

and had patches of caseation on its surface. In the external tuberosity of the tibia there was a sequestrum 1 centimetre in diameter, surrounded by brownish red granulations and the opposing surface of the femur showed several defects in the cartilage and bone filled with caseating tissue. On making a vertical section through the tibia the sequestrum was seen to be triangular in shape with the apex towards the shaft of the bone. In the internal tuberosity of the tibia there was a soft deposit containing brownish red and whitish material. Other deposits were found in the end of the femur.

TUBERCULOUS DISEASE OF BONES AND JOINTS OCCURRING SPONTANEOUSLY IN THE LOWER ANIMALS.

Very little appears to be known about these diseases in the lower animals, and after searching much literature and inquiring among veterinary surgeons both at home and abroad, I only succeeded in 1888 (when I looked into this matter) in finding one paragraph in which there is any description of the disease, and that was in a paper by Ostertag on "Oertliche und allgemeine Tuberkulose," in the *Archiv f. wissenschaft. u. prakt. Thierheilk.*, xiv, 4 and 5. I may quote Ostertag's statement. He says, speaking of general tuberculosis in animals, that tuberculosis of bones and joints "is found chiefly in the dorsal vertebræ, ribs, sternum, and the long bones, or the hip- and knee-joints. The tuberculosis of the bone usually starts from the medulla, or the spongy portions of the bone, more rarely from the periosteum, and leads to the formation of greyish red granulation deposits, which attain a considerable extent by lacunar absorption of the bone. The centre of the growth soon undergoes caseation, and ultimately a cavity is formed, which frequently only shows a narrow border of granulation tissue. As a rule, only isolated deposits are met with, but it sometimes happens that almost half the dorsal vertebræ are affected. The process may spread to the joints from the epiphysis, but an osseous deposit is not necessary for the formation of a tuberculous arthritis. In swine I have seen two forms of tuberculous inflammation of joints—(1) an empyema articulare tuberculolum, in which the synovial membrane is infiltrated with tubercles, moderately reddened and swollen, and distended with muco-purulent exudation; (2) an arthritis fungosa, where the synovial membrane is swollen, and converted for the most part into a granulation tissue with tubercles scattered through it, this tissue filling up the cavity of the joint without any great exudation into the joint."

From specimens which I have had the opportunity of examining, I believe that most of the so-called scrofulous joints of animals are not tuberculous but most probably rheumatic, but I have, through the kindness of Professor Schütz, of Berlin, obtained six specimens of true tuberculous disease of bones in the lower animals. [Photographs of five of these were shown.]

One section of the lower end of the humerus of the cow shows an extensive caseating patch in the medulla of the humerus, which reached as far as the articular surface, and had destroyed the cartilage over it. The soft deposit is surrounded by sclerosed bone, in which we see fresh tuberculous nodules, which apparently commence in the Haversian canals.

In another specimen from the sternum of the cow we see a considerable area of soft issue, and also roundish soft caseating masses. The small masses are composed chiefly of more or less perfect fibrous tissue, caseating in parts, and showing a few small giant cells, with marginal nuclei. The smaller patches are evidently in the Haversian canals, and consist of a central artery, with greatly thickened walls, surmounted by some fibrous and cellular tissue.

The appearances in the sacrum of the cow are essentially the same. At the anterior part there is new bone and sclerosed bone, with here and there circular caseating deposits in it; at the posterior part the osseous tissue has disappeared, and in its place is a patch of soft tissue, in which are similar round caseating deposits. In some parts the bone has become absolutely dense.

In a specimen of the vertebræ of a pig the chief seat of the disease is in the laminae. To the naked eye the tuberculous mass seems to be composed of an aggregation of small nodules. There are also deposits in the bodies of the vertebræ. In one of the bodies there is a cavity of considerable size, filled with cheesy material and opening on the surface. In

a photograph of a section is seen, chiefly in the situation of the laminae, the tuberculous mass which consists of fibrous tissue replacing the bones, the tuberculous deposits being in roundish groups, and clearly commencing in connection with the blood-vessels. There are generally two or three deposits in each group, and some giant cells, but not much caseation.

In a photograph of a fowl's tibia peculiar caseating patches are seen in the medulla of the lower end of the tibia, and two similar patches in the cancelli of the epiphysis. These patches are surrounded, more or less completely, by a reddish ring, and we find here and there in the caseous material smaller red rings, which are apparently composed of fibrous tissue, and are probably formed around the blood spaces. The specimen had been badly preserved, and did not stain well.

The general character of the disease in cattle is the formation of large and small roundish, caseating nodules in the substance of the bone, accompanied in the first instance by sclerosis of the bone. These nodules commence in connection with the blood vessels in the Haversian canals, or in the medulla of the bone. In the Haversian canals the walls of the blood vessels are thickened, and in various parts we can trace all stages, from commencing thickening of the vascular wall to the complete development of a caseating tuberculous mass. The tuberculous growth evidently commences in and around the walls of the vessels, and soon becomes surrounded by a fibrous envelope. As it enlarges, the bone around becomes absorbed, and thus we come to have small and large round spaces in the bone, containing tuberculous tissue caseating in the centre; this caseous material falls out in preparing the sections. These deposits are not always round; in the process of absorption of the bone larger cancellous spaces are opened into, and thus we find elongated or irregular-shaped deposits. In these tubercles giant cells are not usually numerous nor large; and in the specimens which I have examined—which, however, were not well preserved—the bacilli were few in number. I have not met with sequestra in any of these specimens.

INTRALARYNGEAL INJECTIONS IN THE TREATMENT OF CERTAIN LARYNGEAL AND PULMONARY AFFECTIONS.

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ON November 8th, 1889, I read a paper before the Medical Section of the Medico-Chirurgical Society of Glasgow, bearing on this subject, and giving details of several of the cases which had been under my care during the six months previous to that date. The majority of the cases there detailed had been treated in the wards of the Western Infirmary, where, through the kindness of several of my colleagues, every opportunity was afforded me of testing this method of treatment. Among the conditions treated were cases of tuberculous laryngitis in an ulcerative condition without detectable pulmonary lesion, and others with varying degrees of pulmonary implication, cases of early phthisis pulmonalis, pulmonary cavity, bronchiectasis following long standing bronchitis, and some few cases of bronchial asthma. Every case to which I shall refer was examined by one or more medical gentlemen, independent of any examinations made by myself, and all particulars here given of the condition of the patients are founded on the opinions of those gentlemen.

Solutions Employed.—At first I employed solutions of menthol in rectified spirits varying in strength from 10 to 15 per cent., but on account of the glottic spasm produced by its introduction into the larynx in several cases, I substituted at an early date olive oil, used by Rosenberg and other experimenters, as the solvent and vehicle of the drug exhibited. Recently I have made use of vaseline oil as the solvent. When this is employed, the solution remains for a lengthened period perfectly clear, and it is readily borne by those who object to the smell of olive oil. Pure carbolic acid, creasote

eucalyptia, pinol, and oil of eucalyptus, separately and in varying combinations, and dissolved in olive oil, I also employed—the latter to a very limited extent only. Those to whom the oil of eucalyptus was administered complained of its smell and taste as communicated to the palate by the expired air, and on account of this and the loathing and sickness it produced in others, it was after a very limited trial laid aside. I then returned to the use of menthol dissolved in olive oil of the strength of from 12 to 15 per cent. Where fœtor of the breath existed I added pure creasote in proportions varying from 2 to 5 per cent. This I replaced by guaiacol after a time, and now the combination most largely employed, as it appears to be the most efficacious and the most pleasant, consists of from 12 to 20 per cent. menthol, and 2 to 4 per cent. guaiacol, in olive or vaseline oil. Guaiacol, which is contained in beechwood creasote to the extent of 60 to 90 per cent., has all the properties of creasote, is devoid of its— to some—disagreeable odour, is a much more powerful germicide, and is of definite composition.

The Syringe.—When first employing the injection I made use of the special syringe imported from the Continent. The point of the laryngeal tube of this syringe terminates in several openings, after the fashion of a spray. This, after an extended use, I considered objectionable, as the fluid injected was spread over the upper surface of the larynx, and spasm was the result. Chiefly on this account I discarded the use of this syringe, and in place of it I had laryngeal tubes made in vulcanite to fit on to the nozzle of a hypodermic syringe, or a larger syringe if desired, and by means of which the injection can be given thoroughly and satisfactorily. They are simple tubes of equal calibre throughout, and they are made in three sizes, the difference being in the size and form of the curve.

Method of Administration.—In the administration of the injection I have almost constantly employed the laryngeal mirror, by the aid of which the point of the laryngeal tube of the syringe can be accurately guided over the epiglottis and into the larynx without coming in contact with the tongue, the fauces, or the pharynx, thus obviating all risk of retching being induced. With a little practice, however, the tube in the majority of cases can be readily inserted, and the injection given without the aid of the mirror, by placing the patient before a good light, having his tongue held in the protruded position, and with the mouth widely open. The ease with which the tube can be introduced within the larynx greatly depends on the shape and the position of the epiglottis. Where the epiglottis is elongated and dependent, it will be found necessary to resort to the use of the frontal and laryngeal mirrors, and possibly the specially curved tube as well. The point of the laryngeal tube should be inserted within the larynx to the level of the vocal cords at least, and it should be in that position before the fluid is injected. If this is not attended to, if the fluid is spread over the cords the sensation produced is disagreeable, being similar to something having gone the wrong way, and the patient may be compelled to cough.

If, however, the nozzle of the syringe be placed below the level of the cords, the fluid is injected directly through the larynx into the trachea, and as much as two drachms in some cases can in this way be injected without the slightest inconvenience to the patient. An ordinary hypodermic syringe holds from 25 to 30 minims, and, in using it with the laryngeal tubes spoken of, I repeat the injection two or three times at each sitting, thus giving roughly from a drachm to a drachm and a half. Applying it in this gradual way, I never have patients coughing as they did when the same quantity was given at one injection by means of the large syringe.

EFFECTS FOLLOWING THE INJECTION.

Respiration and Cough.—Immediately on the administration of the injection containing menthol, the patient experiences a sensation of warmth in the larynx, which rapidly spreads downwards to the region of the sternum, and is soon followed by what the patient usually describes as a comfortable glow all over the chest. He breathes more freely, and where tightness or a feeling of constriction across the chest is complained of, this is rapidly relieved by the menthol injection. Following on its administration there is much less inclination to cough; this relief from the constant tickling cough is in many

cases very marked, and more so after the first few days of treatment. On making the inquiry of patients under treatment, many say that they cough none for from four to eight hours, and in some cases even longer, after having the injection, and, if it be given at bedtime, many whose sleep was previously much interfered with by the frequently recurring cough, rest the whole night long without once coughing. This fact, which is corroborated by others who employ this form of treatment, and with whom I have conversed on the subject, is, on account of the rest it secures to the parts, of the very greatest importance in the treatment of laryngeal ulcerations.

Expectoration.—The expectoration in phthisical cases becomes greatly reduced in quantity, and much less offensive. In several cases the purulent element has entirely disappeared, and what little expectoration continued to be discharged resembled the frothy expectoration of simple bronchitis. The sputum in the tuberculous cases was not systematically examined for the presence of bacilli except in a comparatively small number of cases. Where it was thus carefully examined, the bacilli were markedly reduced in number in a given preparation, and as the amount of sputum in the twenty-four hours was but a fractional part of the quantity previously expectorated, the distinct reduction in the number of bacilli can be readily appreciated. Dr. Charles Workman, bacteriologist to the Glasgow Royal Infirmary, examined the sputum of one of the cases shown at the Medico-Chirurgical Society while she was under treatment, and he subsequently wrote that he had no difficulty in finding tubercle bacilli in the sputum, "but at the same time they were not in such large numbers as I often find in tuberculous sputum." Before treatment expectoration was large in quantity, tubercle bacilli were very numerous, and Dr. Workman's examination was made after three weeks' treatment only. In some few cases no bacilli could be discovered after some months' treatment, and as in many the cough had entirely disappeared, there was no expectoration for examination purposes.

Bodily Condition.—In most of the patients thus treated there was marked increase in weight, and in some the rapidity with which this was accomplished was noteworthy. The explanation of this, I think, is twofold—(a) by relief from cough following on the administration of the injection sleep was less broken and thus more satisfactory; and (b) the organs of digestion were in no way interfered with by the means used to attain this end.

CASE I.—J. S., aged 34 years, whose family history contains the record of three deaths from consumption, namely, two brothers, aged 30 and 35 respectively, and a sister at 42, first came under my observation at the throat department. He was suffering from ulceration of the left vocal cord, a great part of which had been destroyed by the ulcerative process, accompanied by œdema of the aryteno-epiglottidean fold on that side. The laryngeal ulceration was considered to be tuberculous in nature, and as he was rapidly losing flesh, besides developing other signs of tuberculosis, he was referred to the wards. There he was placed under the care of Dr. Dun, who, on examination, detected consolidation at both apices. Intralaryngeal injections were given daily from August 22nd till September 20th, when, on account of irregular conduct, he was dismissed. His weight on admission was 8 st. 12 lbs.; on September 2nd, 9 st. 1 lb.; September 9th, 9 st. 3½ lbs.; and on September 16th, 9 st. 6 lbs., a gain of 8 lbs. in four weeks.

CASE II.—S. V., who was also a patient in the Western Infirmary, increased from 6 st. 12 lbs. on admission on July 30th, 1889, to 7 st. 11½ lbs. on September 30th, an increase of 13½ lbs. in two months. This factory girl is now, at the end of twelve months, in regular attendance at her work, her hours being from 6 A.M. till 5 P.M., and she is in as good health as she ever was.

CASE III.—P. McL., aged 33, was admitted to the Western Infirmary on November 29th last, complaining of hoarseness and difficulty in breathing. On laryngeal examination it was found that the ary-epiglottic folds and the epiglottis were deeply injected, the ventricular bands were thickened, and the inner edge of each in a state of erosion. The vocal cords were injected, and the edge of each was ulcerated throughout its entire length, and the cords were fixed on account of the inflammatory œdema of the ventricular bands. Three days after admission (December 2nd) he weighed 10 st. 12 lbs., and his weight steadily increased from that till February 14th, when, previous to his being dismissed, he registered 12 st. 4½ lbs., a gain of 1 st. 6½ lbs. in eleven weeks. Previous to his admission to hospital he was losing flesh rapidly, he had profuse night sweats, and his sleep was much broken by the tickling cough, and by the dry and painful feeling in the larynx. After the first few days of the menthol injection this was altogether changed; he slept undisturbed the whole night long. The laryngeal ulceration entirely healed (it cicatrised), as was witnessed by several medical gentlemen, and his voice was restored to its normal degree of clearness. In the infirmary he was under the care of Dr. Coats, whom I asked for an expression of opinion on this case. On July 4th he replied that, "I regarded it as a distinct case of tuberculous ulceration of the larynx. He improved in general condition while in the ward, and the local lesion virtually healed."

CASE IV.—C. E., a jeweller, aged 20, was admitted to the Western Infirmary under the care of Dr. Christie on December 11th, 1889. He complained of loss of voice coming on gradually, accompanied by frequent cough, and, recently, marked loss of flesh. The laryngeal mucous membrane was hyperæmic, and the whole inner surface of the interarytenoid mucous membrane was in a state of ulceration. His weight on December 26th was 6 st. 1½ lbs., and on April 15th, previous to dismission, it was 7 st. 12½ lbs., a gain of 15½ lbs. in three months and a half. Here again the ulcer, which occupied a position frequently the site of a tuberculous ulcer, cicatrised, and is at present firmly healed.

It may be argued by some in opposition to these statements, that the increase in weight might be due to the rest in bed, the appropriate food, and the improved hygienic surroundings obtained by residence in hospital. This I was careful as far as possible to guard against, by having patients for a time under the usual ward treatment, noting the weights at stated intervals previous to administering the injection. In some there was slight increase, others remained at much the same weight, while in several the weight continued to diminish. In almost every case from the time at which the injection was begun distinct increase in weight was registered, examples of which I have given.

Temperature.—The last point to which I desire to draw attention is that of reduction in the temperature of the patient. To say that the fever of phthisis may thus be overcome seems a very bold statement, but that it does occur was admitted by those who carefully observed the various cases under treatment. And to my mind it is capable of rational explanation. Dr. Joseph Coats, in his presidential address, delivered at the opening of the Section of Pathology at the meeting of the British Medical Association, held at Leeds in 1889, among other subjects, spoke of the constitutional susceptibility to tuberculosis. "Tuberculosis," he said, "wherever its seat, usually produces constitutional manifestations, fever, emaciation, frequently amyloid disease. It does so not necessarily or usually by the bacillus passing into the blood, but rather by the evolved products doing so. I think it may be said that whatever their seat, the bacilli do not produce tuberculosis by their mere presence, but rather by the poisonous principles which they evolve. These are probably alkaloids, and are soluble in the juices of the body. They are diluted by the fluids, and in this form may be carried away from the local seat, and pass on into the blood. I believe that it is the presence of these products in the blood which is the main cause of the fever and other constitutional phenomena." If then by any means we can overcome the activity of the bacillus, and, if not destroy it, render it at least innocuous, we may hope to prevent the formation of those poisonous products, the absorption of which results in elevation of temperature and the other constitutional manifestations referred to.

The temperature in Case II, previously referred to, was 101.2° F. on the evening of the day of admission. Injections were begun about a fortnight after admission, during which time the temperature ranged from 99.2° F. and 100.2° F. From that time it gradually, though irregularly, descended to normal, at which it remained. M. C., who was under the care of Dr. Christie, I first saw on account of aphonia. On examination I found the faucial and pharyngeal mucosa markedly anæmic, and the laryngeal mucous lining generally, in a similar condition. The ventricular bands were slightly thickened, possibly œdematous in character, both vocal cords were eroded throughout the posterior half of each, that on the left side having passed into a condition of ulceration close up to the arytenoid cartilage, and the inter-arytenoid mucosa was the site of an ulcer. The condition of his lungs was such that Dr. Christie had no hesitation in giving it as his opinion that the lad was suffering from phthisis pulmonalis. On admission, May 7th, 1889, his temperature was 101.8° F., on the third evening it rose to 103.8° F., and for a week it ranged between those points. On the eighth day injections were begun, and three days thereafter the temperature was normal, and was only once above 99° F. (and that four points only) during the remainder of his stay in hospital. In reply to an inquiry, Dr. M'Corkindale, of Lugar, the district in which the patient resides, wrote, on May 11th, as follows: "I saw M. C. yesterday, and on examination found his general health good; he is working regularly and has to travel three miles to it, and does not complain of exhaustion after the day's work is done." He has gained 12 lbs. in weight since leaving the Western. The rapid reduction in temperature in other

cases was more or less marked, and very much on the lines indicated in those quoted.

Other Treatment.—Those patients who were wholly under my care, had, in addition to the intralaryngeal injections, some chalybeate tonic, administered usually in the form of tinct. ferri perchlor., along with a plentiful supply of milk food. No complications arose during the treatment of those cases, which could in any way be traced to the use of the injections, even in advanced cases of phthisis, if we except the glottic spasm produced, which in some cases seemed alarming, while making use of rectified spirits as the solvent.

Conclusions.—Regarding the action of menthol specially, when thus employed, I think we may consider it to be of a triple character. It is, first, a local anæsthetic. On account of this property, we have relief from cough, and that in a way greatly to be preferred to the older fashion of administration of opiates by the stomach, with their consequent deleterious effects on alimentation. Secondly, administered internally, it is a powerful, though comparatively harmless stimulant. Thirdly, it is an antiseptic, and being of a highly volatile character, it is readily diffused throughout the whole lung. By its use in this fashion, we have an antiseptic brought as closely into contact with the affected surface as it is possible; certainly much more completely than is the case when inhalers are employed. The active ingredient used with an inhaler is to a very large extent absorbed on its way to the lungs, by the moisture on the surface of the tongue, cheeks, fauces, pharynx, etc. Here we place the antiseptic—menthol rendered more powerful by the addition of creasote or guaiacol—within the trachea, from which it readily enters the larger bronchi, and all air inspired, passing over this, becomes laden with the antiseptic, and is carried onwards to the finer ramifications of the bronchi. The active ingredients thus introduced slowly volatilise, and their odour, especially when creasote is present, may readily be detected in the breath, eight or ten hours after introduction. The oil, I suppose, is partially absorbed, but in greatest quantity is, by the cilia of the epithelium, driven upwards through the bronchi and trachea along with the mucous secretion towards the larynx, from which it readily enters the gullet. By this form of treatment the majority of the patients whom I have seen treated have had their sufferings alleviated, and a goodly proportion have not only been markedly relieved, but restored to apparent health.

REPORT OF A CASE OF PAGET'S DISEASE OF THE RIGHT NIPPLE,¹

FOLLOWED SEVEN YEARS AFTER ITS FIRST APPEARANCE BY CARCINOMA OF THE BREAST; REMOVAL OF BREAST BY OPERATION; RECURRENCE OF CARCINOMA IN RIGHT ARM AND AXILLA AND LIVER SEVEN MONTHS AFTER THE OPERATION.

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Mrs. L., aged 54 years, married, has had eight children; her youngest child was born twelve years ago. About fifteen years ago, when suckling her seventh child, her breasts became inflamed, and each nipple was fissured. Spirit lotion was applied to the affected parts, and the fissures healed in a few days. With this exception, she states she never had any disease of her breasts or nipples until 1882, when the skin around the right nipple became tender, inflamed, and abraded, exuding a watery discharge. The surface of the skin was smooth, red, and painful.

When first seen on November 25th, 1885, her general health was good. There was no history of cancer, rheumatism, or gout in her family. Her catamenia had ceased two years before. She was nervous, and complained of severe pain of the right nipple and the surface of the right breast, which was ulcerated for 2 inches around the nipple. The base of the ulcer was smooth and red, slightly lower than the surrounding skin, and exuded a copious discharge of thin, acrid, serous

¹ Read at a meeting of the North of Ireland Branch.