ART. VII.—*The Value of Enlarged Spleen in the Diagnosis of Tuberculosis in Infancy.* By J. A. MÉDAIL, M.D. Translated by CHARLES GREENE CUMSTON, Student Associate of the Royal Academy of Medicine in Ireland; Assistant at the Butini Hospital, Geneva, Switzerland.

I.—“It is certain that the existence of tuberculosis may be suspected, but not affirmed, in cases where an acute and painful tumefaction of the spleen exists, because acute tuberculosis is accompanied by simple acute tumefaction of the spleen as in typhoid.” This is what Besnier says, in speaking of tuberculosis in general, in his article “Spleen” in the “Dictionnaire Encyclopédique des Sciences Médicales.” In 1886 Landouzy¹* particularly examined tuberculosis in the newly-born, and showed the frequency of the malady, which up to that date was little known. In the very complete table that he traced of this disease he showed, above all, its infectious character, quick progress, and tendency to generalisation. For him the spleen counted among the organs the most often infected, and its enlargement should be an element in the diagnosis. This important remark was confirmed by Professor Damaschino² shortly after; he had also remarked that the spleen was among the numerous organs filled with granulations in very young children affected with tuberculosis. In the same year Dr. Queyrat took the subject for his thesis.³ He noted with care the enlargement of the spleen, and gave it in his clinical proofs a large share in the diagnosis. Dr. Money, in a very judicious commentary, with a case which he published in the *British Medical Journal* of 1885, unites the theory that an increase in volume of the spleen is a sign of great importance in the diagnosis of infantile tuberculosis. We tried to find what were the opinions of the authors of the classical text-books. Bazin,⁴ Bouchut,⁵ Rilliet and Barthez,⁶ d’Espine and Picot⁷ found that the spleen was large, infested with tubercles in the different tubercular affections of the newly-born, but gave this fact as of no clinical importance. Hensch alone of the modern authors of the most authority gives to enlargement of the spleen in miliary tuberculosis a place beside the indications given by auscultation, progress of the temperature, and cerebral excitation. Recently Dr. Leroux⁸ published a certain number of cases in which the enlargement of the spleen in tubercular infants was often found, but only at the autopsy.

* The numerals refer to the Bibliography at the end of this paper.

Passing now from the facts given us by human pathology to the results of experimental medicine, we could quote the experiments of Landouzy and Martin,⁹ which show that the generators could transmit to their products "not only a soil for tuberculosis, but a grain producing the disease." In these experiments, all the guinea-pigs who died during the progress of general tuberculosis had enlarged spleens infested with granulations. Now, this is an anatomical fact, found a great many times in the newly-born, that the tubercular infection attacks the spleen. This fact is found sometimes in the adult, under particular circumstances, and more constantly in tubercular animals. In the newly-born it is nearly the rule, and we shall see further on in what form and proportion. Now, from this general fact, are we permitted to draw a conclusion? This tendency to appear in the spleen is, as is known, a distinctive character of infectious diseases. We are then authorised to agree with Landouzy¹⁰, when in his teachings and publications he shows that, in the baby, tuberculosis generally tends to keep the aspect of a general disease more so than in older children. And still more so as, "neither pushing its localisations forward nor profoundly," it spreads them in nearly the entire economy without respecting a single organ¹¹. When tuberculosis spreads on this so-called special ground furnished by the baby, it is essentially of an infectious nature, which is shown by other characters usually apparent in most cases. For this reason Landouzy thought that tuberculosis might be introduced into the ætiology of certain broncho-pulmonary affections so frequent in the baby, and which, up to the present time, for want of knowledge of the cause, have been termed "*à frigore*." Bacteriological examinations which were made in these cases clearly showed that, if not always so, the bacillus was the cause (Thoan)¹² much oftener than had been suspected, even after an autopsy had been made. It is in the same order of ideas that tubercular fever may be classed,¹³ and as a good example of it I shall quote a case given by Queyrat:—"A. S., aged four months; healthy in appearance on entering the hospital with her mother, who was a confirmed consumptive; died two days later in the midst of convulsions, combined with fever and a greenish-coloured diarrhœa. The autopsy revealed psorenterie and four caseous glands; in these the bacillus was detected; the other organs microscopically intact were pronounced to be healthy. The clinical facts seem to be accumulated in this case to confirm this reducing hypothesis; the progress of bacteriology will some day make it a certainty, and thus do justice to the ideas of Landouzy.

Apart from these questions of ætiology, which are certainly of great importance, no one has determined exactly what benefit the clinician could gain from enlargement of the spleen. Nevertheless, tuberculosis is far from being easy to discover in a baby, and the conquest of a symptom is not to be disregarded. Can enlargement of the spleen in a very young child furnish an indication, and if so, what is the value of this indication? These are the points that we have tried to establish.

II.—It has appeared indispensable, in order to give this study a basis, to find out, for a given number of tubercular babies on which an autopsy was performed, how many had an enlarged spleen. The following numbers are what, in our opinion, represent approximately the weight of a normal spleen in the different epochs of a child's life during the first two years, and we consider an enlargement exists the moment that its weight exceeds these numbers:—

Under 1 month	the weight ranges between	6 to 10	grams.
Between 1 to 4 months	„	- 10 to 16	„
„ 4 to 1 year	„	- 10 to 20	„
„ 1 year to 2 years	„	- 20 to 30	„

This table is arranged after the numbers given by Frerichs¹⁴ and Parrot,¹⁵ as well as the results obtained by Mr. Lesage, which he kindly communicated to us, and also after some that we tested in Dr. Landouzy's service. Here then, these figures being taken as a starting point, is the result of our researches:—(1), 18 cases taken at the Tenon Hospital, in Dr. Landouzy's service, during the year 1888. The tubercular infants in this series died at the ages of from 3 months to 2 years. Out of these 18 autopsies, 11 times the spleen was found enlarged; out of the 7 in which no enlargement existed, 3 of these were, nevertheless, noted as presenting either tubercles, perisplenitis, or even an apparent increase in size (Cases I. to XIX.); (2), 11 cases of tuberculosis in babies, which were given us by Dr. Lesage—9 times the spleen was enlarged; out of these 9, 6 were decidedly tubercular, one was incompletely examined from this point of view, one was found intact, and lastly, one presented granulations which were considered, in the first place, as tubercular, but, examined by the microscope, were found to be a sclerosis (Cases XX. to XXX.); (3), in the cases published by Dr. Leroux there is no mention made of either the size or weight of the spleen; but out of 51 cases of infantile tuberculosis the spleen was noted as being tubercular in 38 of

them, and it is allowable to suppose that in the greater number of these 38 cases enlargement existed.

Let us now briefly state, although it does not directly touch our subject, under what form tuberculosis appears in the spleen. One sometimes finds the spleen simply enlarged, without apparent tubercular lesions. On section a very pronounced colour of dregs of urine is seen, and the corpuscles of Malpighi are very prominent. The microscope sometimes detects the presence of the granulations of Koster, or an embryonic infiltration of the corpuscles—we do not believe that anyone has ever found or looked for the bacillus. On the other hand, these cases are rare; usually the lesions are already very apparent when the organ is found enlarged. These are either patches of perisplenitis or granulations appearing through the capsule on both sides, or found on section disseminated in the pulp beside the prominent corpuscles of Malpighi. In one case these granulations, which appeared typical to the naked eye, were found by the microscope to be a small nodule of sclerosis (Case XXIX.).

III.—The spleen is accessible to the physician in two ways—by percussion and by palpation; but we would add at once that in the infant we prefer palpation. Percussion gives, even in the normal condition, a superficial dulness, but it is really a tax on one's patience to find it, and still more, as causes of error result from exaggerated pulmonary expansion when the child cries, and gaseous dilatation of the stomach or intestine so frequent at this age. Percussion is, to our mind, the most unreliable means of physical examination; we will, nevertheless, briefly state the results that it has given us in the normal condition. The dulness (which is only relative) measures about one finger's breadth in width, encroaching upon the eleventh, tenth, and ninth ribs. Its anterior limit is on a line extending from the anterior extremity of the eleventh rib, and directed towards the nipple. Its length in the antero-posterior direction is from two to three centimetres, but we repeat that this is too precise a statement for the usual conditions of infantile practice; the percussion rarely allowed us to be positive. Perhaps it would be more useful as in the enormous enlargements of malaria, &c., the spleen ascending towards the thorax, but it loses its value when it is necessary to discover the inferior limit of the organ; at this level it is hindered by the clearness of the stomach and large intestine. This is what Henoch¹⁶ says—"Usually affections of the spleen can be recognised with certainty only when they give

rise to a palpable tumour, extending beyond the left costal border. I expressly say *palpable*, because I have not an absolute confidence in percussion alone, at least in children." Palpation is then the procedure to adopt for exploring the spleen in children; it may even be admitted, as a rule, that if the spleen is felt by palpation it has increased in size. The best method to employ for this exploration is to place the pulp of the thumb parallel to the costal border on a level with the anterior extremity of the eleventh rib, and to press on the wall. According to a more or less considerable increase in the size, a small, regular, flattened, resistant mass is felt, or a tongue-like body, hitting against the finger, which by the pressure curves into the shape of a hook behind the costal border. Meteorism, by dilating the large intestine, may render this method of exploration impossible, and so may an abdominal effusion, by pushing the organ towards the thorax. A pleural effusion, on the contrary, pushes it down, and might cause one to suspect an existing enlargement when in reality there is none, or more considerable than it really is, supposing one to exist. If the child cries—and this almost always happens—the examination by palpation is still possible. One should wait, the finger on the costal border, until an inspiratory movement takes place; at this moment the abdominal wall can be depressed, and the spleen becomes accessible. By a little patience, and repeating the manoeuvre several times in succession, a clear idea may be had of the organ under examination. Sometimes the enlarged spleen may be found projecting in the left hypochondrium, but these cases being absolutely exceptional, should not be counted on. Of Dr. Lesage's ten cases (XIX. to XXVIII.) clinical examination in four revealed enlargement of the spleen; microscopical examination found it in eight of them. More than once was the clinical examination hindered, even prevented, by tympanites or distension of the abdominal walls. It should be remarked that those cases in which the hypertrophy was found by clinical examination showed a considerable degree of development.

As a *résumé* of what has been said—when the spleen is big it is perceptible by palpation; more surely and easily by percussion. In order that the enlargement may be revealed, this enlargement must have reached a certain degree. In about two-fifths of the tubercular babies a spleen, much enlarged, may be found on a clinical examination (Cases XIX. to XXVIII.).

IV.—We have already said that tuberculosis is not easy to discover in very young children. If a proof is necessary, it will suffice, perhaps, to recall to mind the prejudice existing for a long time as to its extreme rareness. This is not astonishing, as we have none of the characteristic signs announcing phthisis as in the adult. We have often, on the contrary, “undetermined symptoms—ætiology varying according as the maximum of the attack is in the brain, lungs, or abdominal organs,”¹⁷ which are a series of ordinary phenomena, so ordinary that anything at all is sufficient to justify them. What rôle has not been attributed to cold, destitution, or intestinal worms! How many cases of tubercular disease in little ones, even at the present day, are put under the head of athrepsia! We should recall to mind that under this mask is often hidden a tuberculosis, and we should learn how to discover it. Clinical discovery of splenomegalia becomes a most useful aid. An enlarged spleen, accompanied by the symptoms already mentioned, indicates that an infectious disease is the cause, and in the greater number of cases, it must be said, the disease will prove to be tuberculosis. Nevertheless, the physician must deduct what belongs to phthisis and what to other infectious diseases which attack very young children. These diseases are numerous, and deserve to have their differential characters recalled. We speak from memory only of acute diseases—typhoid fever is rare at this age, scarlet fever and small-pox are easily recognised, measles merits a special mention; is it a tuberculosis entering the door opened to it by the measles, or is it the remains of infection which is at fault in a child attacked by a post-rubeolar bronchopneumonia? An enlarged spleen would make the balance fall on the side of tuberculosis, thus darkening an already serious prognosis. A child with hereditary syphilis has an enlarged spleen, and this is a fact on which Parrot¹⁸ and Lancereaux¹⁹ in France, and S. Gee²⁰ in England, have laid much stress. But if an enlarged spleen should here count as an element in the diagnosis, how much more important and characteristic are the other signs furnished by the disease. Without speaking of paternal or maternal antecedents, the epoch of the appearance of the symptoms at about the second or third month constitutes a very good reason for suspicion.

Then come the objective signs—coryza, erythema of all kinds, papules, plantar and palmar psoriasis, mucous patches around the anus, on the buttocks and genitals; and lastly, the physiognomy of the little patient, the arch of the eye-brows dark-coloured, and the

skin of the forehead coloured a dirty gray; the upper lip swollen, prominent, cracked; the under lip thin, stretched, and covered with fissures. This picture of a syphilitic child at least presents some distinctions which render it easy to recognise.

Now for a class of cases in which syphilis and tuberculosis are combined, and the phthisis runs a good chance of passing unnoticed, at least until the autopsy. This is what happened in Case XVI., where the signs of hereditary syphilis attracted the attention to such a point that the discovery of tuberculosis at the autopsy was a real surprise. Enlargement of the spleen ought to have, perhaps, awakened our suspicions if Parrot²¹ is to be believed when he says that in hereditary syphilis in children of over four months enlargement of the spleen no longer exists. Malaria, either acute or chronic, manifests itself in the spleen of the newly-born as in the adult. If acute, the intermittent febrile paroxysms do not escape an attentive physician. But in the newly-born it is the convulsive, choleraic, or broncho-pneumonic forms which sometimes mark it, and thus open the road for tuberculosis. In these cases the diagnosis is important, for if not interfered with they may become promptly fatal. The size of the spleen, which is larger than in malaria, may perhaps enlighten the physician, but the true touchstone is quinine. It can, and sometimes ought to be prescribed in very large doses for several days, and should be resorted to the moment that malaria is suspected. Chronic malaria and tuberculosis can easily be taken one for the other. The emaciation, dyspepsia, alternative constipation and diarrhoea are their symptoms in common. Nevertheless, paludism preserves its febrile paroxysms, which always have three stages—coldness, fever, sweat. In paludal cachexia, according to J. Simon, the emaciation is extreme, the child loses its appetite, and presents grave general troubles, such as anasarca, and the spleen is larger than in tuberculosis.

The symptoms of diphtheria are usually so very typical that we have no need (in cases presenting an enlarged spleen) of entering into the details of a differential diagnosis. From what I have said, and from the cases which follow, I shall formulate these conclusions—(1), enlargement of the spleen, when clinically discovered by percussion or by palpation, becomes, in the diagnosis of tuberculosis in the newly-born, a most valuable symptom, all the more so as at this age the phthisis, although frequently discovered, easily takes the character of a general infection, and runs the risk of passing undiscovered; (2), this sign is not pathognomonic, but it

acquires a great value when one can treat without doubt the cause of the infectious diseases which seize the young baby—as syphilis, paludism, typhoid fever, diphtheria, and all diseases which can appear in babies, but which are less frequent than phthisis.

The following 18 cases were collected in the service of Dr. Landouzy, while the last 11 cases are due to the kindness of Dr. Lesage, intern of the Paris Hospitals:—

CASE I.—Maria P., aged eighteen months. Entered July 11, 1888. Mother has phthisis. Recovered from measles a week ago; at present the child has fever and great thirst. Examination shows a dullness on the right side, bronchophony and rhonchus, a yellow-coloured diarrhœa, vomiting from time to time. Died July 17.

Autopsy.—Right lung: adhesion of the middle and inferior lobes; circumscribed patch of infiltration in the inferior part of middle lobe; small encysted ulcer; a zone of tubercular infiltration; caseous glands. Left lung: nothing. Weight of child, 5 kil. 100 grammes; of liver, 28 grammes—this organ is fatty—of spleen, 20 grammes, firm; kidneys enlarged.

CASE II.—Blanche D., aged five and a half months. Entered Feb. 22, 1888, with cough and intense fever; sick for one week. Numerous rhonchi in the entire thorax; clearness lessened.

Diagnosis.—Broncho-pneumonia. Died March 1st.

Autopsy.—Cadaver quite plump; neither erythema nor ulcerations. Weight, 4 kil. 515 grammes. Nothing to note in the brain, pericardium, or heart. Right lung presents lesions from the broncho-pneumonia, with infiltrated miliary tubercles, surrounding a caseous mass: exudative pleuritis; tracheo-bronchial adenopathy. Bacteriological examination shows that it is a bacillary pneumopathy; spleen, 20 grammes; liver, 260 grammes. A section of this organ shows it has a colour varying between a fatty and amyloid liver.

CASE III.—Maria P., aged nine months. Entered Feb. 28, 1888. Loss of elasticity under pressure of the finger; dullness; rhonchus in the right apex; alternative constipation and diarrhœa; prostration.

Diagnosis.—Broncho-pneumonia and meningitis. Died March 17, 1888.

Autopsy.—Cadaver not thin or phthisical, presenting neither ulcerations nor erythema. Meninges: tubercular encephalitis of the base. Lungs: on the right, interlobular adhesive pleurisy; at the apex, caseous nodule surrounded by granulations, and underneath by gray infiltration; on the left, congestion; tracheo-bronchial adenopathy, with more or less advanced caseation of the glands. Nothing in the heart. Fatty liver, weighing 230 grammes. No appreciable granulations, either under

the capsule or on section of the organ. Spleen, 20 grammes, enlarged, perisplenitis; granulations the size of a large pin-head. On section granulations are found scattered throughout the organ; fatty kidneys, with one or two granulations in the cortex; small intestine; some circular ulcerations the size of a pea; three or four granulations. Mesenteric glands are large, and more or less caseous.

CASE IV.—Georges P., aged nineteen months. Entered May 9, 1888. Cheyne-Stokes' respiration; dysphagia; inequality of the pupils; tonic convulsions; nystagmus; stiffness of the neck.

Diagnosis.—Tubercular meningitis. Died May 13.

Autopsy.—Cerebral oedema; ventricular hydrocephalus; a yellowish-green exudation under the interior arachnoid space; tubercular granulations of different sizes scattered along the Sylvian arteries, and especially in front of the protuberance and bulb. Lungs: congestion at both bases, no adenopathy; liver slightly enlarged and fatty—weight, 320 grammes; spleen enlarged, long—weight, 40 grammes. Peyer's patches are rose-coloured and projecting.

CASE V.—Armand A., aged twenty-two months. Entered June 8, 1888. His progenitors had tuberculosis. Fed by his mother's breast (she was healthy) up to the age of eight months. At eighteen months he was taken with a cough and became thin; no diarrhoea; no convulsions. On his entrance a dulness was found on the right side of the thorax and behind; a whistling respiration and subcrepitus. Death from tubercular cachexia, July 9.

Autopsy.—Weight, 8 kil. 565 grammes. Lungs: on the left scattered granulations and commencing infiltration; on the right some granulations at the apex; very advanced caseation and softening at the base; the peribronchial glands of a dull white colour, with a patch of softening. Liver, 700 grammes, absolutely fatty; superior perihepatitis; spleen, 41 grammes; long, enlarged, perisplenitis, some granulations. Mesenteric glands voluminous, caseous in different degrees; small intestine; some granulations. Peyer's patches red and tumefied.

CASE VI.—Alice L., aged one year. Entered Jan. 30, 1888.

Diagnosis.—Broncho-pneumonia of the right base.

Feb. 10.—Symptoms of meningitis; fever; rapid pulse; constipation; vomiting; convulsions of the four limbs, during the interval of which the child had the superior limbs contracted; strabismus. Died Feb 16.

Autopsy.—Weight, 5 kil. 315 grammes. Brain: nothing but congestion. Liver enlarged, 230 grammes; perilobular sclerosis; perihepatitis in the antero-superior part of the right lobe; no tubercular granulations to be seen by the naked eye. Spleen, 20 grammes, firm; no perisplenitis; no granulations; small intestine. Peyer's patches slightly tumefied.

Nothing in the uterus and annexes. Right lung; patch of broncho-pneumonia at the apex; peribronchial tubercular granulations.

CASE VII.—J. C., aged one year. Entered July 7, 1888, with appearance and diagnosis of athrepsia. Is the second child of an Italian mother with phthisis in the second stage. Mother aged eighteen years, and in labour for the first time at fifteen and a half years old. Child nursed by the mother, and has been sick since the age of five months. Since this age the child has increased only one pound in weight, always has a greenish-coloured diarrhoea. In the right lung is found dulness and loss of elasticity under pressure of the finger. Whistling respiration; short cough and some sub-crepitus; fever. Died July 11, 1888.

Autopsy.—Cadaver white and very thin; weight, 3 kil. 770 grammes. Lungs: nothing on the right side; in the left lung, in the inferior lobe, is a caseous nodule surrounded by a zone of congestion and granulations. The tracheo-bronchial glands, on the left side only, are enlarged, caseous, and some contain a puriform mass. Liver, 270 grammes and fatty. Perihepatitis on the superior foci. No granulations appreciable. Spleen, 25 grammes, surrounded by a perisplenitis; two large granulations on the convexity of the organ. Kidneys fatty; granulations in the cortical substance; large caseous mesenteric glands; small intestine. Peyer's patches are injected, ulcerated with some tubercular granulations in the neighbourhood.

CASE VIII.—F. G., aged two years. Entered April 24, 1888, for oppression in breathing and a cough. Has been sick for a month; slight fever; good appetite; coughing by spells, interrupted, resembling whooping-cough a little; expectoration thick, creamy, and large in size. Looks slightly puffed; no albumen in the urine; dulness at the base of the right lung, with rhonchus and diminution of the vascular murmur.

Diagnosis.—Broncho-pneumonia. Death, April 27, after twelve attacks of coughing.

Autopsy.—Weight, 8 kil. 220 grammes. Liver, 490 grammes; perihepatitis; large and small granulations scattered throughout the organ, and especially on the surface. Spleen, 40 grammes; thickness, 9 centimetres; length, 5 centimetres. Perisplenitis, large flat granulations throughout the organ. Kidneys present sub-cortical granulations; some of the mesenteric glands are enlarged; three circular ulcerations in the intestine, with some small granulations. Lungs—Congestion in the left; in the right lung, tubercular infiltration of the middle lobe, with dilatation of the bronchi, which are surrounded by caseous glands.

CASE IX.—Julia A., aged three and a half months. Entered March 31, 1888, with symptoms of meningitis. Fever; tonic convulsions of arms and legs; clonic convulsions of right arm. Died April 13.

Autopsy.—Cadaver plump, weighs 5 kil. 220 grammes. Brain, both lateral ventricles distended, and both Sylvian arteries are filled with fine granulations. Tracheo-bronchial glands, tumefied and caseous; some are softened. Lungs—Granulations and infiltration, especially on the right side. Liver, 175 grammes, covered with granulations on both faces; on section appears marble-like, milky-white and light red. Spleen, 18 grammes, long; 15 granulations are to be found. Mesenteric glands enlarged and caseous. Peyer's patches injected, enlarged without granulations.

CASE X.—L. S., aged one year. Entered Feb. 14th, 1888. Fed by his mother's milk; she is wet-nurse at the St. Louis Hospital. His father coughs and is not well. At six months old child had a bronchitis; has never been well since. For the last four days has been worse; he complains of his head and cries often. On entering, had the following symptoms: anorexia, fever, crying, headache, vomiting, constipation, dilatation of the pupils, strabismus and convulsions.

Diagnosis.—Tubercular meningitis. Died Feb. 20.

Autopsy.—Weight, 7 kil. 365 grammes; cadaver is in good condition and not thin, no erythema, and appears not to have suffered. A yellowish white exudation is found in the anterior arachnoid space, fine granulations surrounding the branches of the Sylvian artery and on the pia mater; no isolated tubercle, no hydrocephalus. Lungs—sub-pleural infiltration; a single caseous nodule of old date in the superior lobe of the right lung, which is surrounded by granulations and a zone of congestion. Tracheo-bronchial glands caseous and infiltrated. Spleen—46 grammes; thickness, 10 centimetres; breadth, $5\frac{1}{2}$ centimetres. Granulations on both sides; no perisplenitis. Kidneys fatty, granulations under the capsule. Peyer's patches injected.

CASE XI.—J. S., entered August 23rd, 1888, aged fifteen days. Born at term. Mother has lost five brothers out of nine from tuberculosis; she herself is well, and feeds her child entirely from her breast. Child has a conjunctivitis and thrush; has a yellowish colour. Child remained three months in the hospital, and died with symptoms of athrepsia.

Autopsy, Nov. 22, 1888.—Adhesion of both pleuræ which contain fluid; bronchial glands caseous and large as peas; interlobular pleuritis, pseudo-membranes, pleural granulations; caseous nodule firm and white; nodule of infiltration in the apex of the superior right lobe; granulations scattered throughout the left superior lobe. Liver, 185 grammes; capsule of Glisson covered with granulations as large as pin-heads; tissue is firm, slightly fatty. Spleen—length, 6 centimetres; breadth, 5 centimetres; weight, 30 grammes. Perisplenitis of anterior edge and internal surface; fine granulations on the external surface. Left kidney shows some granulations in the cortex.

CASE XII.—M. D., aged nine months. Entered March 9, 1888. Father coughs; mother has antecedents of hereditary tuberculosis; and has already lost one child of broncho-pneumonia with convulsions; she is manifestly a consumptive, and was probably so at the time she became pregnant with our little patient, who is her fourth child. She has been pregnant six times, and had two abortions. This child was fed on the breast for four months; at five months the mother, being fatigued, gave him the bottle; at this epoch he contracted measles, and has coughed ever since. On entering he had the following symptoms:—Pale, asphyxia; takes to the bottle pretty well, slight constipation, no vomiting; no convulsions, but frequent movements of rotation of the head; difficult breathing, often with noisy inspirations. On percussion, sub-crepitus in both bases, with loss of elasticity; dullness in both apex; rhonchus in the entire thorax, which is deformed. Died March 18.

Autopsy.—Weight, 4 kil. 340 grammes. Thorax—double pleural adhesions, more so on the left; false membranes, which are not vascular. Tracheo-bronchial glands caseous. Small caseous nodule at the base of the left lung, surrounded by gray granulations; a mass of gray granulations in the inferior lobe without any nodule of broncho-pneumonia. Liver—190 grammes; fatty miliary tubercles on the surface and on section. Kidneys—a few miliary tubercles in the capsule. Spleen—20 grammes, with tubercles on the surface. Nothing in the heart. Intestines—Peyer's patches swollen, and mesenteric glands caseous; psorenterie.

CASE XIII.—G. F., aged ten months. Entered March 10th, 1888. Child of a consumptive mother (who had signs of softening); child appears to be well and is with her mother, who is under treatment; child died March 29.

Autopsy.—Weight, 5 kil. 900 grammes. Intestine—Peyer's patches prominent, an ulcerous crateriform patch is granulating. Spleen—25 grammes, with one granulation. Kidneys—nothing. Liver—260 grammes. Right lung—a reddish gray nodule of infiltration in the superior lobe; two glands the size of a walnut are commencing to be caseous.

CASE XIV.—A. G., aged seven months. Entered March 28th, 1888, in full measles eruption. Sick for five days. Intense fever, vomiting, has had diarrhoea the preceding days, but none since admitted. Slight ocular catarrh, frequent cough, sub-crepitus in right lung, rhonchus on both sides, more distinct on the right. Died April 2.

Autopsy.—Weight, 7 kil. 270 grammes. On the right is a tracheo-bronchial adenopathy. In the right lung is a congestion containing in the centre of the middle lobe a zone of caseous infiltration; in the left in the inferior lobe is a pseudo-lobular broncho-pneumonia, in the middle of

this lobe is a gray peri-bronchial infiltration. Nothing in the heart. Liver—320 grammes, a dozen granulations. Spleen—80 grammes, no perisplinitis, granulations on the internal surface. Granulations on the kidneys. Small intestine—Peyer's patches are enlarged. Nothing in the brain. Bacteriological examination showed micrococci scattered throughout both lungs, and the bacillus of phthisis in the right lung and in the caseous glands.

CASE XV.—P. T., aged fourteen months, admitted September 9th, 1888. The little patient has just had the measles, which commenced two weeks ago. On the third day of her illness, the physician treating her made a diagnosis of broncho-pneumonia and applied a blister. When admitted the child was very thin, had lost strength, intense fever, much coughing and dyspnoea. On the right is found sub-crepitus, loss of elasticity under finger pressure, whistling rhonchus and bronchophony. Respirations, 60; pulse, 120; temperature, 39.4° C. Died September 12.

Autopsy.—Weight, 6 kil. 345 grammes. Liver—400 grammes, anæmia of the organ; no granulations whatever. Spleen—30 grammes, nothing. Kidneys—congestion under the capsule. In the right lung is a nodule of pseudo-lobular broncho-pneumonia, in the inferior and superior lobes patches of exudative pleuritis, and in the left lung broncho-pneumonia of the inferior two-thirds. Nowhere is a granulation to be found.

CASE XVI.—E. M., aged four months, admitted September 25th, 1888. She has hereditary syphilis. Her mother had two children by another father; both are strong and well. Mother was well until the fifth month of her pregnancy, when, from this epoch, she became thin and feeble, pains in the bones with swelling of the left knee and side of the forehead. Roseola on the hips, abdomen, and inferior part of the thorax; during six months had mucous patches on the vulva and œdema of the labia majora. Delivery at seven months; after accouchement all symptoms disappeared for some time, and the patient felt better. On being admitted, there are found general adenopathy, alopecia and crusts on the hair, plantar and palmar psoriasis, mucous patches of pharynx, tongue, lips, vulva and umbilicus. Lungs—a slightly feeble vascular murmur. Three years ago the father had a chancre and two bubos (one on each side) which suppurated and were opened; to-day may be found two large cicatrices. He has observed nothing since these either as to physical or functional signs. On examination some axillary and epitrochlean glands are found enlarged. The child was born at seven months. During the first month was in good health, although weak. The second month had some digestive trouble (constipation, swelling of abdomen). At the beginning of the month had small pimples on the gluteal region which bled easily. At the consultation at the Hospital St. Anthony, he was ordered liq. Van Swieten and starch

baths; the eruption lasted one week. At the end of the month, stools were regular and abdomen less swollen. The third month his strength returned and he had good health during this month. The fourth month, during the three first weeks, general condition was bad; emaciation. A doctor being consulted ordered an emetic and frictions with "Neapolitan ointment" ("onguent napolitain" of the French "Codex"—an ointment composed of metallic mercury, 500 parts; benzoated lard, 460 parts; and white wax, 40 parts). This the mother had continued up to the present time. The doctor also told the mother to stop nursing (on account of her health and the lack of milk), but the child would not take the bottle, so that this recommendation was not carried out. About ten days ago the eruption of the pimples which continued was almost limited to the legs. The mother had noticed only about five days before that the child had patches on the tongue, but when the doctor had examined it the spatula made it bleed. Since the frictions have been made the child has two or three stools a day, but does not vomit. Coughs for last two weeks (a little like whooping-cough); her sister, aged five years, has developed whooping-cough a few days before she commenced. Examination, on being admitted, showed considerable emaciation and enlarged abdomen; cutaneous eruptions, nearly entirely on the legs and under the umbilicus; they are of two kinds:—1. Pustules of various sizes (a large pin-head to a millet seed), violet with an areola of paler hue; some have an epidermic flange, others have a very small purulent point in the centre. 2. Deep irregular indurations from $1\frac{1}{2}$ to 2 centimetres in breadth; in certain parts on their level are small, softened fluctuating tumours of violet colour; in other parts pustules pure and simple; at any rate these superadded elements do not correspond to the entire induration. The indurations are located on both knees, the gluteal region, and the calf of the left leg. The left thigh is doughy and voluminous, with elevation of the local temperature. The articular surfaces of the knee appear to be increased in size. The extension of the left leg on the thigh is incomplete even when force is used to produce it. The mother noticed two days ago indurations and troubles in the movement in the left knee. Over all the points of the diseased legs no pain is to be discovered; no enlarged glands are to be found. Spleen—percussion gives no clue; palpation allows the organ to be felt descending three fingers' breadth below the costal brim, and it may be easily taken between the fingers; its breadth seems to measure three fingers' breadth. Liver—percussion shows it to be situated a finger's breadth above and below the costal brim; nothing by palpation. Lungs—behind and in front percussion is negative; behind, the inspiration is harsh; in front, inspiration is sibilant; nothing else. Mouth—two mucous patches on the tip of the tongue, one on the middle of the lower lip; no ulceration of the frænum; nothing abnormal in the pharynx. Sept. 27.—The points where the indurations with fluctuating tumours were found are entirely softened;

and, on incising them, a grayish-brown fluid flows out mixed with drops of oily substance; on pressing, the pus was squeezed out and with it a light yellow-coloured mass of sphacelated tissue, all these lesions are subcutaneous. The slight œdema of the left leg which existed yesterday is most pronounced to-day. Sept. 30.—Died at two o'clock in the morning without anything to be noted.

Autopsy.—Weight, 2 kil. 825 grammes. Liver—190 grammes; congested with steatosis produced by nodules having a porto-biliary situation, but more distinct in certain parts; numerous granulations; density increased. Gall-bladder shrunken and containing a small quantity of amber-coloured bile. Spleen—31 grammes; surface slightly uneven, with a dense thickening of the capsule; increase in size; section only reveals a small purulent nodule near the lower extremity. Kidneys (left 24 grammes, right 24 grammes) appear to be paler than normal; one or two granulations on the surface of the right kidney. Small intestine—Peyer's patches are slightly prominent; no psorospermia; mesenteric glands are moderately tumefied. Testicles—nothing abnormal; epididymus light yellow and spongy as in the normal condition. Left femur—bone-like thickening of the periosteum, forming a bony cylinder-shaped sheath, covering the bone and separated from it by a nearly uninterrupted sinus. Brain—a small caseiform mass the size of a pea, irregular and soft, situated at the upper part of the right hemisphere in the frontal zone. Tongue—at the tip the three mucous patches still exist; nothing else to be noted. Heart—24 grammes; two small transparent spherical nodules entering into and placed between the posterior segment and the right segment of the aortic valves; as to appearance they do not differ from the neighbouring corpora Arantii; nothing in the pericardium. Left lung—superior lobe is infiltrated in its upper half by caseous matter, separated in places by bands of dense tissues of a milky tint; the inferior lobe has a cavity extending from the surface of the hilum, adhering to the pleuræ which are fused together and consequently to the thoracic walls—this cavity appears to be empty with a dry surface, slightly granular; an important branch of the pulmonary artery extends through it giving off smaller branches. Right lung—splenisation of the greater part of the upper lobe; nuclei of broncho-pneumonia and granulations scattered throughout the organ, becoming more numerous towards the base; superficial sub-pleural granulations are present. Before opening the lungs they had the appearance of solidified masses, being hard, red, with an unpolished look on the under side and lower portions, on account of the existence of a pseudo-membranous pleuritis, more marked on the left side. The tracheo-bronchial glands tumefied, caseous. Only one contains a purulent cavity limited by a fibrous membrane—this gland appears to be in communication with the cavern in the lung. Histological examination of the organs: Left lung—the usual lesions of

caseous pneumonia ; the tubercles of pneumonia essentially of the irregular type as to shape and size, with two usual zones, &c. Heart—no lesions of the muscular fibres ; no inter-fascicular sclerema. Liver—numerous nodi scattered in groups along the porto-biliary tract without relation to the tubercles ; periporto-biliary adipose tissue in moderate quantity, but varying according to the part, and in some extending into a certain number of the neighbouring biliary lobules. Other than these two lesions there is no noticeable modification of the vascular or cellular tissues. Kidneys appear perfectly normal, excepting one or two tubercular nodi situated on the covering of the vessels forming the vascular vault. Spleen—filled with tubercular nodules ; the corpuscles of Malpighi are extremely tumefied, and reveal all the stages from simple embryonic infiltration (rare) or combined with one or two nodules (rare also) to the transformation into a large tubercle (the most frequent). No trace of tuberculosis in the tongue.

CASE XVII.—B. M., aged six months ; mother Italian, who has had smallpox ; father healthy. Admitted June 27, 1888, with her mother, who has typhoid fever. Child appears to be well ; has been fed on her mother's breast up to date. Died Sept. 6, after two or three days of cough, fever, and diarrhoea.

Autopsy.—Weight, 5 kil. 315 grammes. Lungs : nothing on the left ; on the right the inferior lobe is covered on the entire length of the posterior border and external surface with fibro-purulent pseudo-membranes. The inferior two-thirds are occupied by a caseous mass, partly softened, pseudo-lobular caseous broncho-pneumonia. Low down in the right ilium is a caseous gland the size of a large pea ; above an oblong gland measuring 3 centimetres, containing a yellowish white cheesy mass. Liver 235 grammes. Spleen 30 grammes ; no tubercular granulations. Kidneys healthy.

CASE XVIII.—J. C., aged twenty months. Father healthy ; mother had a sister who died, aged thirty-three, of tuberculosis. She has lost three children out of five—one of meningitis and one from enteritis. Personally she appears healthy. When fourteen months old the patient had an eruption of pimples over the entire body ; at sixteen months, that is to say, in March, 1888, entered the hospital for the first time for a left-sided broncho-pneumonia, and remained some weeks ; cough, rhonchus, vomiting, diarrhoea, fever, and dyspnoea. In August, 1888, admitted again for a broncho-pneumonia—this time on the right ; left much better. Entered again October 10, 1888. On examination the following was obtained :—Child quite stout, but with flabby flesh ; very pale complexion ; hair and eyelids very long. From time to time momentary cyanosis is remarked—cries, intense dyspnoea, frequent cough. At the time of

examination is quiet, owing to fatigue. Auscultation, in front on both sides mucous râles, principally inspiratory, varying from one moment to another; at both bases dulness quite marked, with loss of elasticity under finger pressure; souffle nearly entirely inspiratory, of pleural type, with resounding cry, and direct and fine crepitations extending to the lowest portion. Behind, in both sub-spinous fossæ, mucous râles, principally inspiratory, are found.

15th Oct., evening.—Calmer, less oppression. Auscultation, same signs in front; behind, feeble respiration towards the base, with heavy rhonchus in the upper region of the left side. On the right, in the upper part, normal clearness; dull rhonchus as on the left; dulness still exists in the lower part, but is more limited; souffle entirely expiratory, sharp, with resounding cry; fine sub-crepitant râles accompanying inspirations.

22nd, evening.—Coughs very much; does not swallow the sputum, and her mother succeeds in making the child expectorate; auscultation reveals nothing abnormal either behind or in front on the left. On the right, normal clearness everywhere; a few râles in the upper parts; below, the souffle is lessened, and hardly perceptible on account of the resounding ægophony of the cry. In the right arm-pit finer sub-crepitant râles are heard in the entire organ, with resounding ægophony of the cry; a few dull sub-crepitant râles in the middle.

27th Nov., evening.—Behind, on the left, in the supra- and sub-spinous fossæ, souffle and cavernous inspiration without râles; on the right, at the base, sonorous sub-crepitant râles, with equal rhythm, with an inspiratory souffle and resounding ægophony of the voice. In front, whistling respiration; under the arm-pits same signs as behind. For four days there has been a puriform expectoration containing hardly any air, reminding one of liquids excreted by caverns; cough resembling whooping-cough. Died Oct. 31.

Autopsy.—Nothing in the brain. Lungs—the tracheo-bronchial glands form large masses, greatly compressing the bronchus, especially on the left, where a mass of intra-bronchial glands form a projection under the pleura, separating the lobes. All these glands are caseous or tuberculous in different degrees. Quite numerous miliary granulations exist in both lungs; splenisation, and probably also atelectasis, increasing towards the base; nearly complete in both inferior lobes. The middle region of both lungs contains quite a number of emphysematous lobules. Hypertrophy of the heart; congestion of the liver, with two or three granulations on the surface. Congestion of the kidneys; cortical substance slightly pale and opaque; no tubercles visible. Spleen—moderate hypertrophy; corpuscles of Malpighi distinct; mesenteric glands moderately tumefied; a few are cheesy; tumefaction of Peyer's patches; psoren-teric.

Microscopical Examination.—Spleen—embryonic infiltration of the

corpuscles of Malpighi, which are distinctly disengaged from the rest of the tissue of the spleen; no tuberculosis present. Search for the bacillus in different sections, by Ehrlich's method, is negative; kidneys normal. Apart from the parts where tubercles exist, the histological examination of the lungs confirms the diagnosis of splenisation.

CASE XIX.—R., aged fourteen months; admitted Nov. 20, 1887. Chronic pulmonary tuberculosis; râles and dulness over the right apex; the rest of the lung normal. Child very thin; spleen, on percussion, does not appear increased in size, and is not to be felt on palpation. Died Dec. 16.

Autopsy.—Both lungs infiltrated with tubercles; a slight tracheo-bronchial adenopathy; one caseous gland; all the other organs are normal. Spleen of normal appearance, but weighs 42 grammes.

CASE XX.—Eve, aged four months; admitted Dec. 21, 1886. Pulmonary tuberculosis; râles to be heard everywhere; sub-dulness over both apices; cachexia, tympanites, frequent bilious diarrhœa. Child very thin; spleen not perceptible. Died Dec. 23.

Autopsy.—Pulmonary tuberculosis, with scattered granulations; tuberculosis of the peritoneum; fatty liver; spleen presenting a normal appearance; weight 28 grammes; no perisplenitis; no tuberculosis.

CASE XXI.—Child, aged five months; entered in Dec., 1887.

Diagnosis.—Pulmonary tuberculosis; cachexia; spleen is not perceptible. At the autopsy, pulmonary tuberculosis in the form of patches of broncho-pneumonia; tubercular tracheo-bronchial adenopathy. Spleen 25 grammes, presenting nothing special.

CASE XXII.—Child, aged six months; entered hospital in full tubercular cachexia, with a souffle in different points, and scattered mucous râles.

Autopsy.—Foci of broncho-pneumonia in both lungs; tracheo-bronchial adenopathy. Spleen weighs 32 grammes.

CASE XXIII.—Wall, born Oct. 16, 1887; entered Nov. 22, 1887. Generalised râles of bronchitis; dulness over both apices in front and behind. Cachexia; child very thin; abdomen normal. Spleen felt on percussion, and seems increased in size; dulness extends over three fingers' breadth. Palpation reveals nothing.

Autopsy.—Tubercular broncho-pneumonia; spleen infiltrated by tuberculosis; perisplenitis; weighs 30 grammes.

CASE XXIV.—F. P., born July 5, 1886; entered hospital Oct. 23, 1887.

Diagnosis.—Pulmonary tuberculosis; the notes give the following:—

Dulness over the apex of right lung in front and behind; left apex normal; auscultation; souffle over the right apex, occupying the upper third of the lung; a few sub-crepitant râles at the base, left lung; normal respiration. Some scattered râles, especially at the base. Child very thin; cachexia; cerebral functions are normal; liver and stomach normal. From time to time slight vomiting; increased appetite. The child often presents, with appreciable cause, attacks of bilious diarrhoea, lasting from five to ten days. During the calm periods the intestinal functions are normal; tympanites of abdomen, sonorous and resistant on palpation. On account of the tympanites the spleen cannot be reached. On percussion the spleen is apparent, having a dulness covering three fingers' breadth; an increase in the size of the organ appears evident. The pulmonary tuberculosis follows a slow evolution up to Nov. 21—date of the death. During this evolution the symptoms changed but little; the fever persisted, oscillating between 38° and 39° Centigrade.

Autopsy, Nov. 22.—Tubercular broncho-pneumonia in the right apex, with a small cavern. Diffused infiltration of tuberculosis in the rest of the organ; some scattered tubercles in the left lung. On the side of the neck a large gland is noted; those of the hilum are increasing in size, and one of them is manifestly caseous. Stomach and intestines are normal, as are also the mesenteric glands; liver enlarged, but no tubercles are visible. Gall-bladder contains a great quantity of very green bile; spleen enlarged, infiltrated with tubercles, which are found on the surface of the organ; weight, 54 grammes. Other organs normal.

CASE XXV.—L. B., born Sept. 12, 1887; entered Nov. 21, 1887. Symptoms—cachexia; child thin, having the athrepsia type; absence of digestive troubles; vomits from time to time from bad alimentation. Abdomen normal, soft, no tympanites; no mesenteric adenitis; stomach normal; liver normal. The predominant lesion is in the lung; dulness in the inferior quarter of left lung; clearness over the rest of both lungs. In the middle of the induration a souffle is heard; sub-crepitant râles at the periphery; a few sub-crepitant râles in the rest of the lung. Slight cough, very marked dyspnoea; respirations, 68 per minute; absence of expectoration. Temperature, Nov. 21—38·5° C. in the morning, 40° C. in the evening; pulse, 110 to 120.

Diagnosis.—Localised tuberculosis of the lungs; the other organs normal. Spleen not accessible on percussion, but there is a slight dulness over it which is difficult to estimate. Palpation does not permit of it being felt, so that the conclusion was that the organ was, clinically speaking, normal. Duration of disease, six days after entrance to hospital; persisting fever and pulmonary lesions.

Autopsy, Nov. 27.—All organs normal, excepting the lungs; the left is infiltrated with tubercles, being more abundant at the base, in the form of a mass of pseudo-lobular broncho-pneumonia. Right lung shows a few tubercles in the apex; no broncho-pneumonia. The glands of the hilum are larger than normal, and two of them are noted as distinctly tubercular. The tuberculosis appears localised in the lungs; spleen normal, weighing 10 grammes.

CASE XXVI.—J. P., aged six months. Entered Oct. 6, 1886. Child thin and cachectic; pulmonary tuberculosis most evident. Sub-crepitant râles scattered throughout both lungs; dulness over both apices; a grumbling sound in the right apex; the other organs normal. Spleen, examined by palpation, shows nothing abnormal; percussion reveals the region of the spleen to have apparently a greater extent than the normal; no tympanites of the abdomen. Died Oct. 16.

Autopsy.—Patches of tubercular broncho-pneumonia in both apices; peri-bronchial tubercular adenopathy. Spleen, notably hypertrophied, surrounded a tubercular perisplenitis. The section of the organ reveals some tubercles scattered here and there; weight, 48 grammes.

CASE XXVII.—L. E., aged four months. Entered Dec. 21, 1886.

Diagnosis.—Pulmonary tuberculosis and digestive troubles, probably also tubercular. From the information given by the mother, the child has been ill for a month. On admission, auscultation showed a dulness over the entire left lung; a marked souffle of induration in the upper third; râles of bronchitis in the two lower thirds. Sub-dulness over the apex of right lung; clearness in the rest of the organ. On auscultation, scattered and generalised râles of bronchitis are heard throughout the organ. Brain, liver, and stomach normal; abdomen distended, painful on pressure; tympanites. Bilious diarrhoea, without vomiting; five to six stools in the day. The swelling of the abdomen prevented palpation of the spleen; percussion showed that the organ was not perceptible, as the region was tympanitic. During the two days at the hospital the fever oscillated between 39° C. and 40° C. Died Dec. 23, in the last degree of marasmus.

Autopsy, Dec. 24.—Both lungs presented the most evident tuberculosis of the broncho-pneumonic type, in the right apex and the entire left organ. Spleen normal, no tubercles; weight, 22 grammes. Liver appears enlarged; gall-bladder contained about 60 grammes of very green bile. Stomach normal; the intestines present no alteration (the diarrhoea appears to depend on the condition of the liver), the tympanites only exists. The other organs normal.

CASE XXVIII.—D., aged three months. Entered Oct. 28, 1886. General bronchitis; dulness over both apices behind and in front.

Tympanites, diarrhœa, vomiting; spleen is found by percussion to have two fingers' breadth. Nothing obtained by palpation.

Autopsy, Dec. 11.—Lungs infiltrated with tubercular granulations; some scattered points of broncho-pneumonia. Caseous patches in both apices. Spleen enlarged, and infiltrated with granulations; weight, 40 grammes.

CASE XXIX.—Child, aged five months. Pulmonary tuberculosis, with patches of broncho-pneumonia in the left apex. A few tubercles in the right apex; other organs normal. Spleen enlarged, weighing 26 grammes; nothing abnormal on the surface. On section, small grayish irregular points are seen scattered throughout the organ which look like tubercles, but the histological examination showed that they were small nodular indurations, and not tuberculosis.

LIST OF WORKS CONSULTED.

[The numbers correspond to those in the text.]

- ¹ "Soc. Méd. des Hôpitaux." April, 1886.
- ² *Idem*. April 17, 1886.
- ³ Queyrat. "Paris Thesis." 1885.
- ⁴ "Traité de la Scrofule." Paris. 1861. Page 418.
- ⁵ Bouchut. "Maladies des Nouveau-nés."
- ⁶ Rilliet et Barthez. "Maladies des Enfants." Tome III., page 860.
- ⁷ D'Espine et Picot. "Maladies des Enfants." Page 573.
- ⁸ "Leroux in Études Experimentales et Cliniques sur la Tuberculose." 1888. Tome II., Fasc. I.
- ⁹ "Revue de Méd." 1883. Page 1,014. Also "Études Experimentales et Cliniques sur la Tuberculose." 1887. Fasc. I.
- ¹⁰ *Loc. cit.* and Lectures given at the Faculty of Med. of Paris.
- ¹¹ *Loc. cit.* et Bull. de la Soc. Anatomique. 1879. Page 21.
- ¹² "Revue de Méd." Dec., 1885.
- ¹³ "Note sur la Tuberculose." Société Méd. des Hôpitaux. April, 1886.
- ¹⁴ Frerichs, cited by Besnier in Art. Rate. "Dict. Encycl. des Sc. Méd."
- ¹⁵ "Syphilis Héritaire et Rachitis."
- ¹⁶ Henoch. "Leçons Cliniques." Paris. 1885. Page 454.
- ¹⁷ Queyrat. *Loc. cit.*
- ¹⁸ "Bull. de la Soc. de Biologie." 1872.
- ¹⁹ "Traité de la Syphilis." Paris. 1886.
- ²⁰ S. Gee. *Lancet*. April, 1867.
- ²¹ Parrot. *Loc. cit.*