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BRONCHIAL LYMPHADENOPATHY, NONTUBERCULOUS *

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The tremendous number of observations that have been made on tuberculosis of the bronchial lymph nodes during the last hundred and fifty years yields a literature fairly surcharged with experimental and clinical data. An investigation of the work that has been done on the acute or subacute bacterial infections, on the other hand, is particularly striking on account of its paucity.

Several explanations can be deduced for this interesting status. It has been recognized, ever since the publication of Lalouette in 1780 (*Traité des scrofules*), and Leblond in 1824, that tuberculosis of the bronchial lymph nodes is a distinct disease. Furthermore, Louis (1825), Laënnec (1837), Fischer and others have emphasized the fact that tuberculosis is the most common disease of these lymph nodes and it occurs more frequently in them than in any other viscus of the body. It must be remembered that this information has been largely gathered from postmortem examinations, so it is not surprising that so much attention has been focussed on it. Acute and subacute infections of the bronchial lymph nodes have been studied by very few men, for the following fundamental reasons: (a) necropsy material has always been very scarce; (b) when available, it has been so overshadowed by the associated lesions in the respiratory organs, that its importance has been overlooked, and (c) the diagnosis may for obvious reasons be considered most difficult, both as to classic symptomatology and physical signs.

THE LITERATURE

It is highly interesting, in referring to certain fundamental facts that have been deduced concerning the anatomy and physiology of the bronchial lymph nodes, to review briefly some of the pioneer work that has been accomplished. Modern medicine is too much inclined to take for granted the investigations of the eighteenth and nineteenth centuries, forgetting men whose efforts and studies should always be a source of great stimulation. Becker, in 1826, following the researches of Mascagni and Cruikshank, divided the thoracic lymph nodes into (a) parietal and (b) visceral. It remained for a Frenchman, Baréty, however, so comprehensively and thoroughly to describe these glands, that, up to the present time, practically nothing

has been added to his observations. His description has become so classic that scarcely a reference can be found, either anatomic or clinical, that does not quote him in great detail. He describes a tracheobronchial region that is comprised of all of the mediastinum except the heart. It is bounded above by the superior opening of the thorax, below by a plane, where the pulmonary veins empty into the left auricle. It is limited in front by the sternum, behind by the vertebral column and laterally by the lungs. Baréty divides the mediastinal glands into three groups: (1) pretracheobronchial right and left; (2) intertracheobronchial or subbronchial, right and left, and (3) interbronchial.

1. The pretracheobronchial group of glands occupies the anterosuperior side of the obtuse angle, which is formed externally by the trachea and principal bronchus. They are situated on both sides, but hypertrophy and degeneration are found more commonly on the right.

2. The intertracheobronchial or the subbronchial right and left groups of glands lie on the under surface of the main bronchus. They are more numerous on the right than on the left side.

3. The interbronchial groups of glands occupy the angle of division of the bronchial tubes. They are found in the bronchial divisions up to the fourth order.

The physiology of the lymph nodes is so intimately associated with pathology and bacteriology that their normal function has been extensively studied by investigators in these allied sciences. Councilman, in the Harvey lectures, 1906-1907, in describing the changes in the lymphoid tissue in certain of the infectious diseases, stresses several salient facts. In the masses of small lymphoid cells, particularly along the convexity, are round or oblong foci of differentiated cells. They were first described by His, and later more fully studied by Fleming, who regarded them as centers of cell production or germinal centers. He especially emphasizes the fact that, in the study of the lymphoid tissues, one is impressed by a striking feature, i. e., its preponderance in childhood. They play an interesting rôle in the pathology of the tissue. Oertel first demonstrated that, in diphtheria, areas of necrosis occur in the lymph nodes, corresponding to the germinal centers. Similar changes are observed in scarlet fever, variola and other conditions.

Manfredi, in an experimental study on the function of lymph nodes, found that they act against bacteria by: (1) filtration; (2) diminishing the strength of the bacteria, whereby their virulence is partly or wholly lost, and (3) bringing into contact with the invading organisms the immune substances that are elaborated by the body in general. Next to the skin and mucous membranes the lymph nodes act as the strongest barrier against bacteria. Manfredi's experiments throw inter-

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esting light on the question of latency of bacteria in the lymph nodes, a subject to which too little attention has been paid in the study of infection and immunity. He found that *Staphylococcus pyogenes-aureus* lived latently in the lymph nodes of guinea-pigs forty days and in those of dogs, thirty days, while *B. typhosus* was present in guinea-pigs sixty days and in dogs thirty days. Pneumococci that were recovered from the lymph nodes did not kill rabbits; the same organisms cultivated from the blood or spleen were fatal to rabbits. Typhoid bacilli recovered from the glands lost their virulence for guinea-pigs, while the virulence of staphylococci and tubercle bacilli was definitely diminished by passage through the lymph nodes.

Baumgarten found that, following the intravenous injection of tubercle bacilli, animals developed a generalized tuberculosis of the lymph nodes, and that only when the glands could no longer hold back the bacteria did they get into the blood stream through the veins and invade the other viscera. He considered this highly presumptive evidence of the elective capacity of the lymph nodes to absorb circulating bacteria.

Loomis, Kalbe, Piccini and many others were able to demonstrate by animal inoculation the latency of tubercle bacilli in the bronchial lymph nodes of people in whom there was neither macroscopic nor microscopic evidence of tuberculosis. Kalbe, by cultivating and injecting lymph node material into animals, recovered streptococci, staphylococci, pneumobacilli and pneumococci, the last two of which were fatal in white mice in twenty-four hours, while the first two produced local abscesses in a number of instances. Perez, in eighty-eight cases, found latent bacteria most frequently in the subcutaneous lymph nodes; then in the bronchial group, and least often in the mesenteric glands.

The incidence of enlargement of the lymph nodes in childhood is so striking as scarcely to warrant statistical verification. It may, however, be well to comment on the fact that Laser, in examining 2,506 children, found that those from 7 to 9 years of age had enlargement of the glands in 96 per cent. of the observations; from 10 to 12 years, in 91.6 per cent., and from 13 to 14 years, in 84 per cent. Baer, reporting on twenty-five new-born infants and 350 older infants and children, rather cynically stated that nearly all children had enlarged lymph nodes.

In summarizing these investigations in an effort to determine their bearing on infections of the bronchial lymph nodes, the following facts assert themselves:

1. Lymphoid tissue is strikingly predominant in childhood.
2. The activity of the tissue can be judged by the presence of the germinal centers, which are rarely absent during this period.
3. Enlargement of the lymph nodes in the child is so common as to be almost constantly demonstrable.
4. Bacteria, in a latent stage, are present in many of these glands.
5. The virulence of these organisms is frequently attenuated.

It must, therefore, be strikingly apparent to all clinical observers that the lymphatic apparatus in childhood is constantly engaged in a system of defense against pathogenic organisms, whereby there is gradually developed for the body an immunity against these bacteria. Only a slight realization of this stupendous function is necessary to make one appreciate the great incidence of infections of the bronchial lymph nodes.

A careful survey of the literature bearing on the clinical signs of acute and subacute bronchial lymph node infections reveals the striking fact that it is extremely difficult to find records of observations sufficiently detailed to make a symptomatic diagnosis possible. Zabel quotes no less an authority than Heubner, who states in his textbook that the disease picture in enlarged bronchial glands is uncertain, and no one symptom can be a guide to an absolute diagnosis.

In an effort more definitely to stabilize the clinical manifestations of this important subject, a study has been made of a large number of cases in which physical examination and roentgen-ray findings have, as far as is possible, established the presence of an acute or a subacute bronchial lymphadenitis.

CASE GROUPS

The cases divide themselves into five groups, which may be arbitrarily described as:

1. Those in which malnutrition is the cardinal symptom: malnutrition type.
2. Those in which frequent colds or persistent cough is the primary symptom: subacute bronchitis type.
3. Those in which a pertussis-like cough is the most striking evidence: pertussoid type.
4. Those in which a low grade febrile course is the essential complaint: chronic febrile type.
5. Those in which there has developed persistent attacks of asthmatic bronchitis following an acute respiratory infection, usually a pneumonia: asthmatic type.

It may be presumptuous to attempt a classification of this sort in a disease picture that has always been accepted as somewhat ambiguous. In an effort to justify this classification, a more detailed outline of the typical history and symptomatology in each group is desirable.

1. Malnutrition Type.—These children are brought for medical advice usually on account of their general appearance. The most common complaint is that they have not looked well for a variable period, from several weeks to as long as from two to three years. They are often below weight and give a history of not having gained for a long time. The appetite is poor and the color pale. Fatigue and languor are frequently a source of worry, and the complaint is elicited either that the child never cares to play or exercise, or that, if persuaded to indulge in this form of recreation, he becomes fatigued in a short time. Digestive symptoms may develop, and one not infrequently hears that, incidental to his general lack of well being, the child has equivocal gastro-intestinal disturbances, for which there is no explanation. Notation may have been made of a slight afternoon rise in temperature, although this is rare.

2. Subacute Bronchitis Type.—The clinical picture in this class of case is somewhat variable. Most frequently there is present a chronic cough, with which there is little, if any, expectoration. The cough is liable to be more pronounced at night, although it is rarely severe enough to wake the child. In other cases, the essential element is the marked frequency of infectious colds, in which, notwithstanding their mildness, the symptoms persist for a long time. These children are much more liable to have a distressing cough with the upper respiratory infections; and when all other signs of an inflammatory process have subsided, the cough remains an irritating feature. Any of the general evidences of toxemia present in the malnutrition

type, loss of weight, pallor, poor appetite or lack of energy, may be present.

3. *Pertussoid Type*.—From an historical and from a clinical standpoint, this group of cases presents the most fascinating characteristics. In 1780, Lalouette, commenting on the symptoms in tuberculosis of the bronchial lymph nodes, called attention to the persistent cough, which was so changed in character that a diagnosis of pertussis was frequently made. Leblond, in 1826, described this same cough in patients with enlarged bronchial glands. Ley (1834) noted, in children with enlarged glands, attacks of violent coughing with a sonorous inspiration resembling whooping cough. Verliac, in 1865, stated that if the spasmodic cough lasted too long after pertussis, bronchial gland disease must be suspected. Daga emphasized the fact that the cough in bronchial gland involvement often returned in crisis, and that it was frequently spasmodic and had a peculiar sound, like the bark of a dog. Finally, Rilliet and Barthez commented on the fact that in these cases the diagnosis between pertussis and bronchial adenopathy was often difficult, if not impossible.

A careful consideration of the histories of this type of case reveals some interesting observations. It seems definitely possible to divide this group into several subdivisions, depending on the manner of development of the classic symptoms. One striking feature of these subdivisions is that they seem strongly influenced by the nature of the etiologic agent. Incidental to the epidemics of influenza that have been present during the last few years, cases of this type have been common. They group themselves into two subdivisions: (a) cases in which the pertussis-like cough has developed within a few days of the onset of the disease, and (b) cases in which this peculiar symptom has not become manifest for a considerable period of time, during which the essential symptom has been an ordinary cough incidental to the acute bronchitis.

The children in the first group are taken ill usually with the symptoms of a mild upper respiratory infection, malaise, moderate rise in temperature, coryza and slight cough. Within from two days to a week, these symptoms disappear, and the patient develops a cough which is at first described as harsh and barking and which rapidly becomes paroxysmal, developing a whoop so like pertussis as to make the differential diagnosis very difficult. There are, however, several important distinguishing features in this type of bronchial gland disease, which usually make its differentiation from whooping cough possible: (1) The paroxysmal character of the cough develops within a much briefer period, a few days instead of two weeks. (2) The actual length of the paroxysm preceding an inspiratory whoop is shorter than in whooping cough. (3) Vomiting, while present, is less common. (4) Children exposed may develop the same syndrome, but often only show the signs of a mild upper respiratory infection. (5) The course of this group of cases in which the characteristic whoop is developed in a few days is usually much shorter than in pertussis, the paroxysmal cough disappearing at times in from one to two weeks.

The cases in the second group are as a rule more severe from the onset, and the symptoms of an acute bronchitis are more striking than those of the upper respiratory tract. After the symptoms of acute intoxication have disappeared, the cough persists, and its intensity is out of proportion to the physical signs

ascribable to changes in either the lungs or bronchial tubes. The cough, which is at first harsh and barking in character, may retain this peculiarity, or may become distinctly paroxysmal and finally develop a typical whoop, which may last for many weeks or, rarely, for several months. Slight afternoon rise in temperature is occasionally present and, depending on the degree of toxemia, any of the symptoms described in the malnutrition type of the disease may be in evidence.

It is, by inference, perfectly apparent that all types of bronchial lymph node disease may develop following any respiratory infection in the pleura, lungs or bronchi, irrespective of the etiology. There are, however, two distinct diseases following which the chronic pertussoid type of bronchial lymph node disease is extraordinarily common; namely, measles and pertussis. The frequent incidence of this situation has been responsible for erroneous deductions, particularly on the part of the earlier clinicians. See, in 1854, submitted a work in which he proposed to show the analogy which existed between pertussis and certain of the eruptive fevers, especially measles. He contended that the cough, the fever, the catarrh and the contagiousness were comparable. He based his contention on his own observations and on an historical study which showed that, since 1732, many had been impressed either by the simultaneous appearance of the two diseases or by the observation that pertussis frequently followed measles.

In view of the fact that nothing was known at the time these conclusions were drawn concerning either the physical or roentgen-ray diagnosis of bronchial lymph node disease, and since, following measles, it is most common to find secondary infections of the bronchial glands with symptoms suggesting pertussis, it is not surprising that errors should have been made. Many of the earlier writers were likewise struck by the similarity of the clinical picture of tuberculosis of the bronchial lymph nodes and pertussis, and descriptions were also given of cases of chronic pertussis lasting sometimes as long as from two to three years, with a characteristic cough. As early an observer as Lalouette realized, in 1780, that this peculiar character of the cough was probably due to vagus irritation, but it was not until much later, in the middle of the nineteenth century, that the bearing of secondary involvement of the bronchial lymph nodes in pertussis was appreciated. Noël Guéneau de Mussy, taking up the question of the analogy between bronchial adenopathy and pertussis, says:

I have already noted the pertussoid character of the cough in certain types of adenopathy. It is difficult not to admit that this is due to a direct or reflex action on the vagus by the diseased glands. I do not contend that in pertussis an adenopathy is the intermediary necessary for vagus irritation. I believe, though, that in many cases the glandular involvement mixes its symptoms with those of the disease of which it is the complication. I am disposed to attribute to pneumogastric irritation, by enlarged bronchial glands, the so-called cases of chronic pertussis, which last sometimes from two to three years. Without affirming that the convulsive cough of pertussis, which seems to point to an excitation of the vagus, is associated with an adenopathy, and without denying that this neurosis of the tenth pair of nerves can be a direct manifestation of the malady, one can at least point to the fact that the laryngeal spasm in pertussis occurs only several days and even weeks after the beginning of the pertussis and after the development of the bronchial congestion. If one

can show that, at this point, signs of an adenopathy appear, the correlation of the two phenomena would be infinitely probable.

Guéneau de Mussy's contentions grow much more probable and logical when one remembers the pertussoid cases previously described, in which the characteristic cough develops only a few days after the onset of influenza infections, in which by roentgen-ray and physical examination enlargement of the bronchial glands is definitely demonstrable.

4. *Chronic Febrile Type*.—These are the cases which are the greatest source of concern to the family and the medical advisor. They are characterized by a low grade febrile course, usually without any subjective symptoms beyond those associated with a slight toxemia, such as pallor and languor. The condition may start as a mild upper respiratory infection, more commonly an influenza than any other, so benign in character that the mother is instructed to keep the child in bed until the temperature has been normal for from twenty-four to forty-eight hours. Much to the surprise of every one, the temperature does not reach normal and there is an afternoon rise in temperature of from a half degree to 2 degrees, rarely higher, that may last weeks, months and even years. At times, there are present the characteristic symptoms seen in any chronic infection. At other times, the well-being of the child is not disturbed in the least; and, eventually, the rise in temperature is ignored in the absence of other signs of infection.

5. *Asthmatic Type*.—Considerable exception may be taken by clinicians, particularly those interested in protein hypersensitiveness, to the assumption that there is a type of asthmatic bronchitis due to subacute infections in the bronchial lymph nodes. This is particularly so when one realizes that most children who suffer frequent attacks of asthmatic bronchitis develop enlargement of the glands, incidental to the absorption from the low grade inflammatory process in the bronchial mucous membrane. On the other hand, every one recognizes that there is a definite form of hypersensitiveness which evidences itself by bronchial spasm, in which the sensitizing protein is bacterial in character; and what focus, in view of the experimental work that has been done on the latency of bacteria in lymph nodes, can play a more effective rôle than the bronchial glands? Add to this evidence the fact that, in these children, a history is frequently elicited of attacks of asthmatic bronchitis beginning following an acute upper respiratory infection, usually a pneumonia; and the circumstances combine to make the hypothesis even to the most skeptical, a tenable one.

PHYSICAL EXAMINATION

In estimating the value of physical signs in the diagnosis of bronchial lymph node disease, it seems advisable to divide the upper portion of the thorax into four divisions, in order of their importance: (1) the spinal column between the seventh cervical and the fifth dorsal vertebrae; (2) the interscapular regions; (3) the superior sternal regions, including the sternoclavicular articulations, and (4) the regions to the right and left of the sternum between the clavicle, above, and the third rib, below.

1. It is to d'Espine of Geneva that the greatest recognition is due for his contribution of the most consistent physical sign in bronchial lymph node disease. This sign, which now so familiarly bears d'Espine's name,

was first reported to the French Academy of Medicine in 1904, although the original observation had been made in 1889, while he was studying the early diagnosis of pneumonia of the upper lobe. One can do no better than to translate literally a short description of the sign as originally reported:

The first signs of bronchial adenopathy are furnished exclusively by auscultation of the voice and by observing its character, nearly always in the region of the vertebral column, between the seventh cervical and the first (upper) dorsal vertebrae, either in the fossae under the spinous processes or lower down in the interscapular spaces. The sign consists in a timbre (quality) added to the voice, which one can call *chuchotement* (whispering in the ear or whispered pectoriloquy) in the first stage and bronchophony in a more advanced stage.

D'Espine comments further on his observations:

In young infants, it is necessary to auscultate the quality of the crying voice. In a normal child, the characteristic bronchial breathing emanating from the trachea ends abruptly at the seventh cervical vertebra, where the lungs begin. In bronchial adenopathy this bronchial breathing extends to a varying degree into the space between the seventh cervical and the fourth or fifth dorsal vertebra, corresponding to the last part of the trachea and the bifurcation of the bronchi. Sometimes in extensive adenopathy, the bronchophony extends to the region of the lamina, more to the right than to the left. If auscultation of the spoken voice or the cry does not give a satisfactory result, one can try the whispered voice in children who cooperate and get an aphonic pectoriloquy (*chuchotement*). It has the same value as bronchophony. This bronchophony is the earliest and sometimes the only sign of bronchial adenopathy. In certain cases, however, one can also find, on percussion over the last cervical and upper dorsal vertebrae, definite dullness. Increased dullness in this region always coincides with intense bronchophony.

In a later contribution, d'Espine further emphasizes the value particularly of the whispered voice in eliciting his sign and says:

The sign is most obvious if one makes the child speak or count in a low whisper. The voice is then accompanied by an added whispering sound localized to one or two vertebrae or possibly extending to the fourth or fifth. Bronchial breathing over this area has the same diagnostic value except that it is an indication of more extensive enlargement.

It may be advisable, in briefly commenting on d'Espine's original article, to call attention to the fact that some confusion has occasionally occurred on account of errors in translation. If care is not taken in translating "*les premières vertèbres*" referring to the upper dorsal, in the plural, the whole sense of the observation is lost. As a matter of fact, it is fairly generally recognized that, in older children, it is within normal limits to have what appears to be a positive sign over the seventh cervical or first dorsal vertebra without enlargement of the bronchial glands. Koranyi stressed this point and contends that pectoriloquy is only indicative of large lymph nodes if it occurs below the seventh cervical vertebra in young children, below the first dorsal in those 8 years of age, the second dorsal in those of 12, and the third dorsal in children 15 years old. The sign is brought out much more clearly if the child is instructed to bend the head slightly forward and fold the arms in front of the chest.

2. The spaces between the spine and the scapulae, even though their importance has been discredited by the French school, offer interesting and frequently striking evidences of bronchial gland disease. Dullness in this area, with characteristic auscultatory changes, is of greatest diagnostic value. The breath sounds,

particularly expiration, are prolonged and harsher than normal, and at times bronchovesicular or even bronchial breathing may occur. In simple bronchial lymph node disease, without an accompanying bronchitis, adventitious sounds are conspicuously absent.

3. Baréty, whose epoch-making thesis on disease of the bronchial lymph nodes has already been discussed, lays special emphasis on the importance of the superior sternal regions in physical examination. He briefly quotes Fonssagrives, who, in 1861, first described the percussion of the superior sternal region in tuberculosis of the bronchial lymph nodes, and noted the presence of dullness at the sternoclavicular articulation, although he did not appreciate its importance. Whereas dullness in the superior sternal region is a characteristic sign in enlargement of the bronchial lymph nodes, it can be definitely stated that in the series of nontuberculous cases on which this communication is based, its incidence was definitely less frequent than either d'Espine's sign or interscapular dullness.

4. Changes in the regions to the right and left of the sternum between the clavicle and the third rib are not encountered as often as those previously described, but when present they are, to say the least, most striking. Dullness often begins at a definite point to the right and left of the sternum, and increases as the midline is approached. The limit of this dullness to the right or left can often be definitely marked by dropping a line from the clavicle, either at its midpoint or at the junction of the middle and inner thirds, to the third rib.

Auscultation over this area shows usually prolonged and harsh respiration, occasionally in both stages, but more frequently confined to the expiratory murmur. The degree of this may be so great as to make the breathing bronchovesicular or even bronchial. In some cases, on the other hand, the most striking sign is diminished breathing. At times, this diminished breathing may be bronchovesicular in character. Râles, in this region as in the interscapular space, are usually absent, except in the presence of bronchitis.

ROENTGEN-RAY DIAGNOSIS

It is not within the scope of this paper to enter into a full discussion of the problem of the roentgen-ray diagnosis, but accuracy in estimating the extent of bronchial lymph node involvement is so essential that certain details of the value of the roentgen ray must be considered. In establishing a positive diagnosis of bronchial lymphadenopathy, it is certain that the roentgen-ray examination is of less importance than either the history or the physical examination; but as an adjuvant its value cannot be overestimated. Furthermore, stress must be laid on the fact that there will always be cases of unexplainable malnutrition in which there is an absence of physical signs, and in which roentgen-ray examination and that alone will establish a positive diagnosis.

TUBERCULIN REACTION

It is perfectly obvious, without further comment, that the great problem in the management of this interesting disease is the exclusion of tuberculosis. Without entering into an argument as to the relative value of the Pirquet and intradermal reactions, it will suffice to quote no less an authority than d'Espine, who says, "Von Pirquet's sign, which I use daily, will settle the question." There can be no question that, in a vast majority of cases, this conclusion is correct. If doubt

persists in spite of a negative Pirquet reaction, the problem can be further elucidated by the application of the intradermal test.

TREATMENT

The treatment of nontuberculous bronchial lymphadenopathy may be discussed under three main headings: rest, fresh air and diet. The details must vary with the individual case. The importance of avoiding fresh infection, particularly exposure to tuberculosis, cannot be overestimated. In a general way, it may be positively stated that there is no disease, the management of which is so difficult, on account of its tediousness, for both the mother and the physician. On the other hand, it is difficult to imagine any condition in which the results are as brilliant, if the family is made to realize that a disease is being combated in which the results are essentially slow, even though the outcome is practically always favorable. The rôle of drugs in the general management of these cases is, to say the least, a secondary one. Nothing further need be said on this phase of the subject, beyond calling attention to the fact that iron, iodine, cod liver oil and a few other less important preparations have been recommended. In cases with secondary anemia, they may be of some value; but even here it is doubtful whether better results cannot be accomplished by simple hygiene and dietetic measures. As in the treatment of lymph node disease in the cervical region, too much emphasis cannot be laid on the importance of removing foci wherever they exist. It may be well briefly to outline certain variations in the treatment, depending on the character of the individual case. In the malnutrition type of the disease, children must be kept in bed in the fresh air, preferably out of the city, until they are running a normal temperature, and until the behavior of their weight curve is such that one can be sure that the infection is under control. The treatment is a matter often of several months' duration. When it seems advisable to permit more liberty, the gradual assumption of the following regimen will be found most advantageous: (1) breakfast in bed; (2) arise at 10 o'clock; (3) rest one hour after mid-day dinner; (4) retire at 5 o'clock; (5) supper in bed; (6) at least twelve hours' sleep at night. How long these children must be kept out of school it is difficult to say. It is better that the child be absent from school too long than too short a time. In severe cases, the patient must be excluded from school at least a year. The reasons are obvious enough when one realizes how susceptible these children are to fresh infection. The diet in these cases must be a general one, except that it has been found beneficial to insist on the daily consumption of a quart of milk in all cases in which there is no idiosyncrasy.

The management of the pertussoid type of cases requires certain special methods of treatment. The degree of rest in bed depends on the temperature curve. Any of the drugs used in pertussis, belladonna, antipyrin or bromid, may prove of value, and, above all, the use of opium, particularly to prevent the irritating cough at night, which disturbs the sleep, is to be recommended. If the child vomits after eating, the mother must be instructed to feed him immediately, because no one element in these cases is so conducive to a chronic course as loss in weight. The methods of treatment outlined for the malnutrition and pertussoid type of case may be combined in handling these children in whom bronchial gland involvement is responsible for repeated or lasting upper respiratory infections, par-

ticularly bronchitis. The management of those cases running a chronic febrile course depends essentially on the stage of the disease at which the patients are first placed under medical observation. If they have been treated for an acute upper respiratory infection, particularly an influenza, and it is found after several days that a low degree afternoon temperature is persisting, they should be kept in bed until the chronicity of the temperature is well established. This direction may sound ambiguous, but it entails an absolute certainty that the general well-being of the child is not suffering as a result of the infection which is responsible for the rise in temperature. If there is progressive loss in weight or failure to gain, or if a secondary anemia develops which does not improve, absolute rest in bed is indicated. Otherwise, after two or three weeks' observation, these children should be gradually gotten up, following the scheme previously described in the treatment of the malnutrition type of case; and, eventually, in spite of their slight rise in temperature, which may last for months, they should be allowed to lead their normal lives and attend school.

The thermometer should be discarded because, if it is not conducive to the development of a neurosis in the child, it is in the mother, which is quite as serious. These children should, however, be seen by their medical advisers often enough that the latter may be certain that the chronic infection is in no way interfering with the general progress, the best criterion of which is normal gain in weight. Nothing beyond the general measures previously recommended can be advised in the treatment of the asthmatic type of bronchial lymphadenitis except the use of bacterial proteins, the specificity of which has been determined by previous skin tests.

CONCLUSIONS

1. Simple bronchial lymphadenitis, acute, subacute or chronic, is a distinct clinical entity in childhood.
2. It may be divided into five definite types, based on the clinical history and cardinal symptoms: 1. Malnutrition type. 2. Subacute bronchitis type. 3. Pertussoid type. 4. Chronic febrile type. 5. Asthmatic type.
3. When one considers the great incidence of respiratory infection to which bronchial lymphadenitis is secondary, the general conclusion can be reached that this type of disease, in contrast to tuberculosis, is the most common disease of the bronchial lymph nodes.
4. The diagnosis must be made by a combined consideration of the history, physical signs and roentgen-ray interpretations.
5. The most important question for differential diagnosis is the possible presence of tuberculosis, which can be established by the use of tuberculin.
6. The treatment may be briefly summarized under three heads: rest, fresh air and diet.
7. With accuracy in diagnosis and careful observation in the details of treatment, the prognosis is invariably good, unless a secondary infection takes place with the tubercle bacillus.

350 Post Street.

Complement Fixation in Exophthalmic Goiter.—The blood of some patients who show symptoms of exophthalmic goiter binds complement in the presence of an antigen made from normal thyroid glands. The reaction may be due to a specific thyroid substance which combines with an antibody in the blood of the patient.—J. Koopman, *Proc. New York Path. Soc.* 21:55 (Jan.-May) 1921.

MEDICOLEGAL APPLICATION OF THE BLOOD GROUP

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The danger of using the blood group as a means of determining parentage in cases of suspected or known illegitimacy arises from the difficulty in establishing the origin of the particular blood group in each instance. The danger rests solely in the transmission of an unexpected blood group through the germ plasma of a heterozygous parent. The heterozygous status of a parent cannot be foretold today, except by a study of the offspring.

The criteria established by Ottenberg¹ to govern the medicolegal application of the blood group are incorrect in some instances, and based on insufficient evidence in others. They would lead frequently to the miscarriage of justice when applied by a court in the adjustment of a dispute concerning parentage. The families used by Ottenberg in formulating his criteria are too small in most instances to justify any conclusions.

Ottenberg has established certain definite laws in connection with the blood group by means of which he contends that the legitimacy of children can be determined:

1. If a child is in Group II, III or IV, when its parents are both in Group I, the child is illegitimate.
2. In unions of Group I and Group II, if a child is in Group III or IV, it is illegitimate.
3. In unions of Group I and Group III, if a child is in Group II or IV, it is illegitimate.

RESULTS OF CROSSING GROUP I WITH GROUP I

In a previous communication² on this subject, I published eight charts, which were representative of eight actual families. The blood of the families was grouped by myself. The Moss classification was used. The Group I of Jansky is the Group IV of Moss. The blood group of the family represented in Figure 1 of my previous paper, when classified according to the Jansky classification, shows, although both parents are in Group I, that there are two children who are in Group III, and four children who are in Group I. At that time I had completed grouping the blood of a family in which by the Jansky classification both parents are in Group I, but their twin daughters are in Groups I and II. Somewhat later, in grouping the blood of the Tink family,³ I discovered two parents in Group I of the Jansky classification. Three of their children are in Group IV, and one child is in Group I.

In a family whose blood I have grouped, both parents are in Group II, but three of their children are in Group II, and one child is in Group I. The grouping of the blood of the grandparents in this family shows that the Group I could have arisen from either the maternal or the paternal side, as the parental stem on both sides consists of a cross between Groups I and II.

MEDICOLEGAL SIGNIFICANCE OF THESE FINDINGS

The first law of Ottenberg is invalid, as unions of Group I can result in children whose blood may be in

1. Ottenberg, Reuben: *Medicolegal Application of Human Blood Grouping*, J. A. M. A. 77: 682 (Aug. 27) 1921; *Hereditary Blood Qualities*, J. Immunol. 6: 363 (Sept.) 1921; *Medicolegal Application of Human Blood Grouping*, J. A. M. A. 78: 873 (March 25) 1922.

2. Buchanan, J. A.: *Medicolegal Application of the Blood Group*, J. A. M. A. 78: 89 (Jan. 14) 1922.

3. Buchanan, J. A.: *A Consideration of the Laws of Heredity and Their Application to Various Conditions in Man*, to be published.