developed. During the last 3 months of life exophthalmos very slight, and thyroid enlargement only moderate.

VI. Female, aged 46. Fatal at the end of 4 years.

RECOVERY.

VII. Female, aged 40 in 1896. I first saw this patient when house physician at the Manchester Royal Infirmary, in 1884. Exophthalmos, thyroid enlargement and palpitation were then all exceedingly well marked. Oedema of the leg. Symptoms noted 2½ years previously. I examined the patient at her own home in April, 1896, that is 14 years after the onset of the disease. There was then no enlargement of the thyroid, no exophthalmos, no increased frequency of the heart beats, the pulse was slow, rather feeble and irregular. She stated that at times she suffered from palpitation. There was no oedema.

VIII. Female. Thyroid enlargement, palpitation, exophthalmos, eyelids remained open during sleep. About four years later these symptoms were all slight. Von Graefe's symptoms was present but not well marked. The patient gradually improved, and 9 years after the onset all the symptoms had disappeared.

IX. Female. Slight case. At the end of 5 years, I found on examination of the patient at her own home, that all the symptoms had disappeared.

X. Male. Slight case. His friends state that the symptoms disappeared. He died of appendicitis and peritonitis 8 years after the onset of the symptoms of exophthalmic goitre. Dr. F. C. Bottomley kindly informed me that no indications of exophthalmic goitre were noticed during the patient's last illness.

XI. Female. Slight case. The exophthalmos soon disappeared. Then the patient suffered from several attacks of rheumatism. Nine years later, on examination, I found the physical signs of mitral stenosis. Exophthalmos, goitre, and palpitation had all disappeared.

RECOVERY ALMOST COMPLETE.

XII. Female, aged 50 (in 1895). Symptoms first appeared in 1878, they were well marked and continued for many years; then they gradually diminished. Seventeen years after the onset of these symptoms she died of double pneumonia (in 1895). Her friends state that some years previous to her death all the symptoms of exophthalmic goitre had entirely disappeared. Dr. Prince Stallard, who saw the patient shortly before death, kindly informs me that there was, however, a little enlargement of one lobe of the thyroid remaining, but there were no other indications of exophthalmic goitre. The symptoms of the disease had therefore almost disappeared.

XIII. Female. Well marked case. Very greatly improved at the end of 7 years. She married a few months ago.

CONSIDERABLE IMPROVEMENT.

XIV. Female. Disease commenced in 1887. She improved greatly under treatment, resumed her occupation as a teacher and was fairly well until 1894, when she became much worse. At the end of 3 months improvement occurred and she again resumed her occupation and has continued fairly well since. Patient was married in 1895. At present, 9½ years after the onset of the disease the symptoms are only slight.

XV. Female. At the end of 7½ years, exophthalmos has disappeared but thyroid enlargement and palpitation still present.

XVI. Female. Symptoms followed very soon after a fright. 12 months later she had rheumatic fever. The symptoms of exophthalmic goitre have partially subsided. Seven years after the onset slight exophthalmos is still present, but the thyroid enlargement has almost disappeared, pulse 52, irregular. The patient is now suffering from parenchymatous nephritis and symptoms of valvular disease of the heart, probably the result of rheumatic fever.

XVII. Male. Palpitation still present, but exophthalmos and thyroid enlargement stated to have disappeared at the end of 6 years.

XVIII. Female. Exophthalmos and goitre much less, but palpitation still present at the end of 2 years.

ONLY SLIGHTLY IMPROVED.

Seven cases (duration in years is given after each case).

19 Female (7 years); 20 Male (6½ years); 21 Female (5 years); 22 Female (2½ years); 23 Female (1½ years); 24 Female (1½ years) 25 Female (1 year).

CONDITION MUCH THE SAME.

Six cases (duration in years is given after each case).

26 Female (9 years); 27 Female (7 years); 28 Female (5½ years); 29 Female (3½ years); 30 Female (2 years); 31 Male (2 years).

Case 32. Female, a well marked case. Seven years later the patient was still alive and in service as a housemaid, but information as to the exact condition could not be obtained.

RESULT IN THIRTY-TWO CASES.

	Cases.
Fatal termination	6
Recovery	5
Recovery almost complete	2
(Duration of life 17 years and 7 years).	
1 Considerable improvement	5
(Durations of disease in years 9½, 7½, 7, 6, 2)	
1 Only slight improvement	7
(Durations of disease in years 7, 6½, 5, 2½, 1½, 1½, 1)	
1 Condition much the same	6
(Durations of disease in years 9, 7, 5½, 3½, 2, 2)	
Patient still alive at the end of 7 years, condition not known	1
	32

If we eliminate from the above table the cases which have been under observation during the shorter periods, and include only those cases which have terminated fatally, those

1 Symptoms still present.

which have recovered, and those in which the disease has existed for over five years, we have the following results in twenty-four cases: Fatal termination in six cases; recovery complete, or almost complete, in seven; improvement in seven; condition much the same in three; patient alive and following her occupation (exact condition unknown), one case. These conclusions furnish statistics which, I believe, represent fairly well the course of the disease.

THE TREATMENT OF CONSUMPTION BY THE OIL OF CINNAMON.

By J. HILTON THOMPSON, M.D. VICT.,

Late Senior Resident Medical Officer to the Children's Hospital, Pendlebury.

GENERAL CONSIDERATIONS.

THE various methods of treating pulmonary consumption adopted by modern physicians appear to have in view the two following objects:

1. By various means to improve the general health, and increase the resisting power of the tissue cells.

2. To kill or lessen the vitality of the invading germs.

The carrying out of the first object is frequently more easily achieved than the second. There is, I think, no doubt about the efficacy of fresh air, exercise, good living, and tonics in the treatment of consumption as a means of improving the general health and giving the individual a better chance in the combat with the disease.

The treatment of the disease by drugs calculated to injure the bacilli is, however, much less satisfactory. There are practically three ways in which germicidal drugs may be administered: 1. By injection into the affected area. 2. By the blood stream. 3. By the respiratory tract.

The first method was tried by Dr. Ransom, then of Manchester, but his experience was not such as to encourage the continuance of this plan. With regard to the second method it would seem impossible that any drug could be put into the blood in a dose sufficiently strong to affect the bacilli without at the same time killing the patient, more especially if these bacilli are out of reach of the blood stream.

The third appears, however, to offer a much better means of getting at the cause of the disease than any other method; but even by this means one can only hope to attack such bacilli as are in the air passages, for it is obviously quite impossible to injure organisms outside the air current, more especially if surrounded by fibrous tissue. In other words, catarrhal phthisis is the only form of consumption one can directly benefit by antigermicidal remedies.

I take it that a drug to be perfect for inhalation should possess the following qualities: 1. It should be strongly antiseptic. 2. It should not be injurious to the tissue cells of the lung or the organism. 3. It should possess a pleasant taste and smell or an absence of both. 4. It must not produce nausea or loss of appetite if used for a considerable time. None of the antigermicidal drugs that have been used in the treatment of phthisis appear to possess all these qualities. Although most have their good points, and are no doubt useful in certain cases, none of them appears to be thoroughly satisfactory.

GERMICIDAL POWER OF THE ESSENTIAL OILS.

My attention was first drawn to the essential oils through reading a paper by M. Chamberland, published in 1887. It appeared to me that if the oil of cinnamon possessed strong antiseptic properties, it was a drug likely to be of service in the treatment of pulmonary tuberculosis if used as an inhalation.

I first used the drug as an inhalation in cases of tuberculous phthisis in 1892. I found the patients liked the smell and taste of the oil; it caused no irritation of the air passages, and did not interfere with the appetite; the progress of the disease was influenced favourably. My interest was further aroused in 1893 by a paper by Dr. Lucas-Championnière.¹ Since then I have regularly prescribed inhalation of the oleum cinnamomi ver. in cases of consumption.

¹ Journal de Médecine et de Chirurgie Pratiques, No. 11.

CASES.

The following abstracts give the result of the treatment of five cases, picked because they all had a well-marked phthisical family history, and were, moreover, treated under very unfavourable conditions. I felt that if in cases of this kind a favourable result could be achieved, the result would be still better when the family history and conditions of life were less bad.

CASE I. Family History.—Both the father and mother are poorly developed; the latter has well-marked butterfly lupus, and a tuberculous family history.

Past History.—Since the age of 13 the patient has worked in a cotton mill; until the present illness he has been able to attend regularly to his work, but he has always been poorly nourished and of pale complexion.

Present Condition, March 1892.—A thin anæmic young man, aged 19. He states that he is troubled with a cough, profuse expectoration, and night sweats. I found over the upper part of the lower lobe of the right lung the usual signs of tuberculosis. The sputum presented the usual characters, but was not stained with blood. Under the microscope, and stained by Gabbett's method, large numbers of tubercle bacilli were seen.

Treatment and Result.—Rest in bed. Quinine in 5-grain doses to anticipate the evening rise of temperature, and the inhalation of oleum cinnamomi ver. I found that the patient could wear the inhaler nearly continuously with very slight inconvenience and without any feeling of nausea. In a few days the sputum smelt strongly of the oil, and the patient said he could taste it in the mucus he coughed up for an hour after he had ceased to use the inhaler. In four or five days the temperature became practically normal. The quinine was continued in small doses as a tonic. The patient appeared to be much better, so he was allowed to get up and go about. The sputum was examined fourteen days after the inhalation was commenced, and there appeared to be a decided diminution in the number of the bacilli. The patient soon began to gain weight and looked better. I examined the sputum every week, and found that the bacilli steadily diminished in numbers until the end of the second month, when I could only find them with difficulty. The patient was now sent to Southport, and there gained weight to the extent of 14 lbs. in three months. On his return home both the cough and the night sweats had ceased, and beyond weakness of the breath sounds in the affected portion of the lung, nothing abnormal could be detected.

After-History.—I saw nothing more of this patient for eight or nine months. He then presented himself complaining of shortness of breath. He stated that some weeks before he had fallen asleep in a field; a short time afterwards he had severe pains in his right side. On examination I found the right side of his chest full of pus. Resection and drainage were carried out, but the patient ultimately died of exhaustion.

CASE II. Family History.—Her mother, three brothers, and three sisters have died of consumption.

Past History.—The patient stated that for some months she had been troubled with pain in the right clavicular region, with a short cough, and the expectoration of large quantities of blood-stained mucus. Recently she had severe night sweats.

Present Condition, June, 1892.—A woman aged 34, unmarried, poorly nourished. On examination I found a well-marked area of consolidation under the third rib in the mammary line on the right side. On auscultation over this area the characteristic crepitations could be heard. The sputum stained by Gabbett's method revealed under the microscope a few scattered tubercle bacilli, but no preparation showed large quantities of the organisms.

Treatment and Progress.—The inhalation of oleum cinnamomi ver. ordered. Ergotin and tonics prescribed. This treatment was continued for six months with little or no improvement. Bacilli continued to appear in the sputum in small quantities, and the patient had several attacks of hæmoptysis. After this time, however, a gradual improvement commenced, the night sweats ceased, the cough became less troublesome, and the expectoration became more frothy and not streaked with blood. At the end of nine months no bacilli could be found. The patient put on fat rapidly, and her general appearance was very much improved. She now considered herself cured, and would no longer wear the inhaler.

After-History.—I did not see her again for four months, when she once more consulted me. The night sweats had returned, and she was evidently going down-hill. She told me that she had been using cinnamon oil obtained from some chemist, but it had done her no good. I found that she had been using a cheap and very much adulterated oil. When put upon the pure oil she soon recovered the ground she had lost, and remained in good health until the spring of 1895, when she had an attack of pneumonia and died.

CASE III. Family History.—Mother and sister died of consumption; father died of bronchitis.

Past History.—Has suffered for three years from cervical adenitis. For the past three months he has had a slight cough, expectoration, and loss of strength.

Present Condition, November, 1892.—A delicate boy, aged 16. Extensive cervical adenitis. Over the apex of the right lung the percussion note was markedly raised in pitch, the breath sounds bronchial in character, accompanied by a well-marked friction sound and fine crepitations. Sputum thick, yellow and sticky; only a small amount expectorated. Under the microscope and stained by Gabbett's method a few scattered tubercle bacilli were made out.

Progress and Treatment.—The whole of the affected glands were excised. Inhalation of oleum cinnamomi ver. ordered, together with a large amount of outdoor exercise. The patient was weighed and the sputum examined microscopically every week. At the end of two months I ceased to find tubercle bacilli in the sputum. The patient had gained 7 lbs. in weight and had improved very much in appearance. In eighteen months he had gained 28 lbs. and was looking very well indeed. He remained in very good health for two and a-half years, but during the cold weather of the spring of 1895 he began to relapse. There was a short hacking cough, but no expectoration; a friction sound and some coarse rales were heard over the right apex. The sputum was examined, but no tubercle bacilli found. The treatment consisted of the inhalation of the

oil of cinnamon and an ordinary expectorant mixture. He made a rapid recovery, and in January, 1896, appeared to be in a very good condition of health. On examining the right lung the only evidence of the apex having been the seat of disease is a well-marked increase in the pitch of the percussion note and the puerile character of the breath sounds.

CASE IV. Family History.—Mother and sister died of consumption; father strong.

Past History.—He states that he has been employed in a cotton mill. Had an attack of pneumonia a year ago, and apparently returned to his work too soon.

Present Condition, November, 1893.—A tall, thin, anæmic youth, aged 19; poor chest development. No bacilli could be found in the sputum by Gabbett's method. He was sent to Southport Convalescent Hospital, and whilst there appeared to approve. Two months after his return he presented himself complaining of cough, night sweats, and profuse expectoration. On examination a large patch of consolidation was found in the right apex with all the usual signs of tuberculosis. The sputum stained by Gabbett's method revealed under the microscope large numbers of tubercle bacilli.

Treatment and Progress.—He was ordered inhalation of oleum cinnamomi ver., and tonic medicines were also prescribed; no alteration, however, could be made in his mode of living, for he absolutely refused to leave his work. He was weighed and his sputum examined once a week. After the first week the bacilli were decidedly less numerous, the expectoration was diminished in quantity and smelt strongly of cinnamon. The patient stated that he could wear the inhaler nearly the whole day with very little discomfort. At the end of a month no bacilli could be found in the sputum. The weight began to improve from the third week. At the end of six weeks he had gained 7 lbs., and the night sweats and expectoration had ceased. The patient now considered himself well, and would no longer remain under treatment. A month later, however, I examined his chest, and the only evidence of anything having been wrong was the weakness of the breath sounds over the right apex and their bronchial character.

After-History.—This patient remained in good health for about a year, when he again presented himself complaining of cough and night sweats. The sputum contained large numbers of tubercle bacilli. Inhalation of the oil of cinnamon was again ordered. The progress of this attack was very similar to the one already described. In about two months the bacilli had apparently disappeared from the expectoration, and the patient's health remained very satisfactory for another year. He was then lost sight of.

CASE V. Family History.—Mother and two sisters died of consumption.

Past History.—Patient states that for some months she has been losing flesh, and has been troubled with a short, hacking cough, night sweats, and profuse expectoration.

Present Condition, November, 1893.—A moderately-nourished girl, with well-marked hectic flush. I found well-marked tuberculosis of the whole of the upper lobe of the left lung. Microscopical examination of the sputum stained by Gabbett's method showed the presence of enormous quantities of tubercle bacilli.

Treatment and Progress.—Inhalation of oleum cinnamomi ver. was ordered and an expectorant mixture prescribed. The patient was kept in bed. In a month there was a marked improvement in the general condition. Night sweats had practically ceased; cough was less troublesome and expectoration less profuse. On examining the sputum, the bacilli were found to be much less numerous. In two months the patient was so much better that she returned to her work in a cotton mill. She continued the inhalation of the cinnamon, but could only use it in the evening on her return from work. In this case the bacilli never quite disappeared from the sputum; the numbers were, however, very markedly reduced.

After-History.—The patient soon ceased to use the oil, and for several months remained in good health and at her work; she then became ill again. The parents tried home remedies for some time, and I was only sent for when she appeared to be about to die. She was so short of breath that she could not use the respirator. The temperature continued between 102° and 103° until death.

THE ADVANTAGES OF OIL OF CINNAMON.

That oil of cinnamon, when used as an inhalation in certain stages of consumption, affects injuriously tubercle bacilli, is, I think, rendered probable by the very remarkable way in which, in the above cases, the organism diminished in numbers or disappeared from the sputum in a comparatively short time after commencing treatment. Also by the tendency for the disease to relapse when inhalation was discontinued. It appears probable that the oil of cinnamon tends to cure consumption in two ways: first, in the very early cases of catarrhal phthisis, by so directly affecting the bacilli as to stop their growth; and, secondly, in cases that are rather further advanced, by only allowing organisms incapable of growth to pass along the bronchi, and thus prevent the infection of fresh lobules. In this way the disease may be limited to a small area, where it can be dealt with by the vital processes of the body, and cut off from the system by the formation of fibrous tissue, and so cease to be an immediate source of danger. Besides the five cases abstracted the drug was tried in the more advanced stages of the disease, but as might be expected, without any benefit.

An interesting feature of the above cases was the order in which the symptoms subsided. The expectoration and the cough were the first to improve, then the temperature tended to the normal, and finally the weight began to increase.

These favourable changes in the symptoms were accompanied by a gradual diminution in the number of tubercle bacilli in the sputum.

FORM OF INHALER.

With regard to the form of inhaler used, I found that those in ordinary use served the purpose very well. If the patient were in an early stage of the disease I endeavoured to persuade him to use an inhaler that would cover both the nose and the mouth, but in the later stages, when there was shortness of breath, an inhaler covering the mouth only was used. I found that in the early stages of the disease particularly the patients liked the smell and taste of the cinnamon; they could use it most of the day and also at night with very little discomfort. It was also interesting to note that the continued inhalation of the vapour caused no irritation of the buccal cavity or of the air passages, and that no constitutional effects were produced.

Of course, my experience with the oil is comparatively limited, but so far as it goes I have found the oil of cinnamon to have more points in its favour when used as an inhalation in the early stages of consumption, than the drugs that hitherto have been administered in this way and for similar objects.

LANOLIN VACCINE.

By SURGEON-LIEUT.-COL. W. G. KING, D.P.H., I.M.S.,
Sanitary Commissioner for Madras.

IN his interesting contribution to the Jenner Centenary Number of the *BRITISH MEDICAL JOURNAL*, Dr. Hime, in referring to my introduction of lanolin as a preservative of animal vaccine pulp, asserts that, beyond its use by its originator, few have adopted it. This statement may represent facts correctly as to Great Britain, where the use of animal vaccination is very trivial, but it certainly does not do so when applied to India. Indeed, although—owing to official circumstances entered into by you in an editorial some four years back—lanolin vaccine has not (till within the last year) been used since 1890-91 in the Madras Presidency, when 214,876 cases were vaccinated with this preparation, its use in other parts of India may be fairly described as extensive; so that it would really be more correct were Dr. Hime to have stated that the employment of lanolin vaccine is yearly increasing at the hands of others than the originator.

As giving some idea of the extent of this employment, I may state that this is the preservative officially used in the Central Provinces, Hyderabad, and assigned districts, in Bengal, and in Mysore, and that its introduction is now contemplated in the North-West Provinces and Assam. In Mysore all vaccinations are conducted with animal vaccine pulp preserved with lanolin to the exclusion of all other modes, the advanced and independent Government of His Highness the Maharajah having possessed since 1892 the Mysore Government Vaccine Institute at Bangalore, whence it not only supplies its own territories, but much of Upper and Lower Burmah. In 1894-95, in Bengal, 60,613 were vaccinated with this preparation. During 1895-96, by means of issues from the Mysore Government Vaccine Institute, 122,258 cases were vaccinated within the Province, and 79,579 in various parts of India and Burmah. In the former case the percentage of successful to the total vaccinated was 94.20; in the latter the percentage was 94.13. In the Madras Presidency, in 1895, on its partial reintroduction in two districts, 27,540 cases were vaccinated with 94.3 per cent. success, against 89.4 per cent. for glycerinised paste in other districts.

As regards the superiority of this method of preservation in a tropical climate when compared with glycerine, there cannot be the slightest doubt, as amply proved by my own experiments and the evidence of other observers. I see no reason why this cheap and simple method should not have received attention in Great Britain by those concerned with public vaccination beyond the want of familiarity with it. Copeman has shown that, in common with glycerine, anhydrous lanolin, which is the form advised by me, has the power of inhibiting the growth of saprophytic microbes, a fact that Dr. Hime ignores when he calls attention to this special virtue of glycerine, whilst Gottstein has testified to

the protection of lanolin from penetration by microbes introduced on the exterior of the mass. So that it has been found in practice that the mere careful removal with a cleanly instrument of an upper exposed layer of lanolin vaccine secures safety, notwithstanding free exposure of the mass to the air at intervals in a manner that must be used by the busy practitioner in Great Britain, or by the public vaccinator in this country, where single cases may be vaccinated in villages many miles apart. I believe, if ever vaccination with animal lymph be widely employed by British local authorities, that this cheap and simple method of preservation will be found best to suit their requirements.

It is usually understood that anhydrous lanolin is used for the preservation of vaccine lymph. That it will act in this manner is true; but, beyond a few experiments, I have no experience of it and do not recommend it. I have advised it only for the preservation of vaccine pulp. Of course it does not follow that because lanolin is used preservation should result; it is not infallible. As in the case of the glycerine method, perfect cleanliness in the collection and during the process of preservation and storage is requisite; but if this condition be observed, lanolin vaccine, when subjected to tropical heat, will give results at the end of a period when glycerine lymph or pulp would be absolutely inert. I do not recommend its employment in the heat of India on human beings beyond forty days after preservation, although it has been successfully employed by others at the end of three months—for example, Surgeon-Lieutenant-Colonel Hendley, C.I.E., late civil surgeon, Peshawar; Brigade-Surgeon-Lieutenant-Colonel Grigg, late Sanitary Commissioner, Bengal. Nevertheless, I have seen specimens of lanolin vaccine that have been subjected to heat in long transport by runners on Indian roads in post bags arrive completely melted, thrown aside as useless without protection from dirt, and yet, when covered with fungus, still assert their power on inoculation of calves, after the lapse of four and five months. Surgeon-Lieutenant-Colonel Thomson, I.M.S., when a member of the Leprosy Commission, reported activity of a specimen of the ordinary character issued to vaccinators at the end of six months, during which time it had been exposed by opening for vaccination, and had travelled with him throughout Southern India and Burmah. Instances of activity as exhibited by inoculation of calves at the end of nine months of exposed specimens have been common.

The Mysore Government Vaccine Institute was started with vaccine descended from stock that had been preserved by me in July, 1891, on closure of my own experimental depot; this was started for experimental purposes at Vizagapatam in January, 1892, and was preserved and taken by me to Burmah till August of the same year, when it was sent to Bangalore for the purpose stated. One specimen was sent to England by me and was left there for twelve months, was then sent to me at Mandalay, and was brought by me to Madras, whence it was forwarded to Bangalore, and then again started a vigorous stock sixteen months and twenty days after preservation, and after undergoing various changes of climates and frequent opening to ascertain its condition. The longest known preservation has amounted to two years and eight months, as certified by the Superintendent, Mysore Government Vaccine Institute.

It may not be irrelevant to refer to a further matter mentioned by Dr. Hime. I am glad to find he gives his testimony to the fact that the "regeneration of calf lymph" by insertion of human lymph from time to time, as taught a few years back, is not necessary. On the opposite, I think this procedure leads to endless trouble and risk of "dying out" during cultivation. By carefully selecting typical vesicles, and by taking care that the exact stage of perfection in development of these is seized, my variola vaccine stock has been maintained in an unbroken line from calf to calf since March, 1891; at first by myself, but since 1892 under the skilled care of one of my late superintendents, Assistant-Surgeon P. Palgni, now in charge (subject to the Sanitary Commissioner, Mysore) of the Mysore Government Vaccine Institute. My experience has taught me the making of experiments whilst holding an official appointment is surrounded by difficulties, and I therefore intend to carefully avoid them; but it may be worth while my stating, for the information of such observers as would wish to push further investigations