health of the patient must be carefully studied, and treatment commenced if necessary—as it nearly always is. Anemia and debility are to be corrected, and especial attention is to be given to the digestive apparatus. In my own experience the neurotic and psychopathic states are most frequently associated with some digestive disturbance, whether this is the cause

or the accompaniment; and the successful treatment of this condition will often be followed by amelioration in or a disappearance of the nervous manifestations. This was true in a number of the cases I have detailed. Other possible causes for the disturbance of the nervous system must be carefully sought for, prominent among these being the constant association with other nervous members of the household. It is here that the mingling with healthy children as playmates, after infancy is passed, is especially to be insisted upon. There are cases, however, where shyness, timidity, or morbidness render the teasing of other children harmful, and the patient must then be entertained in other ways. This is a matter to be determined for the individual case. Complete change of scene and climate, with separation from the family, under the care of a specially trained nurse, and under medical supervision, will often work wonders in nervous children; and in severer cases, as in psychasthenia and hysteria, this is often one of the best means of cure. In many such cases among the poorer classes the placing of a child in a hospital is frequently the best possible procedure, as some of my cases illustrate.

One of the things most harmful for nervous children is the evident and openly shown anxiety of parents. There can scarcely be any more deleterious suggestive influence for evil than the so common practice of mothers of detailing to the physician or to friends all of the child's peculiarities in the presence of the child itself. I have repeatedly sent such children out of the room in order that they should not hear the account given by the mother. Often the question of attendance at school arises. This, too, is an individual matter. Over against the mental and bodily fatigue of school life is to be placed the fact that absence from school may draw still more the attention of the child to its condition, at the same time that it takes away occupation, inasmuch as there are often no play companions to be had during school hours.

I may reiterate the chief principles which constitute the basis of all treatment, especially for the severer cases, such as the psychasthenic and hysterical states. While the general health is being improved and all visible causes removed, the direct object of all other measures is to make the child *forget*. This is slow of action, but satisfactory in result. Absolutely no anxiety of any sort must be shown by the parents or others with regard to any of the hysterical or other manifestations, or remarks of any sort made regarding them. Seeing the parents indifferent the child soon learns that the condition is a harmless one. It learns, too, that it can no longer enjoy the pleasures of sympathy or be the occupant of the center of the stage. Separation from anxious parents is almost a necessity in such cases, since the majority of parents can not sufficiently control the exhibition of their feelings. The nurse in charge must always be kind, and must obtain the

affection and full confidence of the child; but there must always be firmness and an apparent indifference to the symptoms. This applies equally well to the physician. The symptoms, if noticed at all, are to be made light of, as something which is sure to pass away soon, and encouragement of every sort must be given. Suggestive treatment may be employed in the form of insisting that the patient is better. In fact, suggestion in some form is of the greatest value, by the employment of mechanical or other devices which seem strange or wonderful to the patient; combining this with the assurance that recovery will surely follow. Usually it is better not to express the belief that the malady will quickly disappear, but only little by little. It is also important that any treatment employed be directed against some other region of the body than that showing symptoms, otherwise the mind of the child will continue to be directed to these.

Punishment does no good in most cases of this kind, and only destroys the confidence and affection of the child, which is so necessary in order to obtain good results.

I have said nothing regarding the administration of drugs for any of the nervous diseases described. They occupy but a very minor position and are to be employed only to relieve certain urgent symptoms. This does not apply to the remedies needed to improve the geneal health in any particular.

It is always to be remembered that in all of these diseases there is the underlying nervous disposition which can not be entirely removed. Consequently, when apparent recovery has taken place, care must still be observed that no causes are allowed to operate which can be the occasion for a return of the nervous manifestations. Nevertheless, it is encouraging to observe that with care many nervous children seem to outgrow the neurotic tendency entirely.

SOME OBSERVATIONS ON THE CONDITIONS AND TREATMENT OF STUTTERING.

CONSTANCE CHARNLEY, *formerly Assistant in the Voice Clinic, Out-Patient Department of the Psychopathic Hospital, Boston, Mass.*

(*Boston Medical and Surgical Journal, Dec. 4, 1913.*)

One of the most baffling features of [stuttering] cases is that no two are similar; for this reason a successful method of treatment must be adapted to the individual, and this perhaps explains some of the failures of those systems where patients are treated in groups, without reference to their special needs, or where the same treatment is applied to every case, whether it fits the needs or not.

Undoubtedly where some degree of impediment has been present since first learning to talk the cause lies in some cerebral predisposition, yet also in cases where the commencement of the trouble

can be assigned to a definite later date and is associated with some such event as a fright, illness, or fall, the primary cause still must be sought in a mental or nervous condition, perhaps latent until then, or perhaps brought about then for the first time. In other words, the character of the impediment as it becomes recognizable to the listener, whether it be a contortion, a repetition of sounds, prolonged silence, or whatever it may be, is the effect and not the cause of the trouble. Yet, as will be shown later, excellent curative results may sometimes be obtained from directing the attention to exercises for the relief of the physiological bad effect.

However, though the underlying cause be cerebral, the longer the patient, in order to speak, goes through struggles without knowledge of the normal muscular and respiratory processes involved in articulation, the more his bad physiological habits become involuntary and reflex. If his impediment takes the form of noticeable and more or less violent contortion, as of the jaw, lips, eyes, tongue, head, etc., the longer it goes on the more this in itself reacts on his mental and nervous condition. Therefore, what may have originally been a mere tendency to wrong cerebral direction of the articulatory process, or a slight upset of the efferent impulses, becomes a fixed improper habit, correspondingly difficult to overcome, and spreading until its effects attack the will and even the personality itself.

On the basis of this explanation it will be seen that no method of treatment can be considered well balanced which does not include both the psychic and the physiological. But these overlap and frequently some exercise obviously in one sphere will have effects in the other. For example, if a person's confidence in himself can be increased by suggestion, he will without doing muscular exercises for the purpose probably stand straighter, breathe deeper, and be on the whole better fitted physically to articulate correctly than if he is embarrassed, despondent, sullen, or self-deprecatory. In the same way, if as a result of doing some purely muscular or tonal exercise, a person is enabled to speak easily where previously he had difficulty, his spirits will rise, his confidence increase, and the desirable psychic effects be obtained without a direct word on the subject.

A satisfactory method of treatment must take into consideration the complicated nature of the speech process: It is dependent on quantity and placing of breath, muscular processes of the trunk during the emission of breath, muscular processes in the throat and larynx governing the quality, pitch, and volume of tone, and finally on the muscular processes governing the position of the articulatory organs above the larynx, the pharynx, palate, tongue, lips, and jaw.

It is easily seen that in a process so involved there is infinite opportunity for the formation of improper habits; the lack of right use of one set of muscles immediately throws undue strain on some

other set, which then overwork in the effort to accomplish some part of sound production they were never intended to perform.

On the physiological side, then, treatment must recognize these elements: The teaching of correct breathing, the correction of habits, of muscular over-rigidity in any of the sets of muscles concerned, a thorough study of phonetics, and the cultivation of proper laryngeal action to secure flexibility and flow of tone. Probably every intelligent and honest method devises similar exercises based on these four elements of voice production.

It is sometimes enough to call the attention of the patient to the necessity for inhalation before speaking. Frequently the effect of his nervousness is to make an inhalation impossible because of throat, chest, and intercostal rigidity; with other patients the instruction to inhale results in filling only the upper part of the lungs and in consequent contraction of the shoulder and neck muscles, but none at all of the diaphragm and abdominal muscles, which are the important ones for breath control both in inhalation and exhalation. Therefore, some attention to the placing of breath and the quantity taken is essential if the patient's difficulty chances to depend even partially upon lack of breath or incorrect breathing, which is often, but not always, the case. Most patients when they are told to take a breath close the mouth and inhale through the nose. This necessitates a change of position of the soft palate and back of tongue before speaking can begin; therefore, the tendency after such inhalation is to make a nasal exhalation, and this is a fatal hindrance to speech, which requires exhalation through the mouth. Of course it must be pointed out to the patient that ordinary, quiet respiration should be nasal—mouth breathing used only for speaking.

Experimentation with voice production in singing has convinced me that the teaching of bodily expansion with contraction of the diaphragm during inhalation and the consequent filling of the lower lungs with air constitutes the best breathing method for support and control of tone. The application of this is as important in the removal of speech defects as in the cultivation of a singing voice. It is easy to teach, and it relieves rigidity of upper muscles which should not be used at all, in the slight inhalation and exhalation needed for ordinary speaking; repeatedly patients who complain of feeling a tightness or hardness in the chest or lower, during the effort to speak, sometimes amounting to actual pain, have entirely lost these accompaniments of their difficulty after mastering the habit of diaphragmatic breathing. Exercises for this purpose, together with specific relaxing exercises, usually are of great benefit, but are not needed in all cases.

Nearly always the tone of the stutterer's voice is very poor, being either noticeably weak or of a low pitch expressive of depression, or very monotonous. This means that the action of the vocal cords

is not as it should be. Frequently they get no chance to act normally because of the too great effort made with the extrinsic muscles of the larynx, or because of some contortion habit by which an effort is made to substitute the use of the voluntary muscles of the jaw or tongue for the involuntary ones of the larynx. As a remedy for this, exercises in the relaxation of the throat, jaw, and tongue are extremely helpful. In the attempt to develop flexibility I find the musical ear of the patient is of great importance; stuttering is frequently associated with a remarkable degree of tone deafness. In such cases directing the attention to change of pitch does no good.

There remains the teaching of correct position for different sounds. This is extremely important in many cases, of no assistance in some where the sounds are always made correctly if at all, and the cause of trouble is elsewhere; but this sort of training alone rarely accomplishes a cure in mature cases. It is, however, of the greatest value with young children. Since the study of phonetics has made such work familiar, there is no necessity of dwelling on it in further detail here.

The recultivation of the ear is of the greatest importance, not only in making a cure of stuttering, but in insuring the permanence of cure. The average stutterer does not hear his own voice as it is. He must be trained to listen to the normal speaking voice of others and contrast it with his own, to apprehend what the easy flow of one word to another means in sound as well as in breadth and muscle sensation. It is extremely helpful in assisting easy "beginning," so often the greatest stumbling block to a stutterer, to develop in him the power to make an absolutely clear mental concept of an easily and correctly produced vowel sound. To be effective this mind picture must be accompanied by muscular sensation in the throat, which he practices until perfect familiarity is assured and the ability to call up that sensation at any time results. For example, a stutterer will be perfectly able to say any vowel easily and correctly, but the moment a consonant is placed before the vowel, there is a change in the pharyngeal action and the vowel perhaps can not be spoken at all or comes out after a time spasmodically with no ease or right quality of tone. The patient must first be taught the distinction between vowel or pure tone, depending on the action of the vocal cords primarily, and the articulatory processes which give consonants and break up the pure tone into words. This done, a beneficial exercise is to have him speak a vowel aloud, directing his attention to the throat sensation, possibly even placing his fingers on his throat to feel not only the vibration but the muscular movement accompanying the sound. Then he speaks aloud a word containing this vowel. For example, "a, bake." He then *thinks* the vowel, still directing attention to the muscular throat action, but stopping

short of audible sound, and only calling up the sounds mentally with all possible vividness. He then again speaks the complete word aloud.

General training and the study of language structure, too, is helpful at times. Some stutterers fail to realize how they break up language, chopping and chipping their speech until only two or three words are jerked out at a time. This is, of course, due to incorrect muscular action rather than to incorrect thought, but by analysis of their sentences as they speak them, they can be made to see how certain words in a group belong together, and how there are natural and legitimate places to pause, as well as unnatural and illegitimate. This new focus of attention on grammatical or rhetorical structure relieves the fear of isolated words and brings the patient to expecting more of himself.

There remains the purely psychic side of the treatment. Inculcation of right habits of thought, the doing away of mental hesitation, both with regard to thought itself, and the choice of words for its expression, the training of the attention and the will, the establishing of a better attitude on the part of the individual toward himself, others, and his evironment. It is obvious that in this sphere particularly much depends upon the natural endowment of the patient. It is also essential not to try to work with more than one idea at a time. Multiplicity of exercise is dangerous. One may advise a number of exercises as a home practice, and during the treatments one may try by suggestion to bring about several desirable mental changes, but in outlining a mental attitude for the patient to assume when the necessity for speaking arises, it is well to select one idea and insist that the whole mind be given to that; it is a good plan to vary the idea from time to time, depending on the extent to which it seems to have become habitual, and the amount of benefit derived in its being persisted in.

The gaining of the confidence of the patient is also very necessary, as is the awakening of confidence in himself. For certainty and permanence of cure, it is essential that the patient should thoroughly understand the object of all exercises given, see why they have beneficial results, and reach the conviction that the matter is in his own hands if he is sufficiently faithful and determined.

It is obvious that in work requiring the formation of new habits the oftener treatment is given, especially at first, and the longer each treatment is, up to the point where fatigue makes concentration and attention impossible, the better are the results obtained, and the quicker. The importance of the psychic side of treatment for a disorder primarily psychic is evident. It is quite possible to make actual and permanent cures in five weeks, even of cases which appear extreme; it is also quite possible that work will have to be kept up

for months, perhaps for years, before there is sufficient improvement to call it a cure. Cases are very likely to improve rapidly at first and then either go backward or remain stationary for some time. It is then that the most care is needed to maintain confidence and choose the most helpful exercises.

The question of what to say to a patient regarding the time the cure will take is a delicate one. If one states at the outset that the time will be indefinitely long, there is great discouragement and perhaps insufficient determination even to give the treatment a trial. Therefore the maximum amount of confidence to aid in commencing the work is not secured. On the other hand, the bad effects of unfulfilled promises are deplorable. If a cure is promised in a rash moment and not brought about in the specified length of time, the patient will relapse, so that his "last state is worse than his first."

But as the common experience among honest experiments in this field is that more than 50 per cent of cases are curable and nearly 50 per cent more capable of much improvement, one can, by taking pains, reach a conclusion as to how best to present the requirements of treatment to a stutterer, so as to do what is half the battle from start to finish, namely, establish and retain his confidence in the method, in the teacher, and in himself.

A STUDY OF 1,000 CASES OF STAMMERING, WITH SPECIAL REFERENCE TO THE ETIOLOGY AND TREATMENT OF THE AFFECTION.

G. HUDSON MAKUEN, M. D.

(*The Therapeutic Gazette, June, 1914.*)

The age of the patients at the time of consultation was from 2½ to 53 years, the average being about 15.

The affection usually begins during the first few years of the developmental speech period, or to be more precise, it begins during the period of transition between the child's more or less meaningless jumble of words and his attempts to make accurate use of them as a means for the expression of thought and feeling. This period is that which comes between the ages of 2 and 4 or 5, the exact time depending upon the state of the child's psychophysical development. It is rare for the affection to begin after puberty, for by that time the speech habits have become more or less fixed; but we have one patient who had no difficulty up to his 23d year, when the stammering began to manifest itself.

Of the 1,050 cases of stammering, 77 per cent were males and 23 per cent were females. This shows a greater proportion of females than statistics usually give. In my report of 200 cases, published in 1897, only 5 per cent were females. The high percentage here given may be due to the fact that clinic cases come largely from the

working classes, and girls have more leisure and greater opportunities for taking up the task of seeking relief. However that may be, the affection is undoubtedly less prevalent in females than in males, and the reasons given for the difference have been many and varied, the chief one, I think, being the greater natural aptitude of females for all work requiring the finer coordination of muscles.

That stammering usually occurs in those exhibiting a somewhat characteristic temperament must be apparent to all who have made a careful study of the affection. Whether or not the temperamental peculiarities, however, are the cause or the result of the affection is another and more difficult question. As a rule, stammerers are emotional, sensitive, hesitating, evasive, and oftentimes cowardly.

Eighty-five per cent of the cases were of average mentality, and we have had few, if any, who might be regarded as being above the average; about 14 per cent were a little below the average mentality, and only about 1 per cent were far below the average. Thus it appears that stammering is of rare occurrence among those of feeble mind, a certain degree of intellectuality being necessary for the full development of the affection.

The fact that about four-fifths of all stammerers are of average mentality and that only about one-fifth are below the average is worthy of note, and I would explain it on the theory that those who are mentally alert are under greater phonatory and articulatory stress. In other words, they have more to say and they feel more the importance of saying it than those in the lower grades of mentality.

The general health of stammerers is usually somewhat below par. Faulty breathing and spasmodic attempts at phonation and articulation combine to interfere with normal physical development. The acute infectious diseases, such as whooping cough, measles, scarlet fever, diphtheria, and smallpox, are all important etiological factors in the affection. Moreover, stammerers are generally nervous and excitable, and they exhibit marked neurotic tendencies.

Thirty-nine per cent of my patients admitted having or having had relatives who stammered, and this percentage is probably too low, because there is always a tendency to conceal the facts in matters of this sort, and because stammering probably existed in some of the families without the knowledge of the patients.

Stammering is an affection that develops with the development of the speech of the individual, and it develops chiefly in those children who have inherited, or it may be acquired, the physical anomalies which make the development of the affection possible or even probable. These anomalous cerebral conditions which give rise to stammering may be transmitted from parents who themselves may not have stammered, but who possessed all the cortical conditions which

usually result in the affection and only escaped it through more favorable environmental surroundings.

Association and imitation, however, must be reckoned with in studying the etiology of stammering, and especially since they help to determine the character of the affection and thus suggest certain variations in the treatment indicated in individual cases. Thirty-two per cent of my patients confessed to have associated with others similarly afflicted, but in the majority of instances this association was with others in the family who, together with the patients, may have inherited the conditions which made the affection possible, or who were themselves blood relatives from whom they may be said to have inherited the affection.

Inasmuch as over 28 per cent of my patients date the origin of the affection from the instant of having received a nervous shock, I think that we must give this a conspicuous place in the list of the causal factors of stammering. There is probably no human faculty that is so much influenced by nervous or emotional conditions as the faculty of speech.

Although no very careful studies of the ocular conditions were made, we found 26 per cent had faulty vision, owing chiefly to a defective action of the muscles.

Only about 3 per cent had subnormal hearing, and this seemed to be purely accidental and in no respect related to the affection.

No less than 97 per cent of my stammerers complained of some nose or throat trouble, and so great was it in 36.8 per cent of them that operations were performed for their relief.

TREATMENT.

From what has been said you will readily understand that the treatment of stammering is more psychological than physiological, and yet the psychical causes of stammering can only be reached and removed through the physical activities of the individual. The only way that one can learn to do things is by doing them, and the only way that a child can learn to talk freely and unhesitatingly is by talking freely and unhesitatingly, and when he can not do this, as is always the case with the untaught stammerer, he must be shown how to do it. This is the work of the teacher, but in order that the teacher may be able to do it successfully, he must himself be skilled, not only in the art of speech, but also in the art of teaching speech culture. The successful treatment of stammering aims not to correct a defect of speech, but to establish good speech; not to graft something upon an old trunk, but to plant a new tree, and to encourage its growth. In other words, the treatment of stammering has for its purpose primarily the reeducation of the cerebral speech mechanism,

and this reeducation must be brought about largely through the accurate physiological use of the peripheral mechanisms of speech. The physical exercises must be selected and adapted to meet the needs of each individual patient, and they must be practiced by the patient, not aimlessly, but with close attention and with what some one has called "purposeful intent." The chief purpose of the practice should be the establishment of normal mental imagery, for upon the accuracy of the mental imagery depends the accuracy of speech. Just as one may by practice strengthen and develop his visual imagery and thus increase his powers of observation, so may the stammerer develop and strengthen his auditory imagery, and thus overcome his difficulties of speech.

The stammerer must learn to idealize speech just as the singer learns to idealize song. "As a man thinketh, so is he," is a phrase that suggests the condition of the stammerer. If he thinks stammering speech he will necessarily use stammering speech. His condition is like that of a novice on a bicycle who sees a stone ahead. If he sees it clearly enough and to the exclusion of other things, he will surely hit it. On account of his past experiences the stammerer sees nothing but trouble ahead, and the fear of this trouble amounts in some instances to a veritable obsession, paralyzing all normal effort. Accurate mental imagery under such conditions is a practical impossibility, and we must help the patient to remove the mental confusion arising from his fear of trouble before any satisfactory progress can be made. When the stammerer has acquired an adequate knowledge of the nature of his difficulties, he is then in a position to learn how to redintegrate and strengthen the mental imagery upon which good speech depends.

PSYCHOGENIC EPIDEMICS IN SCHOOLS.[1]

AUGUST STRAUCH, M. D., Chicago, Ill.

(*Medical Record, Jan. 17, 1914.*)

Psychogenic institution epidemics appear at the present time, rather than the great psychic epidemics of the Middle Ages, which were principally of religious origin. The number of these imitation epidemics in educational or other institutions, especially in girls' boarding schools, hospitals, and prisons, is perhaps greater than is generally believed, since it is to the interest of these institutions to prevent such occurrences from becoming generally known.

The cases in the hospital at Haarlem are much quoted, where an epileptic by his seizures through imitation transmitted his convulsions to all the other patients. Van Swieten observed spasms, from

[1] General title of article (with bibliography): "Disorders in Children by Imitation and Induction."

which small children suffered, mimicked by all those who were unfortunate enough to be witnesses. Palmer, in 1892, observed in a girls' school in Biberach (Germany) about 13 children from 11 to 13 years of age who all manifested sleeplike conditions. Rembold, in 1893, reported a psychic epidemic in a girls' school at Stuttgart. After a girl had fainted, 25 cases of nervous disturbances occurred; 15 girls were affected with tremor and screaming; 10 with unconsciousness and sleeplike states. Hirt, in 1893, reported that 20 girls among 48 between 5 and 12 years of age were taken ill with hysterical spasms and disturbances of the sensorium, near Lignitz, in Germany, in the village school of Gross Tinz. Szegoe observed at Budapest in 1895 a singular cough prevalent in a girls' institution (chorea laryngis). Bokay witnessed a very unique and spectacular psychic epidemic in a girls' school near Budapest. Fifteen girls between 9 and 15 years of age who were affected imitated the cries of various animals by peculiar expiratory sounds. A pupil, who had previously suffered from catarrhal cough, suddenly had an expiration that resembled the sneezing of a horse. Soon after two other pupils produced also peculiar expirations, which, however, sounded more like barking. Still other girls reproduced the hissing of geese, the shrieking of parrots, the neighing of horses; the majority, however, imitated the barking of dogs. Whenever one girl started, the rest apparently had to join in, thereby creating a confusion of noises as if "from the animals of a menagerie." Bokay excluded intentional imitation. Von Holwede described an epidemic of light attacks of spasms with sleeplike states in a high school in Braunschweig.

Singultus is not infrequently marked by its epidemic spread. In 1897, when I was still in Vienna as a medical student, there occurred an epidemic of hysterical singultus in a class of a girls' school in the second district, in which 28 girls among 35 were victims, so that the class had to be closed. Dr. Bercach, who has reported this imitation epidemic, in addition to this made a similar observation in another school, in which 20 girls among 30 were affected. Schuette describes the occurrence of "trembling disease" in a girls' school at Meissen.

Unique and very interesting were the observations made by Schoedel of a peculiar disturbance of handwriting that spread among the children of a class in a public school in Chemnitz, 21 of the 35 pupils being affected. During the first days of the disturbance the children, girls and boys, would write well at the beginning of their lessons, but gradually in the course of an hour the handwriting became more and more tremulous. During the following days the characters and figures were tremulous even at the beginning of the lesson and became finally very grotesque and unreadable. This peculiar ataxia of the hand and arm movements appeared only in writing, not in other kinds of work. There were no signs of ner-

vousness, exhaustion, or excitement present. Shortly before the outbreak of this epidemic the daily newspaper published repeatedly articles about a school epidemic of trembling disease in Meissen, where 134 children, mostly girls, were unable to hold any light object, such as a penholder, during the attack. It was proved that the first patient in Chemnitz had heard of this epidemic. In the opinion of Schoedel, this example and the suggestion of the teacher in expressing to his pupils the hope that they might be spared the trembling disease of Meissen served actually as the provoking agent of the epidemic in Chemnitz. In this case the children imitated the peculiar disturbance of the writing of their near neighbors. Schoedel is averse to classifying this or similar psychic epidemics among the manifestations of hysteria, as some authors do, because it dealt mostly with well nourished, healthy, not neuropathic children, of average education and healthy parentage and for other very plausible reasons. He applies to these phenomena the unprejudiced term "induction or imitation diseases." Certainly such conclusions must be approved for a great number of psychic epidemics, though in others hysteria, as the underlying factor, is too conspicuous to be denied.

It is the physiological underdevelopment of the child's psychic organ with its great tendency to imitate and the impressionability of mind and the vivid imagination that render such epidemics possible. A real disease is not necessarily a factor, as idiosyncrasies and aberrations may be imitated. Girls are possessed of these childish characteristics in a more pronounced degree than boys and enjoy more leniency, and this factor is apt to aggravate such evils.

When children, in aping instinctively the bad habits of adults, suddenly exhibit the morbid manifestations seen in others, we must not always necessarily presume an abnormally increased imitative tendency, a morbid impressionability; in such cases the milieu may be sufficiently influential to affect the child. Finally, we must remember that a certain theatrical talent exists in the normal child, which becomes evident in their play; undoubtedly this may aid at least in inducing the children to copy and ape others, including abnormal persons, especially if their desire is directed toward "playing a rôle." The more conspicuous the feature of the example, the more will the instinct of mimicry in the child be aroused.

I shall only cursorily point to the occurrence of enuresis nocturna in previously healthy children as due to psychic contagion by unconscious imitation of classmates and friends who are afflicted with this disturbance. Also the so-called school headaches, which as a rule are of neurasthenic nature, seem to be due to hysterical imitation and suggestion in a number of cases. Thiemich, as school physician, relates the experience that in some classes one-third or more of the pupils, mostly girls, between 10 and 14 years of age, upon inquiry asserted that they suffered from headaches, while in other classes

with the same number of pupils of the same age only sporadic cases were present. A suggestive therapy with tinctura amara was generally followed by speedy and permanent cure, though the neurasthenic forms remained uninfluenced. Thus we see that these epidemics present an endless variety of symptoms, and we realize that the phenomena are too many to enumerate. One feature is common to all of them—psychic contagion in a limited circle of children who spend many hours together and are more or less embraced by the same bonds, as in schools or other institutions.

INVESTIGATION OF 100 CASES OF CHOREA.

ARTHUR NEWLIN, M. D., Philadelphia.

(*Pennsylvania Medical Journal, June, 1914.*)

The new cases applying to the dispensary of the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases during the year of 1910 were selected and the services of a special social worker were obtained through the social-service department of the hospital. The year 1910 was chosen as being not so distant as to make it difficult to trace patients to their homes and yet distant enough to note the existence of recent recurrences.

Of these 100 cases, 69 per cent were Americans, the other 31 cases being fairly evenly distributed among Irish Americans, Russian Jews, English Americans, etc. The female sex predominated, 63 females and 37 males being enrolled. The majority were between the ages of 5 and 15 years, there being little difference in the distribution in two-year intervals between these ages. The average duration of the attacks was from one to six months, 34 out of 87 cases, where accurate records were obtainable, lasting from one to three months. The month of onset was interesting in that there was only a fair proportion beginning in the spring months; that is, 28 in March, April, and May; during the summer an equal number began, and in the last three months of the year there were also 28 cases beginning in that period. In only five instances was there evidence that shock or fright was the casual factor in the beginning of the attacks. As far as association with diseases in the parents is concerned, it was noted that rheumatism headed the list, there being histories of that disease in 40 of the parents, in 21 evidence of functional nervous disorders, while 15 gave histories of tuberculosis. In 15 of the 100 families there was the existence of chorea in other members than the patient. In 13 instances alcoholism was recorded in one or other of the parents. As far as the previous health of these patients was concerned, it was found that outside of measles, chicken pox, and whooping cough, tonsillar troubles were the most frequent disorders recorded. There

were 62 instances of tonsillar disease, of which tonsillitis comprised 24, hypertrophied tonsils 20, and in 18 the tonsils had been removed. In 25 cases there was a definite history of rheumatism and in 12 there were histories of joint affections that were ascribed to rheumatism and suggested that disease. In 39 instances ocular defects were noted; the majority of these had been ordered, but were not wearing, glasses. In only 6 instances was there history of heart disease.

On investigating the environment of these cases it was found that the class of patients affected with chorea seemed to be rather above the average dispensary case as far as social status was concerned; there were very few instances of extreme poverty, 90 per cent being above the poverty line. The neighborhood was almost always fairly good, in many instances noisy, but sanitary and not congested. In the homes this also held true; 80 per cent were in good condition, underdrained, orderly, and well ventilated. As far as the hygiene of sleeping apartments was concerned it was found that there was but little overcrowding; 27 had rooms to themselves; in 58 instances there were two in a room, and in only 10 cases three in one room. The ventilation was bad in 18 per cent; the hours of sleep were too short in 43 per cent. The investigation of the question of feeding showed that in 15 per cent there was gross, general deficiency, and in 61 per cent there was overindulgence in tea, coffee, and sweets, this in spite of the fact that these patients had been instructed in the evils of this kind of diet. In the matter of amusements there was evidence of gross neglect of instruction, 50 per cent of the children were allowed to go out at night, either playing in the streets, or, as in 48 out of the 50, they were permitted to go to cheap evening vaudeville shows or to moving pictures. In only 15 instances was there actual evidence of the home discipline being an important factor in the continuance of the choreic attacks. The investigation of the schools attended by these patients showed a satisfactory state as far as could be judged. In only one instance could an attack of chorea be traced to overcrowding in the schoolroom, and the standing and conduct of the patients were almost uniformly reported as good, although in many instances there was considerable loss of time from school on account of the disease. The same can be said of the places of employment of the patients who had left school to earn their own living.

Of the 100 cases, 52 had more than one attack. In 30 cases there was one recurrence; in 15, two; in 4, three; in 2 cases, four; and one patient had six separate attacks. The intervals between the recurrences were as a rule from one to two years; in 15 instances one, and in 21 two years elapsed between the primary attack and the first recurrence. In 10 cases one year elapsed between the first and second recurrence, and in 7 cases two years elapsed between the

second and third attacks. Although there were seven primary attacks beginning in January, there was no recurrence amongst any of these cases. The spring months being slightly the favorite time for recurrences, 26 secondary attacks occurred in that time, 20 occurred during the summer, and 15 during the last three months of the year, September and February being unfavorable months both for the occurrence of primary attacks and recurrences. The duration of the recurrences corresponded in the main with that of the original attacks; of the 82 recurrences 50 lasted from one to four months. In 22 instances the parts affected in the recurrences were similar to those involved in the primary attacks, in 13 there was a complete dissimilarity, and in the remaining 17 there was partial involvement of the members originally affected. In analyzing the home conditions affecting these patients who suffered with more than one attack of chorea, it was found that there was simply an exaggeration of the bad factors found in the case of the primary affection. In 31 out of the 52 cases the children were improperly fed and in these the overindulgence of tea, coffee, and sweets was marked. In the matter of diversions, the "movies" here played a more pronounced rôle than ever. In 38 instances out of the 52 cases the patients not only attended these amusements, but almost always at night and in the majority of instances several times a week.

In review it seems that the most important aid that the social worker can provide is in the matter of diet and securing the proper amount of physical and mental rest for the patient. Material help can also be given by obtaining information as to the family history, and previous history of the patient, and in discovering such predisposing factors as unwise discipline, overcrowding, bad ventilation or some unexpected evil influence that would not be brought to light except by a visit to the home of the patient. The proper correction of ocular defects is a very important factor in the health of choreics; and the difficulties that are encountered in making these patients get suitable lenses and persist in wearing them when prescribed, can usually be overcome through the aid of the social service.

FEEBLE-MINDEDNESS AND SCHOOL CHILDREN.

E. Bosworth McCready, M. D., *Associate Neurologist, Southside Hospital, Pittsburgh, Pa.*

(*Medical Record, Aug. 23, 1913.*)

The period between the ages of 6 and 14 is the most important in the life of the feeble-minded child. It is during this period that he is able to make the best use of the special training which he requires. For this reason early recognition of his condition is necessary. Feeble-mindedness is often not suspected until the child by his inability to

advance in school gives evidence of his condition. Parents very often either can not or will not see that their child is any different from other children. Sometimes they fail to bring to the attention of the family physician the apparent abnormalities of the child, but the family physician himself is very often at fault in this matter as he is very likely to lightly dismiss the subject with the remark that the child will outgrow his difficulty or that there will be a change at 3 years or at 7 or at 14. In this way valuable time is lost which might be put to good advantage. The fact that the child has arrived at any certain chronological period in his existence has no more bearing than does the condition of national politics. This superstition has not only been responsible for a vast amount of neglect of the feeble-minded, but has been the cause of early neglect of remediable defects, which had they been corrected at the proper time would have saved, in many cases, lives of suffering and inefficiency. It therefore devolves upon those who come into contact with the child in his early school days to recognize the importance of the situation and to take steps to remedy it.

The question of the responsibility of the public school to the feeble-minded child should be considered in relation (1) to the child himself, (2) to his fellow pupils, (3) to society in general.

In the ordinary classroom the feeble-minded child gains but little of value. It is true that some, in whom memory is well developed, will advance, but they gain practically nothing except the ability to repeat, parrot-fashion, dates, rules, and formulæ, understanding but little of their real meaning. Lacking primarily in the power of attention and unable to concentrate but for a short length of time, the long school periods become irksome and the children soon become fatigued and restless. The feeble-minded child is suggestible to a marked degree. He consequently learns easily evil habits which in his more normally poised schoolmate are little more than incidental phases of development without permanent damage, but in him tend to aggravation of his condition. He also is liable to become the scapegoat for the escapades of his companions and be led even into lawbreaking without any realization of the gravity of his offense. I have, at the request of probation officers of the juvenile court examined a large number of boys who have been arrested on charges of theft and other crimes who were entirely incapable not only of understanding the gravity of their offense but of originating the plans by which the crime was carried out. In the majority of cases the real culprits escaped. The feeble-minded girl is doubly in danger. How great her danger is the records of any juvenile court or maternity hospital will show. It is unfortunate that these girls are very often attractive in appearance and manner, and, while their tendencies may not necessarily be immoral, their power of resistance is very

slight indeed. It has been shown that a large proportion of girls leading lives of prostitution are feeble-minded.

Malnutrition and a lack of bodily tone, with lessened resistance to disease, is practically the rule in the mentally deficient. It has been noticed that whenever there is an outbreak of any of the acute infectious diseases in a school that the feeble-minded are always the first to succumb. On account of limited opportunities for contact with other children and unusual solicitude on the part of the parents, the feeble-minded child is often remarkably free from disease until he begins to attend school, when he contracts one illness after another. The tendency to the development of tuberculosis is marked. In fact, this disease is the greatest cause of mortality.

In the special or ungraded classes which are now a part of the school system in nearly all of our large cities, the feeble-minded child may, and usually does, progress up to a certain point. I am firmly of the opinion, however, that the feeble-minded child should be allowed to remain in the special class only a sufficient length of time for his condition to be accurately diagnosed, or until a place can be found for him in a suitable institution.

Of what advantage, except to the normal children and the teachers of the normal children, has it been to attempt to educate the feeble-minded children in the special classes of the public school? They are no more fitted to participate in the world's work than they were before; they are more dangerous to their fellows, less happy, their evil tendencies are greater, their powers of resistance less. They have lost valuable years during which they have added their quota of misery and debt, to increase as each year goes on, and to no purpose.

The influence of the feeble-minded child upon the other children in the class is bad. One such case can upset the discipline and impede the progress of an entire class. All children are highly imitative, and from amusement at grimaces and grotesque actions they soon come to imitate them. The moral obliquities of the feeble-minded are also a source of contamination to the other children. To include the feeble-minded in special classes with those who are only backward is an injustice to the latter. The backward child is capable of more or less rapid advancement to normal under suitable conditions and when given the advantage of proper individual attention. It is impossible for the teacher to give this attention when her time is taken up with the feeble-minded.

I have already alluded to the increased susceptibility to the acute infectious diseases and to tuberculosis. For this reason the feeble-minded child may become at any time a dangerous source of infection.

At a meeting of the American Academy of Medicine, held at Lehigh University, I offered the following suggestions:

1. That the public school is not the proper place for the education of the feeble-minded.

2. Careful examination should be made by competent investigators of all children when they first apply for admission to the public school.

3. Those found to be feeble-minded should be excluded and segregated in institutions (or when practicable kept at home under supervisory control of the proper authorities).

4. Doubtful cases and those backward in their development should, after the correction of physical defects, faulty environmental conditions, etc., be admitted to special classes where they will receive the training suited to their individual needs, and be under the observation of physicians especially trained in this sort of work.

This plan by some was considered to look like the millennium, though very desirable if it could be brought about. While recognizing the impossibility under the present condition of affairs of its being put into immediate execution, yet I do not see, when the general public, the school authorities, and the legislators have been brought to realize the importance of the problem of the feeble-minded, why some such plan would not be entirely feasible. In the meantime there is nothing, except the inertia of authorities, which need prevent an expert examination of each child when he enters school, with proper differentiation of the various types, and certainly, if it be necessary at the present time to continue the feeble-minded in the public school, nothing to prevent their separation from the backward and from those with slight defects of hearing, vision, or speech. With the feeble-minded in classes by themselves, we will at least know the number with which we have to deal, and other measures would follow.

A STUDY OF THE ETIOLOGY IN 175 EPILEPTIC CHILDREN.

ARTHUR WILLARD FAIRBANKS, M. D.

(*Boston Medical and Surgical Journal, Apr. 2, 1914.*)

Epilepsy can not be regarded as a disease in the sense in which the term should be strictly employed. The longer one studies the cases that come under his observation, the more he will find it impossible to give a concise and unqualified definition of any clinical entity, or in other words to a disease that as such may be termed "epilepsy," and the stronger will become his conviction that the state so designated is merely an instability of the central nervous organization, an inability of the nerve centers to maintain their equilibrium in the presence of either ordinary or extraordinary stimulation from without. The frequency, the persistency, and the

degree of this instability of the central nervous system furnish us with a convenient basis of classification, which is, however, merely a convenience.

From this point of view all of the innumerable exciting factors of the individual attacks, so often emphasized as of importance in the etiology of epilepsy, become immaterial in so far as the solution of the real cause of the unstable state of the individual is concerned. They are merely the immediately exciting factors that for the moment overthrow the poorly balanced nervous system. Overemphasis of these exciting factors of individual epileptic or eclamptic attack serves rather to cloud than to clarify our understanding of the fundamental cause of the condition. Innumerable articles have appeared, and are constantly appearing in medical literature, the sole purport of which is the attempt to prove this or that exciting factor the real or fundamental causation of epilepsy. This tendency, persisting even at the present time, is to be deplored, for it only delays the recognition of the fact that every conceivable external stimulus may be sufficient to overthrow the static balance of the central nervous mechanism when its static balance is below the normal average of stability, and only then. What are the conditions that are responsible for this defective equilibrium? We must first consider the conditions that make the normal development of stability impossible.

In the first place the parent cells may not be endowed with those inherent qualities that permit the ultimate attainment of relative stability in the developed organism. In such instances the instability is inherited. It is of course impossible to assert the existence of this inherited instability unless there exists in the history of the ascendents of the individual positive evidence of similar instability.

Second, given parent cells with normal inherent stable qualities, some influence may be brought to bear on the embryo in utero to impair the development of the central nervous system and consequently to prevent the evolution of stability * * *. It may be relative to the otherwise normal physical development of the child, or it may be but a part of a general defective physical development.

Third, with the embryo normally developed, there still remains, as a possible factor in impairment of stability, the incidence of trauma and disease. The period of birth is the time in the life of every child when the brain is exposed to the greatest danger. After birth there exists throughout the years of childhood the incidence of trauma and disease as cause of cerebral injury. The permanent structural damage produced by diseases that directly affect the brain, as meningitis, encephalitis, and hydrocephalus, is a matter of common clinical observation, while it is by no means a rare clinical experience to

observe the serious injury done to the central nervous structure by the infectious diseases, either directly by the action of their toxin or indirectly through vascular lesions.

The study of these 175 cases confirms an opinion I have held for many years, as the result of the observation of many hundred epileptic children, that heredity is a minor factor in the etiology of epilepsy, whenever the disease is studied at such an age that the true details of the past and family history of the victim can be obtained. These data are obtainable in the case of children to an infinitely greater extent than when the disease is investigated only in adults. Both the data and physical examination of epileptic children indicate that the affection in the majority of instances is the result of acquired cerebral injury from trauma or disease.

THE RELATION OF PHYSICAL DEFECT TO DELINQUENCY.

H. D. NEWKIRK, M. D., *Director and Surgeon to Research Department, Hennepin County Juvenile Court, Minneapolis.*

(*Bulletin of the American Academy of Medicine, February, 1913.*)

From the physical standpoint I think we can safely say that loss or lack of nerve control is the underlying cause of delinquency. This loss or lack of nerve control can be further classified as due to (*a*) nerve irritation, (*b*) gross failure of development of the nervous system, (*c*) lack of development of the higher centers of the nervous system. All of these factors are accentuated during the period of puberty.

Considering causes of nerve irritation there are certain defects which are well known to the medical profession, and in our work we have found them in the following order of importance: Phimosis and elongated, irritable foreskin, adenoids, diseased tonsils, malnutrition, eyestrain, anemia, impacted teeth, chronic appendicitis, hernia, and worms. Of course every physical defect is a source of nervous irritation more or less, but we have found these to be the most important.

The second factor in lack of control is failure of development of the nervous system. The group of children comprising this class is relatively small, but the delinquencies are usually of a more serious character. Here we find the cretin, Mongol, hydrocephalic, and microcephalic of the congenital group, and the acquired with arrested mental development as in the cerebral palsies, epilepsy, dementia, and syphilitic conditions. In this class, too, we should put those cases developing lack of control due to brain injuries. These children are unable to develop and carry out a well-laid plot and are just as apt to give away or lose the results of their trouble as not. Their delinquency is simply the uncontrolled impulse of a childish brain.

The third division, or lack of control due to lack of brain development, is of considerable importance. The former group has more especially to do with gross or macroscopic brain changes, while this class has reference to microscopic changes. I refer mainly to that group of children known to psychologists as Morons or border-line mentalities, a group varying according to different investigators, but one of large proportions and of great importance. These boys were formerly considered simply peculiar or erratic or just plain bad because they wanted to be so, and the rod, well applied, was considered the scientific as well as practical solution of the repeated delinquencies.

I have come to conclude that these boys are very largely victims of cross heredity. Usually one parent is fairly normal and well-balanced mentally, while the other is not. It is generally conceded that idiocy and imbecility are very largely directly traceable to faulty heredity. It is also, I believe, just as true that the higher grades of feeble-mindedness, shading all the way from the normal to the imbecile, are very largely products of a poor heredity. The main causes contributing to this poor heredity are alcoholism, continued for a long period previous to the birth of the child, devitalizing diseases, such as tuberculosis and syphilis, the nerve-racking strain of both high society women with their bridge and late hours, and the mental struggles of the poor to make ends meet, and other prenatal influences of similar nature.

During the different ages of childhood, delinquency has different phases and is influenced by different factors. The most powerful single factor is, no doubt, puberty or the period of adolescence. Why this is, exactly, we can not tell, but it is very certain that there is a marked change in the child at this time and especially the child with a weak mentality. The normal child has control sufficient to protect him against the mental delirium of a new experience and vision of life. He has sufficient mental ballast to carry him safely through the shoals till smoother waters are reached, but the child with the faulty heredity on the side of the nervous system is predisposed to loss of control at this most trying time, and once the fight is lost, it is doubly hard to follow the narrow path in the future. Fathers and mothers should be instructed in the care of their children at this time, for if a child crosses this period safely his parents need not worry over his future, for his habits will be formed and his actions under control by this time. On the contrary, if a child breaks down at this time and happens to receive punishment which he thinks he does not deserve he is very apt to be a confirmed criminal from that time on. It is at this period that the sexual desire is increased, and the boy who is overdeveloped sexually will need extra care, together

with a liberal amount of physical work to take care of his extra energy. Overstimulation at this time with excesses brings about nervous exhaustion, with resulting loss of control. At this important period, when the young man is just coming to maturity, we find an exaggerated idea of self. In short, he is going through a period of adjustment, and if his sense of balance is not quite normal he will fall into misfortune. Thus, while this period, the climax in the life of the youth, may deviate only slightly from the normal, this slight deviation may be the "last straw" action as a stimulant either to hasten the day when he shall graduate into the ranks of the full-fledged criminal or brace him for a straightforward, manly career.

In summing up, let me state again that physical defect is without doubt secondary to environment as a direct cause of delinquency, and that mental defect or an unstable nervous system, due to bad heredity, is, in my opinion, of far more importance than the usual defects, such as of tonsils, adenoids, and vision. The boy with the well-balanced, finished nervous system will survive the misfortune of such defects as these, but to the undeveloped, unstable mind these defects, acting as a nerve irritation, tend to increase the strain on the already overtaxed, unfolded brain, and the outcome is only too frequently disastrous to the child.

THE PHYSICAL BASIS OF CRIME FROM THE STANDPOINT OF THE PROBATION OFFICER.

JOHN W. WITTER, *Superintendent Chicago Boys' Club, formerly Chief Probation Officer, Chicago.*

(*Bulletin of the American Academy of Medicine, April, 1914.*)

In an examination of all the children at one particular time in the Chicago Detention Home, 203 carious teeth were found in the mouths of 58 children, and but 4 of these children had ever visited a dentist. In 90 per cent the teeth were almost totally destroyed.

An examination of 2,367 children showed that 65 per cent had decayed teeth, which were in need of dental care and treatment. We can easily imagine the suffering that would come from 203 decayed teeth. There is little question as to the effects of bad teeth on health and nutrition, and it does not require a great stretch of the imagination to believe that an aching tooth has many times been the first cause of irregularity in attendance at school, and everyone knows that irregular school attendance is one of the first steps to the juvenile court.

The following four cases are typical of hundreds that have come to the attention of the probation department of the Chicago juvenile court:

One that is now before it is the case of a lad from one of the very best families, who has claimed the attention of the police on five or six different occasions—each time for stealing. The last time he stole an automobile. The first time he was brought in those closest to him did not believe he was guilty. The minister of the church, an attorney who was the boy's Sunday-school teacher, and his employer, all came forward giving him the best of recommendation, and making special mention of the good traits of every member of his family. The boy finally admitted the theft to the judge. The probation officer visited the boy, and was surprised, in a very few days, to find out that he had again been stealing. Incidentally, the parent made mention of a severe fall that the boy had had when 3 years of age. An X-ray examination was made of the boy's skull, and it was found that a splint was pressing on certain portions of the brain.

Another case—a boy about 12 years of age, who for years had been unmanageable at home and school, had done very little at school, and had been kept practically all this time in one grade, was picked up a number of times for stealing, and was finally brought to court. It was learned that he was really a "stool pigeon" for other boys. An examination showed that the boy was a subject for the feeble-minded institute.

The third case is that of a young girl who had an extremely bad temper. The probation officer was continually securing a position for her, which she kept for but a short time. The girl often complained about her eyes. Finally she was taken to an oculist, who discovered a terrific eye strain. She was fitted with glasses, and the girl got along so well at her work and at home that the officer finally lost track of her. After more than a year the girl again came to see her about a job. It was the same old story, but it was learned that the girl had broken her glasses and had been doing without them. She again began wearing her glasses, and the former satisfactory experience was duplicated.

The fourth case is a lad who was regularly picked up by the police for stealing and for running away from home. This happened as many as a dozen times in six months. He was finally brought into court and, upon examination by a physician, it was found that he had had a great deal of illness, was exceedingly nervous and sometimes hysterical. His nutrition and development were both very poor. It was recommended that he live an out-of-door life, and he was sent to the country. In a few months his condition was greatly improved, he gained in weight and height, has given no further trouble, and advanced four grades in school the first year.

THE SCHOOLHOUSE AS A CRIME CONTRIBUTOR.

EDWARD C. ELLIOTT, PH. D., *Professor of Education, University of Wisconsin.*

(*Bulletin of the American Academy of Medicine, December, 1913.*)

Up to the present moment the relation of education and criminality has been narrowly interpreted, either in terms of intelligence as increased through instruction, or in terms of physical condition as improved through care and protection. To many of us engaged in the serious study of education as the greatest of the social constructive professions, it appears that another item must be considered along with instruction and hygiene before the influence of the school will be positive in producing individuals possessing permanent behaving tendencies of a noncriminal sort. Broadly speaking, this new item is adequate and proper material provision in the public school for responding to the normal demand for *activity* on the part of both children and adults. Until this is brought to pass the American school will be guilty a contributor toward delinquency. Our ethics and our medicine have been too individualistic. The moralist and the hygienist, to make a bold assertion, have regarded the individual, particularly the child in the school, as something that could be made morally antiseptic as easily as he could be made physically antiseptic. Scanty isolated illustration must suffice.

Just now the subject of physical morality occupies a large place in current thought. We are becoming more and more concerned with the possibility of making an effective program of public instruction, inside and outside of the school, in the matter of sex hygiene. Of what avail is such a program so long as the one place in the schoolhouse where sex obtrudes itself represents too often conspicuous uncleanliness, sanitary incompetence, and evil suggestiveness. As long as the larger per cent of American schoolhouses have their present inadequate and uncleanly toilet provisions and arrangements shall we have a contagious center for immorality.

There is, the country over to-day, an insistent need for the empowering of State boards of health with efficient authority to clean up, not only our dirty physical schools, but our dirty moral schools. This is easy to assert, but difficult of performance. A case in point is that of an eastern State where the conditions to which I have just referred are notoriously bad. The president of the State board of health told me a few days since, while discussing the possibility of a more effective enforcement of the law now giving that board the power to condemn schools with improper and unsanitary outhouses, that a proper enforcement of the law would mean its immediate repeal by the legislature. A study of the social and educational situation in that State convinces me that he was right. There is a vast difference between clean statutes and clean schools.

The American schoolhouse is primarily a contributor to our criminal account, because it fosters just that kind of uncleanliness in which the seeds of criminality find a ready growth. A large part of the problem of social hygiene centers in one part of the American schoolhouses.

The child of the city to-day is the child of the streets. To keep the child off the streets is next to an impossibility. His presence there presents not only an educational problem, but a social issue of increasing magnitude. The crime-preventing schoolhouse must provide, within and without, for proper play space for the children of its neighborhood. This schoolhouse must constitute itself a center for the physical and social activities of children outside as well as inside the school if it would successfully counteract the destructive influences that now characterize the streets of the American city. The schoolhouse of the average American city can not be held guiltless so long as it fails to compete with the alley.

The schoolhouse that keeps bankers' hours is only half a school. Within a few weeks the board of education of a middle western city ordered all-night lights placed at the darkened entrances of all public school buildings. The reasons therefor were obvious. A good police measure, but a doubtful educational policy. The light might better have been provided for the inside and not for the outside of the building. Until the American schoolhouse is constructed so as to make proper provision for the legitimate recreations and amusements of our civilization, your medical sociologist will have an increasing task before him. If we are to fight the devil with fire it is not unlikely that the billiard table and the dancing floor will find a place in the completely equipped and socially enlarged American school building.

The schoolhouse that remains closed for one-third to one-fourth of the year certainly presents a defenseless social policy. For the city child a summer vacation represents a crisis in moral development. The criminal responsibility of the schoolhouse will not be removed until it undertakes to be in operation throughout the whole year and in a way that will meet the instinctive needs of children and communities.

The most characteristic American immorality is political immorality. The American schoolhouse must be constructed so as to enable its use as a common meeting place for the discussion of political problems and social issues. "Keeping schools out of politics" is a pernicious doctrine. If the American schoolhouse is to be the real temple of democracy it must be constructed and arranged so as not only to safeguard children from physical ills and to promote their

best physical development, but also to serve as a shrine in which our people may protect themselves from the criminal furies of modern political life.

So long as we regard the schoolhouse as an influence apart from normal daily life will it remain a factor in the development of the abnormal and the artificial. Our first school buildings were designed and arranged by theologians and pedagogues. Next came the architects and the engineers, who were followed by the physicians and the hygienists. To-morrow the ideals of the humanist will control, ideals that seek to combine the necessities of instruction and of art, of construction and of health, of activities and of morals. All — pedagogue, architect, engineer, physician — must unite to make the schoolhouse sterile of the germs of immorality and criminality.

TEACHING OF HYGIENE IN PUBLIC SCHOOLS.—RECOMMENDATIONS OF THE COMMITTEE OF THE AMERICAN ACADEMY OF MEDICINE.

HELEN C. PUTNAM and EDWARD JACKSON.

(*Bulletin of the American Academy of Medicine, June, 1914.*)

I. That from kindergarten up, by progressive steps, children be helped to learn through studies of plant and animal life the essentials of human physiologic processes, parenthood, heredity, the essentials of influence of environment on health and development, including microorganisms, insects, and other carriers of communicable diseases; that included in lists with typhoid, tuberculosis, and other common contagions, syphilis and gonococcus infection be enumerated, corresponding data being given for each in the list.

For this purpose it is urged that fellows of the academy concentrate individual influence on institutions training teachers and on boards licensing them, insisting that they be adequately prepared and tested in the elements of physical and chemical, biologic, and social sciences with special reference to their practical applications in hygiene and sanitation.

II. That, beginning in seventh and eighth grades, and continuing through high school, girls shall progressively acquire skill in home making by practice in intelligent application to household affairs of the related elementary principles in physics, chemistry, and biology; this to include for girls over 15 years of age details in the care of infants and children. It is also recommended that boys be permitted to take such of these courses as they wish, and be required to take those parts concerned with municipal and household sanitation and with the social relations of the home.

III. That to meet the needs of the several million children who annually drop out of primary, grammar, or high-school grades, for

girls (young women) over 15 years of age, schools or classes in home making be established by the State; and that in all continuation schools or classes for boys (young men) and young women instruction in sanitation and personal hygiene supplement vocational teaching, the minimum being the health details connected with the vocation itself and with the well-being of their families.

IV. That to establish health habits and ideals, a regular part of the daily work of children at school shall be the testing of temperature, humidity, dustiness, air currents, air freshness, cleanliness, etc., by instruments of precision so far as possible (thermometer, hygrometer, anemometer, for example), charting results on the blackboard and permanently recording them in a book, with such service in correcting faults as is suitable; and that open-air rooms be established in every public school system.

V. That special attention be given to having all forms of physical exercise, including dancing, adapted to individual needs, *taken under sanitary conditions*, and conducted with insistence on correctness of fundamental technical details, as, for example, standing position, carriage of shoulders and head, closed mouth.

VI. That medical men and women, nurses, janitors, and their supervisors be provided with instruction and training in school sanitation and personal hygiene according to the public duties which each class undertakes, as teachers are supposed already to be; and be carefully tested before appointing or licensing.

THE TEACHING OF SEX HYGIENE IN THE PUBLIC SCHOOLS.

PROF. C. R. HENDERSON, *University of Chicago, President of Chicago Society of Social Hygiene.*

(*Chicago Medical Recorder, November, 1913.*)

I will put myself on record as favoring the purpose of those who are seeking to give education—and I am choosing my word very carefully—on this subject in our public schools, families, churches, and everywhere else. I do not like the words "sex education." Perhaps "education with reference to sex" would be still better; but the whole treatment of the subject is evidently transitional. I hope the time will come when the word "education" will cover all that boys and girls, and young men and young women, older men and older women, ought to know; that nothing will be omitted; that everything will fall in its place in the teaching of biological science, morals, and physical training, and in the teaching of religion; that everything that interests humanity will be taught in its place and in its due proportions.

I think the whole difficulty has arisen because of false notions in regard to education in the past, and that there ought not to be, and

in the future—perhaps not far away—there will be no such thing necessary as "sex education." It is my profound conviction that the time will come when boards of education the world over will seek to develop and direct to their true goal all the normal interests of humanity. Instruction on this subject must of course be given by competent persons of proper character as well as of adequate information. That is essential to the success of our enterprise, and any other persons than these would do the cause a great deal of harm. I believe that the original motive of the medical society is one that ought to be the motive of all of us—to protect people against infection, against the spread of loathsome and destructive diseases that come from prostitution and its consequences.

Instruction is the least part of education. You may, indeed, protect a great many people by telling them the dangers of certain courses of conduct, but if you can do nothing more than excite the physical fears by giving medical instruction, you have done nothing indeed, and sometimes harm; but you have not accomplished your full purpose, even as medical men, until you have gone further than instruction. Education means vastly more than that. It means the shaping of ideals, a play upon the feelings, such a kind of education as will make the boy chivalrous, knightly, and regard the interests of every daughter of Adam as the interests of his own sister, even if that daughter is a prostitute herself; a boy who will respect the ideal of womanhood even in those that we call fallen and outcast; who will be such a boy, such a lad, such a young man that when he comes to be a man he will be ashamed of himself if he even hints at the argument that it is necessary, in order to protect wife, sister, or daughter from these great evils, that we must have a class of prostitutes.

A second word of caution and warning must be spoken, though the danger of being misunderstood at this point is great. An honored physician once said to me: "You make a great mistake if you merely dwell upon the medical side of this question. There are a great many other sides—the moral and the religious."

Much as you and I believe in the importance of protecting people against venereal poisons, there are some things that are vastly worse than venereal poisons. The medical profession say that these diseases can, within limits, of course, be cured. They tell us that they can "make sin safe." I do not say that they are wrong; that is a medical and professional matter. But if you could prevent all these diseases and keep prostitution you still have the real evils to combat. We must not be contented with a half victory. We maintain that victory at the cost of greater victories yet to be achieved is a kind of defeat. I have a right to say it, as a teacher, as one responsible for shaping the character of young men and young women. I say that we must not dwell too exclusively on this matter of the prevention

and healing of venereal poisons. There is a deeper poison. When the young man permits himself to go into this kind of company there is a damage done to his spirit, to his soul, to his character, to the community. Metaphorically speaking, there is such a thing as a soul poison, and that to me is the supreme interest of this whole business. We must not be satisfied with a temporary and superficial gain. Medical science will gain its victory and we shall all rejoice when these poisons have been done away with. It is toward that ideal that we are moving. But when you have achieved that, beyond there still lies this greater, larger problem, and we can not do it alone as teachers, as ministers of the gospel, and priests of the church; we must have the help of medical men, who come nearer to being the true confessors of the community than any other class among us. What a wonderful trust when we commit to the hearts of the members of the medical profession the secrets of the household. Therefore, because we trust in you, we ask you to use all of your influence to aid us; and we believe that you will. We believe you will be interested not only in the prevention of disease, but that you will join, as citizens, as fathers and mothers, as good friends of humanity, with us in trying to hold up the highest, the loftiest ideals of the race; so that the physical purity of the race will go hand in hand with the purification of the spirit of the race; and then shall we have, with your help—without it, never—a purified and an exalted humanity, that will look back to the disgrace and sorrows and pains of the past as things that have taught us the most lasting, eternal lessons of life.

PROPAGANDA AGAINST ALCOHOLISM.[1]

ALFRED GORDON, M. D., Philadelphia.

(*Journal of the American Medical Association, Jan. 17, 1914.*)

A useful measure for decreasing and preventing alcoholism is propaganda in its broadest sense. The moral and intellectual influence of various antialcoholic societies is beneficial. The good they do can not be sufficiently appreciated. Moral persuasion and conviction are most efficacious in that direction. The widest publicity concerning the effect of alcohol on physical and mental health should be considered as vital. The public should read and see the pernicious consequences of alcoholism. Lectures and clinics should be systematically organized and actual demonstrations given. The public should be invited to visit particularly institutions for the feeble-minded, where they could see for themselves specimens of humanity brought into the world by parents whose alcoholic excesses have thrown on the community a useless burden. Imbeciles, idiots, and those otherwise men-

[1] General title of article: "Administrative and prophylactic measures against alcoholism."

tally deficient, epileptics, and children with all sorts of morphologic abnormalities result from parental acquired diseases or pernicious habits, of which alcoholism is one of the most conspicuous.

Propaganda against alcoholism should be particularly applied to young persons and children. The rôle of the physician is here indicated. It is he who comes in contact with families. As counselor in medical and hygienic matters he can use his great influence in various circles. Considered as a man of knowledge and experience, he will be listened to. He can prevent parents from giving children their first taste of drink. It is he who controls the diet and hygiene of children. It is to him that the mother addresses herself for advice as to the habits of her children.

Next to the physician is the children's teacher. But the teacher himself must be well informed as to the nature and dangers of alcoholism. He should have taken, before he is prepared to instruct, a special course in social hygiene in which the effects of alcoholism should occupy a prominent place. Such a course should be given in schools and colleges, and the instruction should be not only theoretical but also practical. It is necessary that every youth leaving school should possess a fundamental knowledge of the effect of alcohol on tissues, organs, the nervous system, the mentality, and the offspring. From a tender age the child should be thoroughly imbibed with the idea that alcohol is one of the most obnoxious and dangerous poisons. It is the knowledge of what is true, useful, and indispensable in life that presents the most powerful weapon against the acquirement of pernicious habits or diseases. Imparting this knowledge constitutes real scientific prophylaxy.

The public at large should be familiarized with the fact that one of the threatening features of alcoholism is depopulation not only quantitatively, but also qualitatively. It leads to a degeneration of both the individual and the species. It produces a slow and progressive individual deterioration and an intellectual and physical sterility of the race.

TEACHING OF FIRST AID IN SCHOOLS.

CHARLES A. KINCH, M. D., New York.

(*Bulletin of the American Academy of Medicine, June, 1913.*)

The idea of instruction in first aid to the injured originated in the brain of Prof. von Esmarch, of the University of Kiel, when he was surgeon general of the German Army. He argued that the efficiency of the soldier would be increased, his suffering alleviated, and often his life would be saved, if his wounds could be promptly dressed on the field. Accordingly, every man was furnished with a packet sewed into the lining of his coat, containing a clean compress,

a bandage, and a strap for a tourniquet to stay the flow of blood. The results justified the expectations, and after the Franco-Prussian War he expanded his instructions so as to be useful to railway and steamboat officials and employees in factories and mines. He added chapters on poisons and household emergencies. Good Samaritan societies were established all over the Empire. The idea was transplanted to England, and grafted on the St. Johns Ambulance associations which had been formed to inspire manliness in young men and teach them to save people from drowning. In 1882 a first-aid society was organized in New York City to give this instruction. Recently the American National Red Cross has created a very efficient first-aid department for instruction in all the large cities of the country, New York being left to the society already established there. The Pullman Co. has given the Red Cross a railway car completely equipped with appliances, both for giving and teaching first aid. Many of the western railroads, and lately the Pennsylvania, have welcomed this instruction. The Bureau of Mines has also made a liberal use of the Pullman first-aid cars. Many classes have been formed in settlements and neighborhood houses. The New York Board of Education regularly includes this subject in its courses of free lectures, and a very large number of those attending have submitted to examination and received diplomas. The question of including first aid in the scheme of public instruction has been broached. The Boy Scouts and similar organizations of boys all over the country have taken up the matter, all of which leads us to the inquiry: At what age is instruction in first aid best to be given?

The average boy is content to be in "leading strings" until his tenth or eleventh year. At this age he aspires to be a leader, or at least to be a member of a gang. Altruistic principles do not develop until a couple of years later. Neither is cooperation or team work well done before the thirteenth or fourteenth year. Then the boy realizes that he has a neighbor and he wants to do something for that neighbor. His sufferings appeal to the boy's sympathy. Then also he is able to understand the mechanism of the human body and has acquired a certain amount of dexterity in the use of his own hands and members, and he has attained a measure of stature and strength that makes him efficient in rendering prompt aid to the injured.

Of girls about the same things may be said. They are more capable of serious altruistic thought after the thirteenth year than in their childhood days. And by that physical and mental development better able to comprehend and apply the principles of first aid.

Nothing in the foregoing is to be construed as discouraging special instruction for imminent needs. But just as correct speech is taught from the earliest days and the study of grammar and rhetoric deferred until riper years, so should instruction in first aid be fragmentary

and adapted to present emergencies in the case of little children and its systematic study be postponed to the third or fourth year of the high-school curriculum. In social settlement work the proper pupils for instruction are to be found in working girls' clubs and young men's classes rather than in the junior organizations.

THE EFFECT OF COMPETITIVE ATHLETICS ON SCHOLARSHIP.

H. D'ARCY POWER, M. D., San Francisco.

(*California State Journal of Medicine, October, 1913.*)

Two years ago the State Medical Society of California appointed a committee to investigate the effects of athletic training in the high schools and universities and made me a member thereof. As my colleagues were devoting themselves to a consideration of ultimate physical effects, I thought it might be a useful division of labor if I concentrated on a study of the mental side of the question. This paper is the result and is in fact an expansion of my subreport, dealing also with some points that are perhaps a little outside of the direct scope of the authorized inquiry and presenting opinions for which I alone am responsible.

That I may the better present the matter, I propose an attempt to answer the following questions:

First. Is the expenditure of public or quasi-public money for higher education authorized or intended for any other purpose than the cultivation of the mind and the acquirements of knowledge?

Second. Is it necessary or desirable that in order to obtain such intellectual ends physical culture be a part of the curriculum?

Third. If physical culture be desirable, is the method of training a part of the student body in competitive athletics a proper form of such training?

Fourth. What is the ascertained effect, as seen in scholarship and life, of competitive athletics in high schools and universities?

It seems scarcely necessary to ask the first question. That the public is paying for high schools and universities, and private munificence in endowing the same, makes such expenditures for the sole purpose of affording opportunities for the cultivation of the mind, would appear self-evident. Legislative enactments and endowment deeds alike plainly state such to be the fact. These institutions neither exist for their own glorification, for the benefit of any group of individuals, directly or indirectly, nor for any material or social benefit to their alumni that is not the direct product of intellectual culture and efficiency.

Question 2. If we turn the question over to physiology and psychology, certain interesting questions will present themselves. Here are a few:

What rôle does the muscular system play in the life of the organism and the development of the brain.

It is to be remembered that the muscles contribute more than half the mass of the body. Variations in their condition or bulk lead to fluctuations in energy production and chemical changes that affect every cell in the organism. We are too much inclined to think of muscles solely as part of the machinery of motion, but it is to be remembered that we are warm-blooded animals compelled to metabolize a given quantity of food per day to maintain our temperature, and that the muscle is the chief agent in such fuel burning. Ergo, shrunken muscles mean defective heat production and possibly transference of the function to cells that normally are devoted to other purposes, involving, in its train, general malnutrition. From this viewpoint a defective musculature must also involve neural elements. But musculature stands in another and even closer relation to the nervous system. Most of the neuronic cells of the cord and a large proportion of those of the brain are directly concerned in inhibiting or controlling muscular movements. Without functional use their nutrition is not maintained and analogy would require us to expect that adjacent areas devoted to sensory or psychic uses, participating in a common blood supply, are likely to suffer by reason of their contiguity.

We have excellent clinical evidence to this effect in the experience of the prison at Elmira, N. Y. It is part of the reformatory activities of that excellent institution that the unfortunates committed to its care shall receive instruction during their incarceration fitting them for useful service in later life. It was found in the case of the undernourished, muscularly defective, slum-raised prisoners such efforts were fruitless. They neither had the desire nor the capacity for the simplest instruction; but after a course of physical training, with the growth of the body appeared the ability to profit by mental training. So much for the affirmative side of the proposition.

There can be no question as to the desirability of a fairly developed muscular system, kept in reasonable activity, both for its effect on the organism as a whole and the brain in particular. It is, however, to be observed that in considering the classes with which we are dealing, namely, the students of high schools and universities, cases of muscular deficiency such as those encountered in Elmira are very rare. The disadvantages of excessive musculature are many. To begin with, the musculature constitutes the mass of the body. The very idea of health implies balance. To overdevelop or overexercise any one part of the organism is pathological, as Prof. Lee, of Columbia University, writing on this subject, says: "Physiology teaches that fatigue of one tissue from overuse means fatigue of all tissues. Extreme activity of the muscular system involves not only lessened

muscular but also lessened mental activity." But the overuse of the muscles means more than diversion of energy. It implies cardiac strain, with its secondary effects; most important of all, it involves flooding of the system with myogenic katabolites, and that these are poisons the fatigue phenomena of muscle tissue amply prove.

[Then follows a discussion of sensory and motor types of mind, athletes belonging predominatingly to the latter type.]

I would, therefore, be inclined to answer question 2 as follows: Reasonable muscular development and activity is necessary to the attainment of a physiologically balanced organism, and muscle training within limits is conducive to brain development. But there is no evidence that the mass of high-school or university students are so underdeveloped or lethargic as to call for special provision in this direction. If such were the case it would demand an organization of physical training as an integral part of the curriculum from which none should be exempt.

Question 3. Admitting that physical training is desirable, though not indispensable, is competitive athletics a proper form of such training? The first point to be observed is that competitive teams are recruited from a small part of the student body. Let us ask what part? From the poorly developed, who need and would be benefited by exercise or training? We opine not. Such material does not provide the sinews of war. Do they represent the sensory type of mind, with its tendency to excessive introspection, suspended judgment, and slowness to act; whose possessors, even when muscular, would be benefited by the training of the campus? Again we opine not. The man who takes to competitive athletics as a duck to water is the individual of motor type, whose energies constantly bubble into muscular action, who naturally acts on the spur of the moment. He is of the fluid attention, who never learns to study. To such men competitive athletics is as easy as mental work is hard. But they not only do not need training along these lines, but all such training tends to further fix their unfortunate natural tendencies. The athlete must act, not think; so the greater the perfection of their technic, the more automatic the working of their minds. Competitive athletics train the wrong man, physically and mentally. The view here propounded that the man who goes in for exercise is by nature averse to study is not only based on the psychological principles set forth, but is supported by the observation of the majority of teachers. In answer to a questionnaire (to be described later) sent by the writer to all the universities of the United States and to the largest high schools of California, this view was supported by 60 per cent of the replies.

Question 4. I prepared the following post-card questionnaire:

The Committee on Athletics of the State Medical Society of California will be obliged by an answer to the following questions based on your personal observation. (Kindly return answer within a week.)

1. Have you found students excessively addicted to athletics disinclined to or incapable of intellectual effort?

2. Do students that have passed through a period of athletic training show any falling off in the quality of their college work? For how long?

3. If so, what is the effect on—

Memory.
Concentration.
Reasoning.
Will power.

4. Have you noted any relation between athletics and morals in general? In ideal? In restraint?

(Signed) ——— ———,
Professor or instructor in University of———

I forwarded a number to the president of every important university in the United States and to 20 of the high schools of California, together with a letter in the name of the State Medical Society of California, asking the cooperation of the presidents to the extent of placing the questionnaire with the men who would give the most useful and unbiased information, and also inviting correspondence. A very large number of replies resulted, and the great universities in particular have afforded valuable data.

[Then follows a criticism of the dependence of competitive athletics upon gate receipts.]

Bearing in mind the probability that current tendencies must have made for a predisposition to answers favoring competitive athletics, I will proceed to analyze the replies. As already stated, 60 per cent of the total replies express a belief that the athlete is naturally disinclined to study. The high-school instructors place it as high as 75 per cent. This is to be expected, as the nonstudious youth would naturally tend to drop out at the end of the high-school course. The second inquiry is answered in equal proportion by high-school and university professors and is to the effect that 75 per cent of them are of opinion by direct observation that men in training show a falling off in scholarship. Some of my correspondents are explicit on this point.

The third question was designed to ascertain whether the influence affected all or part of the mental faculties, and the terms used were such as everyone understands, even though some psychologists might consider them obsolete. The answers are striking—94 per cent state concentration to be weakened or destroyed; 86 per cent note weakening of memory; 83 per cent weakening of will power; 78 per cent of power to reason. Again, the high-school instructors give a more averse opinion than do the university professorate.

We now arrive at the last question, "What is the effect of competitive athletics on morals?" The very varying opinions expressed are seemingly due to the different ways in which the question was interpreted. It appeared to me that morals could be affected in two not necessarily connected manners. Ideals of conduct (not confined to the game) and life could be raised or lowered. And the power of restraint in face of temptation could be strengthened or weakened, not merely for the sake of physical fitness during the training period, but as a continued influence during life. My questions were designed to bring out observations on these points. Unfortunately, the answers show that in a very large number of cases the respondents considered only the ethics of the game and the training period. We thus find 60 per cent expressing a belief that ideals are improved, but when reasons or details are given they refer solely to fair play in the game. Adverse criticism is, however, explicit. * * * Seventy per cent of the answers are favorable to athletics as increasing power of restraint, but again the result is vitiated by the prevalent underlying thought that because excesses during the training period are sternly interdicted, therefore the men have acquired habitual restraint. * * * As stated, the preponderant opinion as given in the answers to the questionnaires is favorable to athletics as a good moral influence, but the number of replies to this question was smaller than to the others, and I believe largely given under a misunderstanding. Lastly, 40 per cent of all replies were neutral.

ATHLETIC SPORTS IN RELATION TO HEALTH.

(Editorial in Journal of American Medical Association, Mar. 21, 1914.)

It is one of the numerous parodoxical facts encountered in everyday life that the problems of athletics rarely receive the attention of those who are most concerned with health, the supposed ultimate purpose of bodily exercise. The management of athletics is rarely found in the hands of a physician, by whose scientific guidance one might reasonably expect that the various sports would be enabled to effect the best of which they are capable and would be freed from the unconcealed dangers attending some of the present athletic practices. Athletics have for the most part to-day become the province of the people at large. It is the uneducated trainer rather than the physician, the hero-worshiper rather than the hygienist, who directs and inspires the performance of the physical exercises which ought to be undertaken primarily in the interests of a sound body and a sound mind. Games have developed into contests in which victory is sought at any human price. The "manager" is the foremost adviser, and the physician is called on as a last resource

to mend the damage that may have been done in an ill-advised struggle for athletic supremacy. Such are the exhibitions that the populace wants. Until there is a wide-spread education of the people as to the proper underlying purpose of bodily exercise and the dangers that beset the indiscriminate and uncontrolled pursuit of athletics by every one whom the inclination stirs, it is a seemingly hopeless task to preach the gospel of reform.

Meanwhile, the physician and the physiologist must content themselves with acquiring the data on the basis of which sound judgment in relation to the problems of exercise and sane advice in the pursuit of athletic sports may be obtained. Only the beginnings have been made in this field of study. If football or rowing or bicycling have their dangers, what are they? Wherein do the respective advantages of the various types of physical exercise lie, and what are their unquestioned effects on the organism? What are the physiologic prerequisites for participation in each form of gymnastic performance? These and a host of similar questions demand ready answers in respect to which there should be common accord, precisely as there now is a growing appreciation of the physical standard of health demanded in the various industrial occupations. In the latter case the subject is investigated because it has become a matter of dollars and cents; when health and happiness are the sole end sought the same question has been neglected.

Among the internal organs the heart and kidneys have hitherto received most consideration in connection with the physiology of exercise. There is an idea abroad that each form of athletics has its own peculiar types of pathologic defects. Just as one hears of the "tobacco heart," there are the alleged "bicycle heart," "football kidney," etc. It has been the merit of Albu, in Berlin, to point out that the pathogenesis of the abnormal conditions familiarly associated with the pursuit of athletics may be interpreted from a common point of view. In other words, all undue muscular exertion, whether carried out by one group of muscles or another, in one type of movement or a different one, affects certain groups of organs and metabolism in general in entirely comparable ways. The physiologic or pathologic result may vary in degree, but not in kind. The effect of vigorous exercise in its more extreme manifestations exhibits two phases: First, there is a stimulation bringing about a rapid, vigorous circulation to the taxed muscles and the internal organs and disclosing itself by the rise of blood pressure and augmented cardiac activity. This is followed sooner or later, as the varying intensity of the exertion may determine, by a depression phase. A fall in blood pressure and functional heart weakness ensue. It is the latter aspect of the results of undue exercise, with the derived consequences of cardiac insufficiency, that is most likely to engage the attention of the phy-

sician. In varying intensity the symptoms of stasis throughout the circulation now arise. Venous stasis in the kidneys occasions the characteristic nephritic changes which find expression in the altered composition of the urine. Every sort of pathologic sediment, ranging from the slightest deviation from normal to the picture of severe nephritis, may be seen. Frequently the extremely sudden onset of circulatory changes determines a degree of venous hyperemia quite comparable with the condition in acute hemorrhagic nephritis. In the "athletic kidney," however, the pathologic manifestations are always caused by functional disturbances rather than by morphologic alterations in kidney structure. In this respect Albu is inclined to compare the kidney changes resulting from undue exercise with those occurring in orthostatic albuminuria, which is likewise presumably a purely functional phenomenon. He believes that extreme exertion of the musculature of the lower limbs is far more likely to induce renal stasis than the exercise of other groups of muscles. In confirmation of this it is said that even vigorous use of so-called chest-weights and other apparatus of similar design rarely, if ever, disposes to abnormal kidney manifestations in the way that running may.

It is asserted that the kidney disorders at times discovered as the result of the active use of the lower limbs, in running matches, for instance, are due to the mechanical jar or vibration peculiar to this form of exercise. Observations made on numerous persons who have undergone long journeys by railway, in which the opportunity for such alleged injury by vibration alone is not inconsiderable, have failed to disclose any damage to the kidneys.

Athletic exercises may be differentiated into feats of strength and feats of endurance. Albu maintains that these differ essentially only in the fact that in the one case (in tests of strength) the initial rise in blood pressure is very soon transformed into one of depressed circulation; in the case of endurance tests this comes about more gradually. In feats of endurance the fall in blood pressure reaches a much lower level than is found in the brief exhibition of great muscular exertion, and the physiologic consequences are determined accordingly. There are no important differences between the different types of athletic sports in respect to their physiologic effects on the body. The severe symptoms, however, make their appearance more prominently in the exercises like football, wrestling, bicycle contests, etc., which may call for extreme exertion. Every forced muscular exertion leads to a precipitate rush of blood to the periphery and the internal organs. An enormous volume of blood may be driven into the arteries in a very brief period. When the cause of this circulatory response is removed, equilibrium speedily enures. The heart is not overtaxed unduly long and the encountered weakness is transitory at most; but in contests of long endurance the final outcome is a pro-

longed and unrelieved fall in pressure, with an increasing relaxation of the fatigued cardiac musculature.

To what degree the distinctly pathologic manifestations of improper athletics may arise depends on a variety of circumstances, some of which can readily be indicated. Age is a factor of significance. During the period of adolescence, when the organs have not reached their full development, the responses are pronounced, and the person is usually sensitive to muscular excesses. "Constitution" expresses in a somewhat vague way another factor which determines the fitness of a person for athletics. There must be adequate development, suitable nutrition, and a competent nervous system, the latter element often being undervalued. Obviously, appropriate training furnishes another safeguard against the dangers of athletic overdoing. Much of what is called "training" in this country is, however, a combination of unscientific and sometimes irrational dietetics with psychic quackery. Last, but not least, the degree of exertion required is a feature of determining significance when the ill effects of athletic sports are to be avoided. The distinction between doing and overdoing needs to be learned and appreciated more than any other single factor in the rational pursuit of bodily exercise for health and enjoyment rather than for personal superiority and group supremacy.

THE CARDIAC EFFECTS OF IMMODERATE COLLEGE ATHLETICS.

LEOPOLD SHUMACKER, M. D., and WILLIAM S. MIDDLETON, M. D., Madison, Wis.

(*Journal of the American Medical Association, Apr. 11, 1914.*)

The frequency of cardiac lesions among the men participating in competitive sports at the University of Wisconsin has emphasized the urgency for a study of this subject from a clinical point of view. From this aspect it may be divided into three parts: First, the immediate effects of severe muscular strain on the heart; second, the effects of training and a series of severe athletic contests on the heart; and, third, the ultimate effects on the subsequent life of an individual of alterations brought about in the heart through athletic contests in early life.

From a review of the immediate effects of severe muscular exercise on the heart we conclude that—

1. Normally, during severe muscular exertion, there is an increase of pulse rate, arterial and venous blood pressure, pulse pressure, and of the systolic output of blood.

2. In the period immediately following, there is a fall of pulse rate to normal, and of arterial blood pressure, pulse pressure, and, frequently, of the diastolic size of the heart to below normal.

3. Increased diastolic distention during violent effort may reach a point beyond the capacity of the heart muscle to bring about a com-

plete systole. This results in the typical symptoms of acute cardiac dilatation. The weakened condition of the cardiac muscle is shown after the cessation of bodily effort by its inability to contract to its normal size or below. This precludes all possibility of obtaining the rest needed after the strain of increased diastolic expansion and systolic contraction prevalent in very active exercise.

4. Clinically it is well known that infectious diseases predispose to myocardial weakness and to acute dilatation. Experimentally, De la Camp has shown that starvation, likewise, so predisposes. Some authors doubt if there be nonpathologic hearts with a musculature so weak that it can be strained sufficiently by muscular exertion to dilate acutely. Case 2 (1361) appears to indicate that at least chronic overstrain may weaken the myocardium to this extent.

5. At present we have no definite means of judging by clinical tests whether or not an untried apparently normal heart is capable of standing the strain of athletic contests. Some weak hearts remain dilated after a relatively slight exertion and are, therefore, clearly without adequate tone to withstand the severe strain. On the other hand, hearts known to be diseased may respond in the normal manner by contracting slightly after the cessation of moderate exercise. Hearts that give distinct systolic murmurs may withstand a Marathon race better than hearts apparently much more normal (Barach).

6. Extreme care should be given to the examination of the heart before and after moderate exercise in all who desire to enter severe athletic contests. Failure of normal reaction should bar anyone from such contests. Even those withstanding these contests well should have the heart examined at frequent intervals during their training to avoid overstrain. Many men weaken the heart muscle, instead of strengthening it, by continued overstraining. Riviere's observations, in 1909, on the effect of prolonged overstrain on young boys, which he found to result in the production of persistent cardiac changes, should serve as a special warning in care of the young.

7. Infectious diseases are especially liable to weaken the myocardium. For this reason severe athletic contests should be avoided by sufferers with or convalescents from acute infectious diseases, even of so mild a nature as tonsillitis or grip. "To work a cold off" by severe exercise is dangerous advice.

The question next naturally arises as to the condition of the heart in athletes who pass through one or more seasons of training and athletic contests without obvious symptoms of cardiac trouble.

To determine the extent of cardiac alterations in athletes at the University of Wisconsin, we have made an examination of the hearts of 45 athletes who have taken part in major sports at the university, and for the sake of control have examined the hearts of 20 nonathletic students. In both cases we have been guided in our selection

merely by the desire to pick out men whose social and medical history gives no reason for assuming that extraneous factors have altered the normal structure or functioning of the heart.

Our studies show that, while acute cardiac dilatation of an immediate serious nature is not so frequent as one might expect among college athletes, marked cardiac hypertrophy is the rule rather than the exception, and that in a considerable percentage of cases functional disturbance of a more or less serious nature accompanies the hypertrophy.

The marked cardiac lesions found in so large a proportion of our college athletes present a serious problem, especially at a time when physical training is extending from the colleges to the secondary schools and the popular idea of a good physical trainer is so often the man who can turn out winning teams. While it is not desirable unduly to restrict healthy sports, on the other hand the leaders in athletic sports should not be called on to sacrifice too much the future for the present. The tendency in boys from 14 to 18 to develop cardiac lesions which are transitory, if the heart is not at this time subjected to overstrain, complicates the problem when extended to high-school athletes.

There seems reason to believe that at present there is an increase in cardiovascular disease in this as in most civilized countries. The relations of violent muscular exertion to such diseases should be thoroughly understood. The college athlete represents a type of special interest in this connection. During violent athletic contests he is stimulated by the excitement of the crowd to exert himself far beyond the point of physical comfort. Between seasons and when out of training he is apt to lead a more or less sedentary life, and this becomes usually the case after his athletic career is over.

The effects on the after life of the members of the college crews at Oxford and at Harvard have given rise to several studies, but the results are not of much value in throwing light on the general problem. They show in general that the crew men have lived a few years longer than would have been expected from mortality tables used by life-insurance companies, but accurate medical details are wanting, and we have as yet no good data on the life expectations of the picked classes from which the crew men have come. Perhaps the most significant tables are those of the Surgeon General of the Navy, who reports six deaths in athletes from diseases attributable to athletic overstrain to one in nonathletes among the select lot of young men trained at Annapolis. It seems reasonable to assume that a young man whose athletic training had led to cardiac hypertrophy with some functional disturbance likely to increase when the large heart no longer has exceptional work to do will be physically handicapped

in life, to what extent careful study of numerous men is necessary to show. It will be found not only in the field of cardiovascular diseases, but also in the decreased resistance which such men show to acute infections, such as typhoid fever and pneumonia. Dr. Harlow Brooks in 1913, as medical officer of a regiment of the National Guard in New York, in which there are many college athletes from 5 to 15 years out of college, has found the health of these men on the whole decidedly inferior to that of the other members of the regiment.

CONCLUSIONS.

1. Athletic training leads at first to physiologic hypertrophy of the heart; but when prolonged and marked by severer athletic contests it usually leads to hypertrophy plus dilatation of a variable degree, frequently marked by valvular insufficiency.

2. Functionally, the hypertrophied heart, even when dilated and giving distinct evidence of valvular insufficiency, may prove more fitted to carry the man through a severe athletic contest than a normal heart would be. On the other hand, acute cardiac dilatation occurs more frequently in athletes and men used to severe muscular strain than in normal men, and the ultimate effects are more prolonged and severe.

3. There is reason to believe that for normal human activities an "athletic" heart is distinctly disadvantageous.

IMPORTANCE OF REGULATED REST AND PLAY FOR SCHOOL CHILDREN.

JAMES F. LOVE, M. D., Jacksonville, Fla.

(*Southern Medical Journal*, March, 1914.)

In regulating the play of a school child I presuppose that this regulation extends to both the extent and nature of play, for while one child may participate with freedom in games entailing strenuous activity, another child should be permitted but limited indulgence in such, and for still another they should be altogether forbidden. Fatigue, consequent on overexercise, may, by depletion of vitality, awaken into activity a tuberculosis that previously had as its expression only enlarged lymph nodes. By fatigue the resistance of the poorly nourished child may be so undermined as to render it an easy prey to all infectious maladies. Strenuous play may prove disastrous and even fatal in cardiac disease, while selected and restricted play is to be commended.

The school child with a spinal curvature, with flat foot, with narrow chest, the hunchback, the mentally deficient, are all as much

entitled as the cardiac patient to the supervision of a constant physical instructor. In this connection I would protest against the obviously unjust methods pursued by the physical directors of many of our public schools. One has but to visit the playgrounds of one of these schools to note the discrimination practiced against the very child who mostly needs regulated physical exercise. The physically fit and well-developed boy who scarcely needs the assistance of a director has lavished on him the most patient endeavors of an athletic trainer, who hopes, through the physical prowess of his young protégé, that honor may redound to himself and his school. The undeveloped and physically defective child, who has been briefly tried and thrown into the discard, is from every humane point of view more entitled to individual physical instruction and regulated play than the robust and promising young athlete. The pathetic side of this picture is seen in the wistful, longing eyes, the adulation and hero worship, depicted on the face of the little chap who is thus left to his own feeble efforts to work out the problen of his physical salvation. Till the needs and requirements of the school child are studied with a view to developing the weak, conserving the strong, and overcoming the deformities of the defective; till the child's capacity for play is measured and his need of rest is considered; till individual instruction and guidance are given these children under competent supervision, we can not hope for the results that should accrue from regulated rest and play.

While many of the foregoing remarks mostly apply to the growing boy, I should deem my duty but poorly fulfilled were I to omit some special reference to the crying need of regulating rest and play as applied to the developing schoolgirl. No one better than the physician can appreciate the menace to future health that attends the transitional period from girlhood to womanhood. We know that this period is an especially critical one among girls of delicate breeding, and that it must be surrounded by every safeguard to insure for her perfect physical development and future health and strength. During this period the amount of work and play should be carefully curtailed and regulated.

It is not the province of this paper to recommend the nature of play needful for even the average school child. This can only be ascertained by careful consideration of the individual child's capacity and needs. But I would protest against the coercive indoor gymnastics that constitute a part of the regimen of many of out modern schools. For the most part this is not only distasteful to the child but is fruitless of the very results that are hoped to be secured. Just as far as is consistent with the needful limitations and restrictions, a child should be accorded freedom in the selection of his exercise and play, for without a doubt the happy state of mind that attends a

pleasing form of exercise contributes materially to the benefits derived therefrom. This especially applies to the normal child, who for a great portion of the time can rely on the promptings of nature to select and limit his exercise and play.

Many of our school children are incapable of prolonged and sustained mental effort without serious detriment to what is at best but an unstable nervous organization, and I am sure that for these children the study periods required in many of our public schools are entirely too long. In the minds of many of our teachers the idea still prevails that frequent recesses are forms of indulgence or special privileges to which only the brightest and best-behaved children are entitled. I deny the right of any teacher or disciplinarian to select as a form of punishment the curtailing of play which to every growing child is an absolute necessity. I contend that if a child must be denied recess or be "kept in" after school hours as a punishment for acts of omission or commission, then is our system faulty indeed. Desire for physical activity is a predominant trait in every normal child, and associated with this is an equal desire to be amused. I indorse the views of Dr. Kerley, that among our school children "absence of proper amusement is the mother of crime," that amusement and play may be made as educational as we like, and that play of the right kind is always educational.

In closing I would refer to the absurdity of regulating the rest and play of the school child for eight months of the year and freeing him from restrictions and depriving him of guidance during the months of vacation. Any system of regulation of rest and play adopted by our public schools must, in order to be fruitful of best results, be continued without interruption during the entire period of school life. Neglect of this is, for the ends to be attained, just as irrational as to carefully regulate the diet of a child through the school months, and, freeing him from all restrictions during vacation, accord him free rein for such gastronomic indiscretions as are prompted by the caprices of appetite and fancy. Since it is not to be expected that children can be kept under the constant supervision of a physical director, especially during the months of vacation, it is necessary that parental cooperation be secured in order that instructions as to regulated rest and play may be carried out through the entire year. Public playgrounds have become a recognized essential in every large community and could be as appropriately utilized in the smallest towns. On every one of these playgrounds a clubhouse might be built and used not only for indoor amusements and physical training, but as a place for individual instruction of parents and children as to the nature and extent of play and the amount of rest suitable for every child.

COMPARATIVE GROWTH IN CHEST CIRCUMFERENCE AND IN BODY LENGTH.[1]

WILLIAM CARLOS WILLIAMS, M. D., *Medical Inspector of Schools, Rutherford, N. J.*

(*Archives of Pediatrics, August, 1913.*)

In New Jersey the medical inspector of schools in any given district is asked to measure and record the circumference of the chests and the body length in all children once a year.

Turning the problem over in my mind during the regular yearly examination four things become apparent:

(1) That there is no normal size for the chest in either males or females at any given age; no standard by which a chest of a certain age may be judged and declared to be either larger or smaller than it should be, for at any given age there were chests of great variety as to circumference, all of them, as far as could be told, in healthy individuals. Also, I found that these chests were progressing along parallel developmental lines, one with the other, from year to year, at the same time retaining the original—I am to presume hereditary—circumference in relation to length of body.

(2) That in general there appeared to be a fairly uniform increase in circumference each year for all the chests of the same age, though at certain ages this increase in circumference seemed to be greater than at other ages.

(3) Furthermore, that at a certain age the boys' chests seemed to grow faster than the girls' chests, and vice versa.

(4) And, finally, that there was an inverse relation between chest growth and the growth in length of the body, and that in general this was most apparent at one certain age, which differed with the two sexes.

To see if this ratio actually occurred, I at once began to arrange and analyze the mass of figures I had collected during the examinations of that year and the one preceding. The results were chaotic.

Being convinced that this was due to inaccuracy in making the measurements I then began to work with the Bowditch table of measurements of American-born Boston school children, the results of which work are the cause for this paper.

These figures were compiled from American-born Boston school children—4,327 boys and 3,681 girls, from 7 to 16 years.

I took the number of inches gained in height and chest circumference from one year to the next in boys and girls separately, thus:

Gain in chest circumference between the ages 7 and 8—girls, 0.5; boys, 0.5.
Gain in body length between the ages 7 and 8—girls, 2.1; boys, 2.0.

Then dividing the gain in chest circumference by the gain in height (5÷2.1) we get a figure approximately 2, which will indicate the

[1] General title of article: "The Normal and Adventitious Danger Periods for Pulmonary Disease in Children."

ratio between the development in height and chest circumference during that year.

Proceeding in this way from Bowditch's figures we get then an average ratio for each year, one figure for the boys, one for the girls. These figures are as follows (for children 7 to 16 years of age):

	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16
Boys	2	3.8	3.0	3	3	2.9	4	6	4
Girls	2	4.0	.9	5	3	7.0	7	10	16

Consulting my table I found, as I had expected, that there was a minimum ratio between gain in chest circumference and gain in body length, which appeared at a different age in the two sexes, and that in each sex this minimum corresponded approximately to the period just before puberty in the two cases.

Thus, in girls we get a startlingly low factor between the ages of 9 and 10, while in the case of boys we get a less well-marked decrease in the factor between the ages of 12 and 13.

HEALTHY SICK CHILDREN.

LE GRAND KERR, M. D., Brooklyn, N. Y.

(*New York Medical Journal, June 21, 1913.*)

Health is a relative term. Common usage is such that we speak of one who is healthy as one free from disease. The Standard Dictionary includes this as its definition. To be sick brings forth visions of disease or injury, but not necessarily so, because there are innumerable instances in which one feels sick or incapacitated and still remains free from disease. Only recently we have been apprised of instances in which dissolution took place and a careful autopsy failed to reveal disease of any organ, and the cause of death was unassignable. It is possible to be sick and remain free from disease, or, in other words, there are healthy sick persons. This is peculiarly true of childhood, during which functionating is so susceptible to influences from within and from without.

This is a decade in which more than in any other efficiency is being made a prominent part of all activity; along all lines efficiency is emphasized. The time places a responsibility upon the physician which he can not afford to shirk either from a social or an economic standpoint. In childhood especially we should be concerned, not with disease alone, but with the maintenance of every organ in perfect condition. Even this is not sufficient; it is good as far as it goes, but it does not go far enough. Perfect condition of every organ goes a long way toward the continuance of efficiency and the successful

resistance of disease. But perfect organs are not absolutely essential to the continuance of good health, or even to the maintenance of the normal resistance of disease. A child may have one or more organs diseased, and yet remain in better condition than the child who has every organ perfect. And why? Because perfect functionating of an organ is far more important and necessary to life than mere perfection of structure. There must be coordination and cooperation between the several parts if efficiency is to be maintained, and the failure of one or more organs to act in harmony with the others is sufficient to make the child feel sick, although there be no disease present. Shall we disregard perfection of structure? By no means, but we have the habit of emphasizing it beyond its importance, and it is time that we gave the proper value to perfect functionating also.

For the child of these times physiological living is exceedingly important, and from a large experience with children the writer is convinced that normal efficiency is maintained and strengthened by physiological living. Physiological living will mean something different for each child, and in the same child may differ with the different periods of childhood. This is independent of the effect of the varying activities and influences which modify each period. To the infant it means mostly eating and sleeping; to the older child, play and unrestrained activities of mind and body; to the young person, the acquisition of knowledge and the pursuit of pleasure. This life must be lived in harmony with personal and individual peculiarities, whether they refer to sleep, to diet, to mental effort, or to physical accomplishment. No two children are exactly alike, and what will help one may harm another. It is therefore impossible to lay down more than the most general rules. But one general rule must be observed, and that is that the life must be lived in a manner to conduce to the harmonious action of all of the several organs, and to have this a consistent action and not by spells; to promote a continuance of perfect functionating of each organ and to have this accomplished as the result of habit, rather than of mental effort upon the part of the child. One thing is certain, that any scheme that aims to improve the efficiency of children is doomed to early and certain failure unless it is based upon the physiological fact that the pursuit of pleasure is a perfectly normal and commendable attribute of this period of life. And pleasure is not a matter of minutes or hours; it must be adapted to individual needs. The writer trusts that he has made it clear that the healthy sick child is not the victim of disease, or even of conditions that are associated with disease, although the latter may some time be the case, but is a subnormal individual who usually gets scant attention because his need is not emphasized by pathological changes.

In the treatment of these children there is demanded considerable patience to determine the exact fault, and considerable judgment as to how that fault may be corrected, because it is always and essentially an individual problem for the physician. There is always a need for the parent's intelligent cooperation, and this can be secured only by an explanation of just what we are aiming to accomplish. In addition, it may be necessary to adjust the child's diet to individual needs and administer such stimulants or tonics as are clearly indicated. In the great majority of cases the dietetic fault is either a deficiency of fat or the ingestion of food that undergoes putrefactive changes readily, or there may be a combination of the two. In giving a tonic the writer has found that it is nearly always desirable, if not absolutely necessary, to combine with it very small doses of tincture of digitalis, for this seems better than anything else to influence a sluggish or disturbed circulation and enhance the value of the selected tonic. This experience has extended now over several years. Despite all that we may do, some of these children do not respond to any treatment until they are placed in bed and kept there for at least a week or 10 days, and this fact is an important one to remember when we are not meeting with immediate success.

It is not the large things in medicine for which we are commended or condemned, but the little things, the details. The public expects us to do the larger things, but our knowledge of disease has often made us unmindful of the things that lead up to it, and familiarity with the complaints of the adult has perhaps led some to a contempt for their statements in regard to their children. If, however, the hint thrown out by the writer this evening is persistently heeded, the army of healthy sick children will be reduced materially, and some physicians will in time gain a reputation for accomplishing what the public will term "marvelous improvement" in children whom their colleagues disregarded because they did not present definite disease for treatment.

MEASURED FEEDING FOR OLDER CHILDREN.

WM. R. P. EMERSON, M. D., *Assistant Professor of Pediatrics, Tufts Medical School, Boston.*

(*Boston Medical and Surgical Journal, Jan. 15, 1914.*)

The feeding of infants has become an art made possible by percentage feeding of milk and other foods, the constituents of which have been determined with almost absolute precision. Indeed, exactness has been carried to such a degree that sometimes the physician's judgment is led astray by laboratory analyses. In the case of older children this condition does not obtain. In fact, food is prescribed by the physician in most indefinite terms, or else not prescribed at all. Such expressions as, "Give the child good, nour-

ishing food, and plenty of it," or else "Be sure the child does not take anything indigestible" dispose of the whole question. Sometimes the physicians may ease his conscience by adding, "Not too many sweets and no tea or coffee." It seems superfluous to state that this method of dealing with the diet of the growing child is a poor one, but it is met with so often that it demands most serious attention. Someone has well said, "Why do physicians exercise so much care in prescribing drugs that are administered only occasionally and so little care in prescribing food which is taken daily?" This neglect of the proper supervision of the feeding of older children is responsible for many serious diseases of early life and especially for many disturbances of the nervous system that are most difficult to remedy.

For the proper feeding of the child, both physician and parent should have an adequate knowledge of food and food values. Three principal methods are in use for measuring food. In one, all food is divided in portions of 100 grams and tables are made out for the caloric values of each portion. This method is not readily adopted by either physician or parent, as it requires a mental readjustment of values, which is a serious obstacle to its success. We buy food by the ounce or pound. All infant feeding in this country is by ounces. The change into other standards of measurement renders the method impractical except for laboratory work. A second method consists in adopting the ordinary serving as a unit of measure. This method is incorrect, because what is an ordinary serving for one person is not so for another. This method also lacks an important factor present in the other two methods—namely, that of comparison, which is a great aid to memory. The third method, proposed by Irving Fisher in 1906, is called the caloric per cent method. Prof. Fisher prepared tables indicating the amount of food necessary to furnish 100 calories of food value, such amounts being used as standard portions. For example, one slice of bread has a value of 100 calories; also one pat of butter, or the lean meat in a lamb chop, or 5 ounces of milk, or one slice of bacon. These units or multiples of units represent very closely the amount ordinarily taken at one serving, so that food can readily be served according to this plan. It gives at first hand comparisons that help fix food values in the memory, the knowledge of a comparatively small number of which is sufficient to cover all our needs in any particular case. Sufficient information can be given in a short conversation to enable a person to raise or lower his diet 500 or 600 calories daily, which is an amount sufficient to cause a gain or loss in weight as desired.

For a child who is 6 to 14 years of age, 10 to 20 pounds under weight, and who continues his usual occupations, between two and three thousand calories of food per day are necessary for proper gain.

Having, then, a practical measure of food values, in order to make a child gain or lose body weight, the following steps are necessary: In the first place, we must secure the cooperation of the child. This can be obtained by what Dr. Morton Prince calls painting pictures. All girls want to be attractive and beautiful. They also want to do as other girls do- dance, swim, and play tennis. Every boy wants to be athletic. The desire to play baseball and football can always be aroused in him sufficiently to cause him to do almost anything to gain a good physical condition for that purpose. Next, there must be a sufficient control of the patient by parent or other person acting "in loco parentis" to secure a record of food taken and a regular report at stated intervals.

The preliminary record is of importance in this method of feeding. First, it shows how much food is habitually taken; second, it shows the kind taken; third, and more important still, it shows what the child likes and dislikes, making it possible to retain such foods in the diet as are agreeable to the child, simply substituting others for those that should not be taken, thus working along lines of least resistance, a most important factor in successful feeding. In the case of delicate girls, likes and dislikes, aversion to form, taste, or smell, or associations of certain foods with unpleasant events may be almost insurmountable obstacles in securing proper nutrition. Their appetites are fickle, leading them to live almost wholly on carbohydrate food, the proteid being far too low for proper growth. Cause and effect form a vicious cycle often made evident by this simple preliminary list.

The 48-hour record may also show mistaken ideas of parents as regards feeding. They frequently exhibit a certain pride in thinking that what does not agree with them will not agree with their children. Mistaken ideas of food values may lead to the total exclusion from the diet of many important articles of food.

Having from this 48-hour record a knowledge of the kind of food taken and its amount, it is an easy matter to increase or decrease the 24-hour intake by simple changes.

Such changes do not force the child to take too much food at any one meal, and therefore there is little danger of causing indigestion. In fact, in following delicate children with measured feeding I have seen no case of indigestion result. Children under weight seem to have a remarkable ability to digest food, taking as high as 3,500 calories without digestive disturbances. While, on the other hand, in the case of children who are overweight, symptoms of indigestion disappear in a remarkable manner with a diminution of the day's ration.

Measured feeding shows almost invariably that a child without organic disease is underweight because he does not eat enough and overweight because he eats too much. It is a far too common occur-

rence to find children taking tonics, transported to different climates, given all kinds of treatment to make them gain in weight, when a measurement of their food shows they are taking from 1,000 to 1,400 calories daily, an amount too small for them to possibly gain unless actually confined to bed.

In health the question of a proper proportion of protein, fat, and carbohydrates, namely, that of a balanced diet, needs attention only in a general way, as taste regulates this in most instances. For example, bread, which represents protein and carbohydrate, requires butter (fat) to make it palatable. Meat, composed of fat and protein, requires potato (carbohydrate) to please the taste. So the combination of bread and butter, meat and potato, bread and milk, represent physiological needs that taste recognizes and controls.

COLD BATHS AND SLEEPING PORCHES.[1]

A. MORGAN MACWHINNIE, M. D., Seattle.

(*New York Medical Journal, Apr. 18, 1914.*)

The morning cold bath was not only a fad, but became a rage for a number of years. It is still followed by many as a most admirable procedure for toning up the nervous system; and so is the morning glass of whisky. Cold plunges are very much in evidence, even at the present time, in athletic house swimming pools and baths. In England the cold bath is very much in vogue, almost to the stage of fanaticism. It is often related that so and so broke the ice daily, when necessary, in order to obtain his cold plunge. If it were possible to measure the shock to the human mechanism and the extra work thrust upon the individual, what a change of sentiment would immediately take place!

No thought is given to the fact that the human body is a piece of mechanism which will stand but a given amount of strain. No greater shock was ever transmitted to this mechanism than we see at the swimming pools at a temperature of 70° F. This temperature, in itself, if continued for too long a period, adds more work to the internal organs. But for this to be followed, as we ordinarily see, by a hot shower and then by a cold shower, is the most abominable practice imaginable.

It is not to be wondered at that we see so many nervous systems wrecked; it is from nothing more or less than overstimulation. True, many persons are able to withstand this for a while, but the overstimulation is followed by depression, which must be counterbalanced by an overaction or regeneration through an increase of the physiological processes; metabolic changes of all the internal organs and

[1] General title of article: "Two of the Present-Day Fads."

their secretions follow. This, in turn, means a large consumption of food in order to take the place of the losses.

The physiological processes of the various organs are capable of doing a definite amount of work. Such work is governed by the amount, as well as the character of ingested material, and by the capabilities of these organs to produce the necessary conversion, or by their power and that of their secretions to convert this latent energy of fuel to usefulness.

Fresh air never harmed any individual when taken under proper conditions; and it is necessary for healthy existence. In this day we hear much about fresh air; this has resulted in the establishment of numerous sleeping porches, so called. Sleeping in the open air, under proper conditions, is to be commended; but under the conditions we ordinarily see, it is to be severely condemned.

Upon investigating 100 sleeping porches in this vicinity, the following conditions were found to exist: In 96 cases the sides of the sleeping balcony were partially protected from the wind and rain by a tarpaulin or some other material. Two had no protection whatever, and one was inclosed with glass windows which could be thrown open horizontally at night on retiring. This was the only one that could be closed in the daytime, and had hot-water radiators connecting with the boiler in the cellar that kept the bed and its covering as warm all day as the rest of the house. In 98 cases the bed, mattress, linen, and covers were exposed all day to the dampness of the atmosphere. Only 46 had tarpaulin to protect the bedcovers from the moisture. It is needless to say that this covering was insufficient for proper protection.

On interrogating the persons who occupied these sleeping porches the answer was that they found a considerable amount of dampness throughout the covers and mattress. A number found it necessary to warm the bed by hot flatirons; others used an electric pad. The nervous system should not be subjected to the shock which dampness produces, especially at night when we find our physical forces at their lowest ebb. The body must in all these cases furnish heat enough to warm and practically dry out the bed covers or linen before the individual is able to go comfortably to sleep. This again makes it necessary for all the physiological forces to work more than is natural at that time of night, in order both to dry out the bed clothing and to keep the body warm.

A chill is quite frequently the result, and it is some little time before normal equilibrium is established. This will not harm such individuals as are robust and able to overcome the shock; but there are those who are pale and anemic, and not so robust—persons whose physiological forces are not so easily aroused to excessive work, and are able to maintain only their daily physiological processes without

being called upon for any additional strain in the form of drying beds, mattresses, and covers. When such people occupy sleeping porches as described, their physiological forces fail to exert themselves to do the additional things called for. The inevitable result is a lowering of the bodily resistance to the point where attack is easily made by the various diseases.

The suggestion offered for sleeping porches is that they be so arranged as to be completely protected from the weather. Doors should be large, so that the bed can be kept in the heated room during the entire day. When ready for the night, it should be wheeled to the sleeping porch, thus obviating the disadvantageous conditions previously described.

RECENT DATA IN REGARD TO OPEN-AIR SCHOOLS.[1]

JOHN V VAN PELT, A. D. G., A. L. A., *Former Professor in Charge, College of Architecture, Cornell University.*

(Interstate Medical Journal, April, 1914.)

I have sent out inquiries to about 200 open-air schools. These are situated in 86 different cities, and I have had answers from about 90 of them.

I find that, of the total number of schools in the country, about 10 per cent are for normal children, 75 per cent for anemic children, and, in some cases, for those that are predisposed but with no marked symptoms of the disease, while 15 per cent are for tuberculous children. The last-named division includes a certain number of schools that are for bone and gland tuberculosis without admitting any cases of pulmonary tuberculosis.

While it is advantageous for social economy that there be preponderance of schools for anemic and incipient cases over those for cases in which the advance of the disease has become marked, it seems regrettable that there should not be an even larger proportion of schools for normal children.

Although a number of those that are subnormal or weakly have undoubtedly been so from infancy, or on account of very early lack of nourishment and care, there is a marked proportion that retrograde during periods that occur after they enter school. Just as care of the anemic and predisposed children lessen the number of those advanced in tuberculosis, so the open-air school for the normal would doubtless greatly lessen the number of those who would become anemic and develop incipient tuberculosis. Probably one reason that the proportion of schools for normal children and for anemic is so markedly in favor of the latter is that the movement is in its infancy, and the medical profession has made more effort for invalids than

[1] General title of article: "Open-air Schools in their Relation to Pulmonary Tuberculosis."

educators have for normal children. I have no doubt that this proportion is rapidly changing.

Another interesting comparison that has been shown beyond a doubt by my canvass is that there is a larger proportion of schools having no heat in the classrooms than of those having classrooms somewhat warmed. In other words, 57 per cent of the schools are entirely without classroom heat, and only the remaining 43 per cent are what have been termed "low-temperature rooms." In some of the latter, the heat is allowed to be turned on up to a limit of 65° F., which is unusually high. It is probable that the number of schools excluding heat is increased above what the figures indicate on their face, by the fact that California and a certain number of Southern States have rooms where heat would be unnecessary, even from the standard of those who believe in a "low-temperature" room.

From the descriptions I have received of the schools, it is apparent that some of the classrooms that are considered outdoor or open-window rooms, have windows only on one side; inadequacy of this provision is evidently recognized by the majority.

A large number of the schools for defined cases of pulmonary tuberculosis are in sanatoria, and an opinion expressed by the officers where recognized or advanced cases of tuberculosis are excluded—namely, that "a school is no place for such a case," may be very reasonably admitted, if by "school" we mean only places of instruction for children who are not tuberculous. It would be a pity, however, that no place of instruction be provided for well-defined cases of tuberculosis, and the children forced to remain in unhealthy tenements, while they might be taught and furthermore be cured instead of dragging on through a short number of diseased and contaminating years to a premature death.

Although my data are not entirely complete on this point, I should say that a large proportion of the schools furnish the children with some additional food, and a number of the schools furnish a dinner and two luncheons. In New York City a luncheon was furnished up to the present year, 1913–14, but has not been furnished this year. I find that in a few schools where no food is furnished, there exists a strong feeling that none should be provided. Dr. Walter W. Roach, of Philadelphia, voices this in his report to me.

In Boston another system prevails. The children are encouraged to bring a luncheon with them, and additional food of some kind is provided at a small cost. In certain schools, they are required to procure something hot—soup, chocolate, etc.

Just as superalimentation is one of the most important factors in stemming the advance of tuberculosis in the individual when under treatment as a patient, so it is for those in the early stages who are predisposed or tuberculous, and in school, instead of in a clinic or sanatorium.

As we saw in the theoretical discussion of this subject, outdoor life will bring about greater power of assimilation and greater need of fuel supply.

It is difficult to say just where paternalism should be excluded, and it would seem wiser, in the case of all children where the disease has announced itself in any way, to forestall a greater expense in the sanatorium or hospital by supplying requisite nourishment in anticipation.

Finally, I have found that in a few schools there is lack of medical supervision. For normal children such supervision is not so important; but I do not believe that even the ordinary school should be without regular medical inspection, and when it becomes an open air school, such supervision should never be dispensed with. Careful comparisons of the weights, gain in hemoglobin, and gain in mental power of the children, should be recorded and filed for comparison.

It would be of great value if more experiments, ranging over long periods of time, could be made in emulation of those made by Dr. Roach and in a few other districts. If such were instituted in different parts of the country, so that results in California could be compared with those in Pennsylvania and New York, control warm-air classes being compared with open-air classes, and with "open-window" or "low-temperature" classes, all under carefully balanced conditions, some certain knowledge could be adduced.

The most encouraging thing that is shown by the canvass just made is the continued growth in number of open-air schools. It not only means that fresh air in the schools has come to stay, but that fresh air in the home and in the community will soon be on the increase.

ON THE RESPIRATION OF EXPIRED AIR.

THOMAS R. CROWDER, M. D., Chicago.

(*The Archives of Internal Medicine, October, 1913.*)

The immediate reinspiration of a portion of our expired air occurs quite commonly—so commonly, in fact, that it is an accompaniment of respiration during the major part of the lives of practically all. I have made the attempt to determine some of the factors controlling this phenomenon. The work has included the analysis of some 900 samples of inspired air.

[Then follows a discussion of his experiments.]

The experiments represent only such conditions as are likely to be met with in daily life. With the single exception of the closet, the rooms utilized were well ventilated. Many times the air supply was excessive. The attempt has been made to determine what kind of air is breathed under ordinary and good conditions, rather than

what may be breathed under exceptionally bad conditions. It may be fairly concluded that when one lives indoors and remains quiet he will immediately rebreathe from 1 to 2 per cent of his own expired air. When he goes to bed it will be more—from 1 or 2 per cent to 4 or 5 per cent, depending on the position in which he lies. In some of the positions assumed by people sleeping it may even be as high as 8 or 10 per cent, and I have once found it 18 per cent in a single test, which did not necessitate a position by any means improbable. Nor does sleeping in the open insure pure air for breathing. The same influences here produce the same relative results that they do inside. When one buries his head between pillow and bedclothes for the sake of warmth, reinspiration is inevitable, and it is not necessarily small in amount.

[Then follows a discussion of the physiology of respiration.]

It is commonly, though erroneously supposed, that the good effects of efficient ventilation are due to the chemical purity of the air. When attention was called to the occurrence of immediate reinspiration, it was looked on as a newly discovered source of impurity in the air we breathe. To this previously unrecognized source of contamination was attributed much of the failure that has so often attended attempts to bring comfort out of ventilating procedures, and from this has arisen the "theory of displacement" in its application to ventilation. Accepting the old notion that chemical purity is a proper basis for ventilation standards, and assuming that reinspiration is necessarily harmful, some of the hygienists propose to handle the air supplied to a room in such a manner that the expired air will be immediately carried away from the face and can not be rebreathed. It is asserted that, if the new principle is applied, a much smaller quantity of air than is demanded by the older quantitative or dilution standards can be made to yield hygienic results. But smaller quantities of air do not lend themselves readily to maintaining the currents that have been shown to be necessary in order to accomplish the displacement aimed at. Or, if the necessary currents are maintained, and throughout a sufficient area to be effective, it becomes a physical necessity to recirculate the air; thus only delaying rather than preventing reinspiration, and reducing the system to one of simple dilution, which it is the avowed purpose to avoid. By actual experiment I know that the plan most widely heralded does just this thing so far as the contamination of the air of a room is concerned, and it is improbable that immediate reinspiration is materially restricted. The theory of displacement does not sufficiently take into consideration that all animals possessing lungs ventilate them on a very simple principle of dilution; nor does the pure-air theory sufficiently consider that the air of the lungs always remains highly contaminated with their own excretory gases, and

that there is such an effective barrier as the dead space against the lowering of the contamination.

If it is derived to prevent reinspiration, ways have been indicated by which this may be done. The results will be good, bad, or indifferent, according to the plan chosen; but in no case will the results, whether good or bad, depend on the fact that reinspiration is prevented. Within a wide range of variation in the purity of the air we breathe (in so far as the purity is effected by the products of respiration), the respiratory function is perfectly adapted to maintain its normal balance. The only apparent effect of rebreathing a little of our own expired air is a slightly deeper inspiration.

But ventilation is not a matter of little consequence because of this. It is still just as important as it has always been considered; the benefits of fresh air and the outdoor life are beyond question. But these measures should be carried out in the interest of the heat economy of the body rather than with regard to the chemical purity of the air we breathe. The good effects of the outdoor air depend on its coolness, its motion, and its relative humidity. These physical qualities enable it to absorb the heat which is constantly being formed in the body, and which must be as constantly removed. Air that will take it up rapidly will stimulate healthy functions; air that takes it too slowly leads to sluggish metabolism, and if maintained will ultimately result in a low resistance to disease.

The rigor of a temperate or a colder climate makes of its inhabitants a house-dwelling race. They very commonly overheat their houses, if not by fire and steam, then by the heat of their own bodies; and when they do this they complain of poor ventilation, regardless of whether the air supply is large or small. Whichever this may be, under any conditions that are likely to arise, there will still be oxygen in excess of every demand, and the CO_2 will still find a ready escape from the blood; but in an overwarm atmosphere the body will be stagnated and the consumption of oxygen by the tissue cells will be decreased. Ventilation is necessary in order to maintain the thermic balance of the body and to stimulate its chemical activity; and ventilation with cool air is especially desirable. A little extension of the dead space beyond the tip of the nose is of no consequence. In spite of this extra contamination of the inspired air, the proportion of CO_2 in the alveolar air will remain a little lower in a warm room than in the invigorating cold of the out-of-doors, as has been shown by Boycott and Haldane. It will remain so, because metabolism is reflexly retarded by a warm aerial envelope, the consumption of oxygen by the tissues and the production of CO_2 by them being much less in warm air than in cold.

That this discussion concerning the significance of reinspiration applies only to healthy persons scarcely needs to be added. The

capacity of the lungs may become so restricted by disease that the slightest addition to their work is undesirable. But when we learn that they are still capable of performing the respiratory function with the capacity reduced to so little as one-sixth of the normal, the margin of safety is seen to be a very generous one.

THE AIR AS A VEHICLE OF INFECTION.

CHARLES V. CHAPIN, M. D., *Superintendent of Health, Providence, R. I.*

(*Journal of the American Medical Association, Feb. 7, 1914.*)

A vast amount of work has been done to determine the resistance of different kinds of bacteria to drying and their vitality in dust. The factors affecting the life of pathogenic micro-organisms outside of the body are so numerous that it is not surprising that quite discordant results have been obtained by different observers. Certain it is that some bacteria, as those of cerebrospinal meningitis, gonorrhea, and influenza, die so quickly that their carriage on dust is practically impossible. On the other hand, the resistance of tubercle, typhoid, and diphtheria bacilli is sufficient to admit of their floating on dust particles. On account of the mechanical obstacles in the way of explaining how substances so difficult to reduce to fine dust as feces and sputum could be dust-borne, other modes of infection were sought for, and in 1897, Flugge showed that infecting bacteria could be carried in the fine droplets of saliva which are thrown from the mouth during loud talking or coughing, but which are absent during quiet respiration. It had previously been shown that bacteria-holding droplets could be thrown into sewer air by the agitation of sewage, and this experimental work had perhaps suggested that similar droplets of saliva might be a means of spreading disease from person to person. The followers of both Cornet and Flugge inferred much more from the work of these investigators than was warranted, or than was claimed by the authors themselves. Because Cornet's guinea-pigs become infected by clouds of tuberculous dust, and Flugge's pigs contracted tuberculosis when held a short distance in front of a coughing consumptive, one is not warranted in assuming that either dust or droplets are, under natural conditions, the chief mode of infection in tuberculosis, and there is still less warrant for such an assumption for other diseases. There is still less reason for assuming that, because bacteria are observed to fall on agar plates from the air of a room, the air is infectious, and no reason at all for the assumption that because a few diphtheria or tuberculosis germs survive drying for three or four weeks, diphtheria or tuberculosis are dust-borne diseases.

The question of dosage in causing disease is an all-important one, though it has usually been neglected in bacteriologic work on aerial

infection. Winslow, however, appears to have fully recognized the importance of quantitative work, and his careful and extensive experiments on sewer air and on dust and the air of schools and dwellings has served to explain much of the contradictory work of other and to bring bacteriologic and clinical observation in accord. Winslow's first quantitative work was on sewer air. In 1907 careful experiments were made by Winslow in this country and by Horrocks at Gibraltar. The latter succeeded in recovering the colon and also typhoid bacilli from the soil pipes of the barracks under quite natural conditions, and, though the number was not determined, he was believed by many to have thus demonstrated the dangerous character of sewer air. The number found by Winslow was so small that he deemed it necessary to make further observations. In nearly 200 liter samples of air from the soil piles of various buildings in Boston, he found sewage bacteria only four times, and only when there was splashing of sewage at the place and moment of examination. In such air as would be likely to escape from a drainage system, either from the vent pipe or from an opening into a house, such bacteria were never found. Under ordinary circumstances, pathogenic bacteria, such as the typhoid or dysentery bacillus, must be far less numerous than are colon bacilli. The entire absence of the latter from 193 liters of sewer air, taken elsewhere than in the immediate vicinity of splashing, shows how slight must be the danger from this source.

Later, experiments were made by Winslow and Robinson to determine the extent to which general air infection in an apartment is caused by droplet infection. Out of 140 liters of air taken at various points in the room immediately after from 10 to 50 minutes loud speaking by a person whose mouth was infected with *B. prodigiosus*, the bacillus was found seven times. Of 74 liters examined for *streptococcus salivarius*, none were found to contain this normal inhabitant of the mouth. The authors consider that an artificial infection of the mouth may give too high an index of air contamination, while the normal germs of the mouth may be thrown off in smaller numbers than are the disease germs from sick persons. The authors conclude that these experiments furnish "no basis for a belief that tuberculosis or any other disease is contracted to appreciable extent through the inspired air" and are "in harmony with the conviction now generally gaining ground that aerial infection of any sort is a minor factor in the spread of zymotic disease."

Still more recently Winslow has made quantitative studies of acid-forming streptococci in New York City schools. He says:

> It is well established that acid-forming streptococci are among the most abundant forms in the human mouth, while they are absent from sources which have not recently been exposed to human or animal pollution. The numbers of these organisms in

schoolroom air were found by Prof. Baskerville and myself in preliminary experiments a year ago to be quite small. We then found among 30,000 colonies isolated from 750 plates, exposed in schools with window ventilation, only 10 mouth streptococci.

In the present study in the examination of a total of 868 cubic feet of air, we found 52 mouth streptococci, or 6 for every 100 cubic feet of air.

A child breaths less than 100 cubic feet of air during an average school period, and these mouth streptococci must, of course, be far more abundant than pathogenic forms. At a rate of four or five mouth streptococci per day, the chance of ingesting pathogenic bacteria from the air is seen to be a very slender one.

Although Winslow found so few of the bacteria of human saliva in the air of schoolrooms, on another occasion in various schools in this city he found them in dust to enormous numbers, even up to100,000 in a single gram. This shows that the presence of germs in indoor dust, representing as it does, long-continued precipitation, is no indication of the number floating in the air, and it indicates the worthlessness of the deductions which have often been made as to the danger of air-borne infection, from the mere demonstration of the presence of disease bacteria in dust.

While bacteriology has given us facts instead of theory as to disease causation and has made a science of sanitation, bacteriology alone can not solve all our problems. The study of micro-organisms, pathologic findings, animal experiment and epidemiologic observations, must all be utilized and harmonized to solve the problems of disease transmission. It is for us to trace the effect which modern research has had on the old belief that practically all the infectious diseases are air-borne.

[Then follow discussions of typhoid fever; cholera, dysentery, and diarrhea; aseptic surgery; malaria and yellow fever; typhus fever; smallpox; plague; pneumonic plague; Mediterranean fever; influenza; pneumonia; scarlet fever, diphtheria, measles and whooping cough; chicken-pox and rubella; tuberculosis; anthrax.]

After this review a summary scarcely seems necessary, or even a formal conclusion. We have seen that a number of important diseases, formerly considered exclusively air-borne, have been shown never to be such. There is little evidence that, among the diseases which commonly occupy our attention in this part of the world, aerial transmission is a factor of importance. In most it is, under ordinary conditions of home and hospital, a negligible factor. For tuberculosis alone is there evidence that air-borne infection is a factor of moment, but the last word has not been said as to the etiology of this disease. We may be sure that the sewer-gas bogey is laid, the notion that dust is a dangerous vehicle of every-day infection is unsupported, and that mouth spray is usually effective only at short distances.

A NEW METHOD OF DETERMINING THE DUST IN AIR AND IN FRESH-AIR SCHOOLROOMS.

JOHN B. TODD, M. D., Syracuse, N. Y.

(*New York Medical Journal, Feb. 28, 1914.*)

After many experiments the following method has proved satisfactory in giving a positive objective answer to the question of how much dust there is in the air: A canton-flannel disk $2\frac{3}{16}$ inches in diameter is placed in a receiver which has a round opening 1 inch in diameter. Through this, by means of a suction pump, 200 cubic feet of air are drawn. On removing the canton-flannel disk we have the dust record. For the purpose of standardization a scale of 10 gradations, from white to black, has been made. The pump used was a rotary quadruple bellows pump from a Melville Clark player piano. Mr. Morgan Sanford, of the local station of the United States Weather Bureau, standardized the apparatus and found that 200 cubic feet of air are drawn through the apparatus in 23 minutes. The pump used is very efficient and noiseless in operation, but it is too heavy. I am working out one that will be portable.

I am satisfied, since I have used this objective method of dust determination, that we have greatly underestimated the effect of breathing dust as a cause of ill health and disease, and I hope to see the time when it will be as essential to make a dust record of the air a patient breathes as it is to take blood count and pressure. I have found that it reveals dust conditions of the air that many times were entirely unsuspected, but, when once detected, the source of the dust can generally be determined and the means to exclude the dust devised.

Many times in schoolrooms in which the conditions seemed ideal very dark dust records would be obtained. Generally a muddy playground would account for the dust, mud being brought in upon the children's feet, when the warm air of the schoolroom would quickly convert it into dust. The old methods were to *clean out the dust* with dust cloths and vacuum pumps. The dust records enable one to locate dusty places and conditions and suggest methods of preventing dust. Prevention is a nobler function than cure, so the new words will be, *keep out the dust*, and the standing of schools in dust elimination can be kept on score cards by means of the dust-record scale. In that way principals and janitors will be spurred on to greater efforts in maintaining a high record for freedom from dust. The educational value of this way of living hygienically in the schools will react upon the homes and entire community.

It is generally the custom to close the school and fumigate when cases of contagious disease occur among the pupils. It would be a much greater sanitary practice to scrub the floors, walls, and ceiling, to make them absolutely free from dust.

I have been making a study of air conditions, both in fresh-air (screened windows) schoolrooms and rooms ventilated in the conventional way. The fresh-air schoolrooms are rooms in which the lower sash is raised in four or five windows and the opening fitted with a wood frame covered with medium-weight unbleached sheeting. The room in which the experiment was first tried had five 36 by 40 inch windows facing the east. Steam pipes extended across the room under the windows, and a hot-air inlet, 30 by 30 inches, was on the north side, midway from the floor to the ceiling, with an exit opening of the same size near the floor. In the morning before school opened the room would be warmed by hot air driven by a fan. When school began this hot-air inlet would be closed and all the windows opened, so that there would be 50 square feet of open window space covered with the screen. The cold fresh air would diffuse slowly into the room and would be met by the hot air rising from the steam pipes, so that there were no perceptible drafts. Children sitting within 4 feet of the open windows all the winter days experienced no inconvenience whatsoever. The temperature of the room was maintained at 68° to 70° F. as easily as before the screens were used. There are two reasons for this: First, glass is a great conductor of heat and cools the bad air in a room very rapidly, while cotton conducts only one-twentieth as much heat; second, if the air is being slowly diffused into the room there can be no heat loss from radiation or conduction through the screens, and as it takes no more heat units from the steam pipes under the windows to raise the temperature of the air being slowly diffused into the rooms than it would to heat the same air by the heating coils in the fan room the use of the screens is a clear gain of the heat loss by radiation through the glass of the windows. Another economy obtained from the use of the screens is the saving of power and attendance.

After the screens were installed in this room no more cases of fainting occurred; hacking, coughing, and restlessness disappeared; discipline was easier to maintain; and the children did better work. The windows were up during all kinds of weather; the coldest day of the winter the thermometer was at zero at 10 a. m., while it was at 70° F., with 50 square feet of screened opening in use. The principal, janitor, and all the teachers were at first incredulous, but frequent observations of the conditions soon had them all asking for screened windows. The idea has spread to other schools, and whenever the screens have been properly constructed and installed the improved air conditions have been ideal. A critical examination of the ideal air conditions in these fresh-air rooms reveals a scientific basis. In the first place, drafts are currents of air with velocity enough to be perceived, and if the air is cold they are uncomfortable or painful. The screens are covered with cloth heavy enough to prevent any per-

ceptible draft. In fact, it is a permeable membrane which breaks up the air into currents of infinitesimal size and of low velocity, but to obtain any ventilation under these conditions the area of opening must be very large; so I put 50 square feet to the room, which is nearly double the area of the inlet opening to the fan which is supposed to furnish air for 16 schoolrooms, an assembly hall, etc.

Repeated humidity tests have shown that it is practically the same in these fresh-air rooms that it is out of doors, which confirms Hobler that it can be obtained as easily by open windows as by a humidistat.

Believing that carbon-dioxide tests are not worth the trouble of making, the carbon dioxide has been ignored.

One would think that by filling the lower sash of all the windows in a schoolroom with cloth screens the proper lighting would be decreased, but, instead, the lighting is really improved. The light rays are broken up by the cloth and a soft diffused light results, which is more comfortable to work by than the glaring direct light that comes through glass.

The fresh-air rooms are absolutely free from odors, which are so closely associated in our minds with schoolrooms and institutions. Even the smell of stuffiness which can hardly be called an odor is entirely absent. It is, as one teacher has described the air conditions, "like a continued day in June."

Next to the confined, stuffy, bad air in schoolrooms, the dust in the air produces the most insanitary condition. In ordinary fan-ventilated schools the dust that is brought into the room gradually accumulates, the room acting as a settling tank, while only a small portion is carried out by the vent. I have found in the screened fresh-air rooms that this dust is entirely eliminated. This dust elimination is accomplished in two ways. First, the fan inlet being closed, no dust is brought into the room by the fan; second, the air that is diffused into the rooms through the screens is *filtered air* and dust free. The cloth on the screens becomes discolored very much after a time and should be changed for a new cloth. I have worked out a form of screen in which the cloth can be changed with little trouble. Wire gauze and cheese-cloth window screens have been used a great many years, but they have proved unsatisfactory in cold weather because they produce cold drafts.

COUNTRY SCHOOL SANITATION.

FRANCIS G. BLAIR, *State Superintendent of Public Instruction, Springfield, Ill.*

(*Illinois Medical Journal, August, 1913.*)

I am to speak to you on one special item of work which is now being done by the department of public instruction for the improvement of sanitary conditions in the rural schools of Illinois. The plan is a

very simple one and can be very briefly stated. The law makes the superintendent of public instruction the supervisor of all the common and public schools of Illinois. It makes him the adviser of school officers. On this legal authority the superintendent of public instruction has appointed two country school supervisors who have entered on a campaign to better the physical and instructional conditions of the one-room country schools. Two diplomas are prepared by the State department, one for a standard one-room school and the other for a superior one-room school. The standard diploma is awarded to any school which meets a certain minimum requirement. This minimum standard requirement as it relates to the physical and sanitary conditions is as follows:

Yard and outbuildings:

1. Ample playground.
2. Good approaches to the house.
3. Two well-kept, widely separated outhouses.
4. Convenient fuel houses.

The schoolhouse:

1. House well built, in good repair, and painted.
2. Good foundation.
3. Well lighted.
4. Attractive interior decorations.
5. Good blackboards—some suitable for small children.
6. Heated with jacketed stove in corner, or a room heater and ventilator in corner or basement furnace which brings clean air in through the furnace and removes foul air from the room.
7. Floor and interior clean and tidy.
8. Desks suitable for children of all ages, properly placed.
9. Sanitary water supply.

In order to secure the superior diploma the following additional requirements must be met:

Grounds:

1. Playgrounds at least one-half acre and kept in good condition
2. Some trees and shrubs.
3. Well or cistern and sanitary drinking appliances.

House:

1. Separate cloakrooms for boys and girls.
2. Lighted from one side or from one side and the rear.
3. Heated with basement or room furnace, which brings in pure and removes foul air.

The country school supervisors go into the counties on invitation of the county superintendent. They visit the schools and examine personally the physical equipment. Along with the diploma goes a label which is prepared by the department of public instruction for the door of the schoolhouse. The label has printed in gold on a black background *"Standard School"* or *"Superior School,"* in such type that it can be read at a distance of from 200 to 300 yards. This appeal to local pride has been far more successful than was antici-

pated when the plan was formulated. The supervisors have awarded diplomas to over 1,100 standard schools. Four diplomas have been awarded to superior schools. These diplomas are renewable for five years. Each year there must be an investigation to see whether the school has been kept up to the standard. If in any instance the pupils, teachers, or directors grow indifferent and allow the equipment to deteriorate, the diploma is withdrawn. It is believed that this plan not only improves the condition in the schools which are able to meet the requirements and receive the diploma, but it goes farther and improves certain conditions in many schools which can not meet all the requirements. There are hundreds of schools which can not receive a diploma so long as the present building remains, which have from the suggestions offered improved some conditions, say, the character of the water which the children drink, or it may be that they have been able to change the seats, or the heating plant, or to comply with one or two of the requirements set forth. This work, it will be seen, is entirely optional on the part of directors from the district and results from a desire on their part to follow the suggestions of those in whom they have confidence and to place their district on an equality with surrounding districts.

A METHOD OF OBTAINING PROPER SCHOOL SANITATION.

LOUIS BECKER, M. D., Knoxville, Ill.

(*Illinois Medical Journal, August, 1913.*)

A number of years ago, while on the school board of my home town, I had to do with the building of a school building. The school board in this case went into the sanitary features very fully, and especially into those of ventilating and heating. Careful anemometer tests under all conditions of weather showed that we got 1,500 cubic feet of fresh air for each pupil every hour as a minimum. This air was taken from outdoors, warmed, and introduced into the rooms through openings 6 feet above the floor, with suitable exits at the floor line. The rooms were so arranged that they could be heated and lighted properly. We also, while in the business, changed the old school building, built in 1875, so as to supply 1,200 cubic feet of fresh air each hour to each child of a room full. In time it became necessary to replace the heating system in the newer building, and the school board, composed of our best business men, knowing nothing of ventilating problems, replaced the indirect heating with direct; carefully removed the fresh-air room, bricked up the openings for transmitting the warmed air for the rooms, until now the only chance they have to get fresh air is to open the windows occasionally and freeze the pupils nearest the window, then shut them down and wait until the

air becomes noticeably foul. Now our children are suffering because good-intentioned men did not understand and should not be expected to supervise sanitary problems.

At the same time the radiators in the warming flues in the old building began to leak and the janitor was told to shut them off. To prevent admitting cold air to the rooms he was obliged to close the ventilating windows, and now this building has no ventilation whatever. We certainly have no moral right to enforce compulsory school attendance on children during their most sensitive years in our town. A child has a right, above everything else, to have healthful surroundings. From an educational standpoint it is certainly not good practice to give him instruction in hygiene in a classroom which violates important hygienic rules. The child who sees a proper regard paid to cleanliness in its best sense, to light, to pure air and water in the school will be apt to carry the lesson home. Proper instruction, together with proper example in our schools, has a tremendous effect on the homes from which scholars come. In no other one subject will its effects be as noticeable as in those of proper sanitation by example.

At one time I thought that the solution of these difficulties would be in having a physician on every school board. Such a condition, however, is difficult to bring to pass, and considering the ignorance of many physicians as regards the practical application of sanitary needs in the case of schoolhouses, I am sure it would not be a success. Some time ago I thought of making public suggestion that State authority should supervise the sanitary arrangement and safety appliances in all new buildings and in all old buildings undergoing changes. I supposed this idea was original, but there is nothing new under the sun. Two bills introduced in the State legislature are now being considered which purpose to solve the problem in this way; making the plans of school buildings subject to approval of the State architect, the State board of health, and the State fire marshal.

If my experience has proved anything at all it is that no set of men in any ordinary town can be left with the problem of erecting a school building that may be safely attended by your child and mine. Proper sanitation is and always will be the most important thing about a school building.

Very fortunately our one-room country schools can have suitable heating and lighting without much expense, and I have been astonished at the number of country schools around my home town which have complied with most of the ideals. Pure drinking water and suitable water-closets are much more difficult to obtain in these small schools.

CONCLUSION.

I can not conceive of any really serious objection to compelling the submission of all school plans, whether for new buildings or for changes in old buildings, and to a certain extent school equipment, to proper State officials who by training have an adequate knowledge of school needs.

CLEAN BOOKS.[1]

WILLIAM R. REINICK, Philadelphia.

(*American Journal of Pharmacy, January, 1914.*)

The process of killing germs in books by disinfection, although recommended, especially by those who have the disinfectants and the apparatus for sale, may be dismissed as of very little use, on account of the impossibility of the gases penetrating into the interior of the volumes, and in no case, even if the entire surface is reached, will they remove all of the spores.

Both steam and hot-air sterilization are of little value for books, because the first will cause the paper of the books to absorb the moisture, swell, and deform; while in the case of hot-air sterilization, the heat would, by drying up all the moisture in the books, have the same effect, besides in the case of books bound with leather, cause the leather to stretch and often break. The heat also will absorb the moisture, and the paper will become dry and brittle, lessening the life of the volume.

At present I do not believe that there is any method which may be depended upon to entirely eliminate the possibility of diseases being contracted through fomites, such as books and the hundreds of other articles in daily use, constantly being transferred to a sick room, returned and ready for another victim. I believe that some of the State boards of health are now beginning to recognize the futility of quarantining and disinfecting. Instead, they are spending all their energies in improving sanitary conditions as to the necessity of cleanliness and the proper care of health. If persons using books or any other of the numerous articles named as conveying germs will use precautions as to the degree of cleanliness of the article they handle, and will take proper care of their health, they need have no fear of contracting any disease by means of a book or any other article.

The same care that should be given to keeping the books clean should also be insisted upon for the employees and readers of libraries and all places where dust may accumulate.

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[1] General title of article, "Books as a Source of Disease."

A visit to almost any library will generally show, by placing the hands in back of the books upon the shelves, that there is a great deal of dust lying there. Very few libraries, even those recently erected, have had the vacuum system, which seems to be almost perfected, installed. Instead of making the reader wash his or her hands before using a book, it is very difficult for one to obtain access to the lavatory to wash his hands even if he so desires. In fact, there are some libraries which have no lavatories at all for the public.

Books are often placed on shelves in stacks, poorly ventilated and lighted. * * * Not disinfectant plants, but sunlight, fresh air, the elimination of dust, and the proper cleanliness on the part of the employees and readers, are the means, not only to prevent books from becoming fomites, but also the people from becoming carriers in this age of prevention

INDEX.

BULLETIN OF THE BUREAU OF EDUCATION.

[NOTE.—With the exceptions indicated, the documents named below will be sent free of charge upon application to the Commissioner of Education, Washington, D. C. Those marked with an asterisk (*) are no longer available for free distribution, but may be had of the Superintendent of Documents, Government Printing Office, Washington, D. C., upon payment of the price stated. Remittances should be made in coin, currency, or money order. Stamps are not accepted. Documents marked with a dagger (†) are out of print.]

1906.

†No. 1. Education bill of 1906 for England and Wales as it passed the House of Commons. Anna T. Smith.
†No. 2. German views of American education, with particular reference to industrial development. William N. Hailmann.
*No. 3. State school systems: Legislation and judicial decisions relating to public education, Oct. 1, 1904, to Oct. 1, 1906. Edward C. Elliott. 15 cts.

1907.

†No. 1. The continuation school in the United States. Arthur J. Jones.
†No. 2. Agricultural education, including nature study and school gardens. James R. Jewell.
†No. 3. The auxiliary schools of Germany. Six lectures by B. Maennel.
*No. 4. The elimination of pupils from school. Edward L. Thorndike.

1908.

†No. 1. On the training of persons to teach agriculture in the public schools. Liberty H. Bailey.
*No. 2. List of publications of the United States Bureau of Education, 1867–1907. 10 cts.
*No. 3. Bibliography of education for 1907. James Ingersoll Wyer, jr., and Martha L. Phelps. 10 cts.
†No. 4. Music education in the United States; schools and departments of music. Arthur L. Manchester.
*No. 5. Education in Formosa. Julean H. Arnold. 10 cts.
*No. 6. The apprenticeship system in its relation to industrial education. Carroll D. Wright. 15 cts.
*No. 7. State school systems: II. Legislation and judicial decisions relating to public education, Oct. 1, 1906, to Oct. 1, 1908. Edward C. Elliott. 30 cts.
*No. 8. Statistics of State universities and other institutions of higher education partially supported by the State 1906–8. 5 cts.

1909.

*No. 1. Facilities for study and research in the offices of the United States Government in Washington. Arthur T. Hadley. 10 cts.
*No. 2. Admission of Chinese students to American colleges. John Fryer. 25 cts.
*No. 3. Daily meals of school children. Caroline L. Hunt. 10 cts.
†No. 4. The teaching staff of secondary schools in the United States; amount of education, length of experience, salaries. Edward L. Thorndike.
No. 5. Statistics of public, society, and school libraries in 1908.
*No. 6. Instruction in the fine and manual arts in the United States. A statistical monograph. Henry T. Bailey. 15 cts.
No. 7. Index to the Reports of the Commissioner of Education, 1867–1907.
*No. 8. A teacher's professional library. Classified list of 100 titles. 5 cts.
*No. 9. Bibliography of education for 1908–9. 10 cts.
No. 10. Education for efficiency in railroad service. J. Shirley Eaton.
*No. 11. Statistics of State universities and other institutions of higher education partially supported by the State, 1908–9. 5 cts.

1910.

*No. 1. The movement for reform in the teaching of religion in the public schools of Saxony. Arley B. Show. 5 cts.
No. 2. State school systems: III. Legislation and judicial decisions relating to public education, Oct. 1, 1908, to Oct. 1, 1909. Edward C. Elliott.
†No. 3. List of publications of the United States Bureau of Education, 1867–1910.
*No. 4. The biological stations of Europe. Charles A. Kofoid. 50 cts.
*No. 5. American schoolhouses. Fletcher B. Dresslar. 75 cts.
†No. 6. Statistics of State universities and other institutions of higher education partially supported by the State, 1909–10.

1911.

*No. 1. Bibliography of science teaching. 5 cts.
*No. 2. Opportunities for graduate study in agriculture in the United States. A. C. Monahan. 5 cts.
*No. 3. Agencies for the improvement of teachers in service. William C. Ruediger. 15 cts.
*No. 4. Report of the commission appointed to study the system of education in the public schools of Baltimore. 10 cts.
*No. 5. Age and grade census of schools and colleges. George D. Strayer. 10 cts.
*No. 6. Graduate work in mathematics in universities and in other institutions of like grade in the United States. 5 cts.
†No. 7. Undergraduate work in mathematics in colleges and universities.
†No. 8. Examinations in mathematics, other than those set by the teacher for his own classes.
No. 9. Mathematics in the technological schools of collegiate grade in the United States.
†No. 10. Bibliography of education for 1909–10.
†No. 11. Bibliography of child study for the years 1908–9.
†No. 12. Training of teachers of elementary and secondary mathematics.
*No. 13. Mathematics in the elementary schools of the United States. 15 cts.
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*No. 15. Educational system of China as recently reconstructed. Harry E. King. 10 cts.
†No. 16. Mathematics in the public and private secondary schools of the United States.
†No. 17. List of publications of the United States Bureau of Education, October, 1911.
*No. 18. Teachers' certificates issued under general State laws and regulations. Harlan Updegraff. 20 cts.
No. 19. Statistics of State universities and other institutions of higher education partially supported by the State, 1910–11.

1912.

*No. 1. A course of study for the preparation of rural-school teachers. F. Mutchler and W. J. Craig. 5 cts.
†No. 2. Mathematics at West Point and Annapolis.
*No. 3. Report of committee on uniform records and reports. 5 cts.
*No. 4. Mathematics in technical secondary schools in the United States. 5 cts.
*No. 5. A study of expenses of city school systems. Harlan Updegraff. 10 cts.
*No. 6. Agricultural education in secondary schools. 10 cts.
*No. 7. Educational status of nursing. M. Adelaide Nutting. 10 cts.
*No. 8. Peace day. Fannie Fern Andrews. 5 cts. [Later publication, 1913, No. 12, 10 cts.]
*No. 9. Country schools for city boys. William S. Myers. 10 cts.
†No. 10. Bibliography of education in agriculture and home economics.
†No. 11. Current educational topics, No. I.
†No. 12. Dutch schools of New Netherland and colonial New York. William H. Kilpatrick.
*No. 13. Influences tending to improve the work of the teacher of mathematics. 5 cts.
*No. 14. Report of the American commissioners of the international commission on the teaching of mathematics. 10 cts.
†No. 15. Current educational topics, No. II.
†No. 16. The reorganized school playground. Henry S. Curtis.
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*No. 19. Professional distribution of college and university graduates. Bailey B. Burritt. 10 cts.
†No. 20. Readjustment of a rural high school to the needs of the community. H. A. Brown.
†No. 21. Urban and rural common-school statistics. Harlan Updegraff and William R. Hood.
No. 22. Public and private high schools.
*No. 23. Special collections in libraries in the United States. W. D. Johnston and I. G. Mudge. 10 cts.
†No. 24. Current educational topics, No. III.
†No. 25. List of publications of the United States Bureau of Education, 1912.
†No. 26. Bibliography of child study for the years 1910–11.
No. 27. History of public-school education in Arkansas. Stephen B. Weeks.
*No. 28. Cultivating school grounds in Wake County, N. C. Zebulon Judd. 5 cts.
No. 29. Bibliography of the teaching of mathematics, 1900–1912. D. E. Smith and Chas. Goldziher.
No. 30. Latin-American universities and special schools. Edgar E. Brandon.
*No. 31. Educational directory, 1912. 10 cts.
*No. 32. Bibliography of exceptional children and their education. Arthur MacDonald. 5 cts.
†No. 33. Statistics of State universities and other institutions of higher education partially supported by the State, 1912.

1913.

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