polemic, the fact that I am in the position of locally depreciating what may to some extent be regarded as a commercial article is extremely distasteful to me. At the same time, I should be the last to fail to appreciate that M. Calmette's production of antitoxin is the outcome of pure enthusiasm for science and humanity. The tiresomeness, expense, and great patience required to produce a serum of any considerable antitoxic power against snake venom I know from personal experience, and I can only congratulate M. Calmette on having shown that it was possible to do this, and on having gained some measure of success. I doubt not that he will soon succeed in procuring a serum possessed of greater potency, and I assure him that I shall be delighted to hear of his success, and to do what may be in my power to encourage its use in Australia.

REFERENCES.

¹ *Ann. de l'Inst. Pasteur*, 1895. ² *Zeit. f. Hygiene*, xxii, p. 263. ³ *Ann. de l'Inst. Pasteur*, December, 1896. ⁴ *Abstract, Journ. thier. Chem.*, 1896, p. 983. ⁵ *Cent. f. Bakt.*, xxii, 1897, p. 521. ⁶ *Proc. Phys. Soc.*, November, 1896, (not published) quoted by Stephens (*Lancet*, February, 1898). ⁷ *Nature*, April 23rd, 1896, p. 593. ⁸ *Proc. Path. Soc.*, London (*Lancet*, February, 1898). ⁹ *Fortschritte der Med.*, 1897, No. 2. ¹⁰ *BRITISH MEDICAL JOURNAL*, October 15th, 1898, p. 1120. ¹¹ *Vide* my paper in the *Intercolonial Medical Journal*, August, 1897. ¹² *Nature*, April 23rd, 1896, p. 594.

MALARIA: IMMUNITY: ABSENCE OF NEGRO IMMUNITY: VARIETY.

AS ILLUSTRATED BY THE INCIDENCE OF THE DISEASE ON VARIOUS RACES IN SIERRA LEONE.

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A SHORT experience (barely six months) during one rainy season of malarial fever in Sherboro Island and the hinterland of Sierra Leone has afforded an opportunity of observing the incidence of the disease on a newly arrived negro regiment as compared with the native population. The following is a brief account of the observed effects of the disease on different races in so far as they seem to bear on the debated question of immunity and on the existence of varieties of malarial organisms. The facts may be taken to show that there is such a thing as immunity, though only of a relative kind; that the immunity is an acquired one; that the negro possesses no special immunity and that there is some ground for believing in the existence of more than one variety of malarial organism.

The negro natives of Sierra Leone appear to suffer in a mild degree only from the fever; not alone that they are not frequently attacked, but that the attacks are not often fatal and that the illness in their case is of a comparatively benign nature even when not treated with quinine. But in the soldiers of the West India Regiment—negroes from Jamaica, Barbados, St. Lucia, etc.—the fever is of a very severe and often fatal character, requiring prompt and careful treatment by European methods. Indeed, judging by the extent of sickness in the afore-mentioned regiment, West Indians are little if any better able to stand this climate than are the white officers and sergeants who command them. The contrast between West Indians and the natives composing the Sierra Leone Frontier Police when serving in the field in the same column was most marked; the former much troubled by fever, the latter having none.

Most writers—even to the author of the latest work on tropical diseases—ascribe an especial immunity to the negro race generally; but the behaviour of the disease in respect to the West Indian negro, as set forth above, does not support this idea. Yet the latter are the descendants of negro slaves imported into the West Indies from West Africa. The right interpretation of this seems to be that negro races generally have acquired an immunity by long residence in malarious places, but that the exemption is not a racial attribute, and that the West Indian negroes have lost the immunity originally acquired by their forefathers. It is popularly supposed on the coast that they do soon acquire a comparative freedom from malaria—that is to say, that after serving for a year or so in West Africa, they cease to be troubled much by fever. Observations covering so short a period as that under review scarcely warrant any opinion as to whether this is a trace of their ancestral immunity remaining to the West

Indians or is merely the same tolerance which is sometimes said to be acquired by European "coasters"; for the matter of that it is admitted on all hands, wherever malaria prevails, even by those who deny the existence of acquired malarial immunity, that the newcomer is not such a good "life" as is the man who has got safely over his first attack of malarial fever.

A study of the disease in West Indians again leads us to the inference that either the West Coast fever is not malarial, or it is a special variety. But numerous observers have reported the discovery in the blood of persons suffering from West African fever of plasmodia similar to those found in malarial disease in other parts of the world; and we may therefore take it for granted that our fever is a malarial one. Among other places we find that malaria flourishes in the West Indies, and it follows that the West Indian negroes have been more or less subjected to its influence all their lives. It might then be reasonably expected that these people would be to some extent malaria-proof as compared with Europeans; but, as before stated, it is not clear that they possess any advantage over the white races (in West Africa at any rate) beyond that due to their being accustomed to a hot climate. The explanation of this may be that the malarial organism of the West Coast is of a different variety to the plasmodium of the West Indies, and that immunity acquired to the first mentioned confers no protection from the second. It might of course be argued that the interpretation lies in the greater virulence of the African organism. Or, again, that other than malarial factors in the Coast climate reduce the West Indian to such an extent as to render him vulnerable to an organism against which he had obtained sufficient immunity to enable him to withstand it in his own country. To this it may be replied that if it were merely a matter of differing virulence, the less virulent would have conferred some measure of protection; and as to the Coast climate, it is, in the matter of physiological comfort, said to be not inferior to that of the West Indies.

A parallel case to that of the West Indians in Africa may be found in that of the Chinese in Borneo. When in Borneo the writer had an opportunity of seeing that Southern Chinamen employed on the tobacco estates suffered very severely indeed from malaria, their habituation to paludal fevers in their own country being apparently of no value to them in Borneo.

INFECTIVE SARCOMATA IN DOGS.*

BY

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In a previous paper¹ we described a series of tumours on the genitals of dogs which spread from animal to animal as the result of coitus. These tumours, which were of various shapes and sizes—sometimes large enough to completely block up the vagina—originated in the mucous membrane of the vagina and penis. In some cases the walls of the vagina were deeply infiltrated, and the tumours frequently ulcerated. Death sometimes ensued, either from cachexia, or from kidney disease the result of obstruction of the ureters, or from septic poisoning owing to sloughing of the growth. In one instance, a secondary deposit was found in the inguinal lymphatic glands. The structure of the tumours, of which we gave a description illustrated by photographs, was that of a round-celled sarcoma. We were enabled to successfully inoculate the tumours on the penis of one dog and into the subcutaneous tissue of two other dogs, the resulting tumours having the same structure as the original ones.

We gave an account of certain experiments made by Wehr, Geissler, and Duplay and Cazin, and we came to the conclusion that, although these authors gave a different interpretation of the microscopical structure, the tumours described by them were identical with those described by us. Geissler

* This research was aided by a grant from the British Medical Association.

looked upon the tumours as carcinomata, and he made successful inoculations into the subcutaneous tissue. In one instance he found after inoculation deposits in the internal organs; but, as no microscopical examination of these deposits was made, the connection between them and the original tumour could not be considered as proved. Wehr, who was successful in a number of inoculations, also looked upon the tumours as carcinomata. In one instance he found secondary deposits, which he stated to be carcinomatous, in the spleen and lymphatic glands. Duplay and Cazin, who made successful inoculations into the subcutaneous tissue, looked upon the tumours as inflammatory.

The tumours described by us, whether identical or not with those of the above-mentioned authors, were certainly sarcomatous in structure. They sometimes infiltrated the deep tissues, and in one instance we obtained a secondary deposit in the lymphatic glands. We have since obtained secondary nodules in the internal organs, so that the tumours do not differ either in structure or in "malignancy"—except, perhaps, in degree—from the sarcomata met with in the human subject.

In our previous paper we described the course taken by the tumours in the mucous membrane of the genitals when contracted during coitus. We also described a successful inoculation which we performed into the mucous membrane of the penis of a dog. We will briefly state the subsequent history of this case:

The tumour reached its maximum of growth 12 months after inoculation. It then formed a lobulated mass half an inch in diameter; a small portion which was snipped off was found to have the same structure as the original tumour from which it was derived; 4 months later it began to diminish in size, and had completely disappeared in another 2 months.

We draw especial attention to this case, because it is the only instance in which we have observed the tumours disappear spontaneously when situated in the mucous membrane.

We have since inoculated successfully the vagina of a bitch.

A young terrier bitch was inoculated by rubbing a portion of an infiltrating vaginal growth from another bitch over the seared surface of the mucous membrane of the vagina. At the end of two months the animal was killed. At the *post-mortem* examination, two smooth tongue-shaped tumours, the one half an inch in diameter, and the other rather smaller, were found near the urethral orifice. They were microscopically of the same structure as the other tumours.

We have not considered it necessary to make further inoculations of the mucous membrane. We have made a series of inoculations into the subcutaneous tissue, and it is these experiments which we now propose to record.

METHOD OF INOCULATION.

The method which we have adopted for inoculation is the following: The animal is placed under an anæsthetic, and the skin on each side of the abdomen is carefully shaved and cleansed. A small incision is made with a pair of scissors, which are then pushed under the skin so as to make a track in the subcutaneous tissue. One or two small fragments of growth are then introduced by means of forceps along the track for an inch to an inch and a half from the skin incision, which is subsequently closed with stitches and sealed with collodion and iodoform. The whole operation is performed with careful aseptic precautions. The fragments of tumour inoculated were always used immediately after removal.

GENERAL RESULT OF INOCULATIONS.

Including two animals mentioned in the previous paper, we have made inoculations into the subcutaneous tissue of 17 dogs. In 4 dogs the inoculation was unsuccessful, while in the remaining 13 definite tumours developed. Of the 17 dogs, 6 were inoculated with growths from the genitals, and in all a successful result was obtained. These primary growths were obtained from three separate bitches, two with a malignant type, and the third with a simple type of growth. The tumours resulting from inoculation were similar in all three series. The remaining 11 dogs were inoculated with growths from the subcutaneous tissue obtained by artificial inoculation. Definite tumours developed in 7 of these animals, whilst in 4 of them the inoculations were unsuccessful.

We have used as a rule wire-haired terriers, but we have not made sufficient experiments to state what kind of dogs are most susceptible. Most of our dogs were quite young; but we have successfully inoculated an old dog. Some dogs

appear to be naturally refractory, and resist repeated inoculations.

A young white terrier was unsuccessfully inoculated on three occasions, the intervals between the first and the second and between the second and the third inoculations being 6 and 7 weeks respectively. Control animals were successfully inoculated on each occasion at the same time and from the same source.

An old wire-haired terrier was unsuccessfully inoculated on two occasions at an interval of 7 weeks. Control animals were successfully inoculated on both occasions at the same time and from the same source.

The tumours are capable of being transmitted at any time during active growth, and they do not apparently exhibit any marked difference as regards virulence during this period. The earliest successful inoculation was made from a tumour 21 days old, the latest from one 3 months old. As soon, however, as the stage of subsidence is reached, and the growth becomes flabby and begins to dwindle, transmission is no longer possible. Two of our unsuccessful inoculations can thus be accounted for, and the other two by the fact that the dogs were, as was subsequently proved, naturally immune.

SERIAL INOCULATION.

The following experiments were made with the object of ascertaining whether the tumours could be transmitted through a series of dogs by subcutaneous inoculation, and, if so, whether an increase of virulence would result.

The material for inoculation was taken from the vagina of a bitch with a growth of an infiltrating malignant type.

Dog A, a young, fawn-coloured bitch, was inoculated in both flanks with fragments of the tumour from the bitch. At the end of 11 days there was a slight discharge of pus on the right side, but nothing to be felt on the left. At the end of 21 days a lobulated growth, the size of a filbert, could be felt on the left side. This was excised, and used for inoculating B.

Dog B, a wire-haired puppy bitch, was inoculated in the left flank from A. At the end of 10 days there was a minute nodule, which at the end of 25 days had disappeared. At the end of 38 days there was no sign of growth. At the end of 2 months a distinct tumour three-quarters of an inch in diameter was found (the animal had not been examined since last note). At the end of 3 months there was a large lobulated growth the size of a hen's egg, with well-defined margin slightly attached to the skin, but otherwise freely movable. A portion was removed for inoculating C. At the end of 3½ months the tumour was 2½ by 1½ inches, soft and elastic in places with the overlying skin adherent, red, shiny, and thinned out. At the end of 4 months the skin had broken down, causing a deep ulcer extending into the growth with thickened edges. At the end of 5 months the ulcer had healed and there was a rosette-shaped mass 1½ inch in diameter with depressed scar in the centre and with the overlying skin, thin, red, and adherent. At the end of 6 months the mass had again increased to 2 inches in diameter; it was flabby and the skin over it had ulcerated in two places. From this time it began to diminish. At the end of 7 months there was a small flabby mass of cicatricial tissue and at the end of 8 months the growth had completely disappeared. At the end of 8½ months there was some recurrence, a growth the size of a walnut being present. At the end of 9 months the growth was flabby and dwindling. At the end of 9½ months the animal was killed and the growth was proved to be represented by a little fibrous tissue.

Dog C, a small thin wire-haired puppy, was inoculated in both flanks from B. At the end of a month several small nodules the size of peas were present on both sides. At the end of 6 weeks the nodules had fused together so as to form lobulated masses ½ by 1 inch on both sides. At the end of 2 months the growth on the right side was 1½ inch in diameter and that on left side 1½ inch in diameter. Dogs D and E were inoculated from portions of the growth on the right side. At the end of 3 months the growth on the right side was 2½ by 2 inches and that on the left side 3½ by 2½ inches; the skin over both was ulcerated, but the growths were firm and apparently growing at the periphery. At the end of 4 months there was deep ulceration on both sides, the edges of the ulcers being firm and indurated. At the end of 5 months the two growths had nearly united, forming an ulcerated mass 3½ by 2½ inches. At the end of 6 months the animal died, the growths, which had for a time diminished in size, having again increased. There was at the *post-mortem* examination on the right side of the abdomen a mass about 4 inches long extending up to the thorax, and ulcerated at its lower part. A similar mass, but not quite so large, was present on the left side. In the liver a large number of small roundish nodules were found, varying in size from that of a millet seed to ½ inch in diameter, the majority being ½ to ⅓ inch. As many as 30 were counted, but more were present. They were white and soft, and resembled the original tumours in consistence and appearance. None of them were breaking down. These which were situated on the surface of the liver were umbilicated. In the spleen there were 4 nodules from ½ to ⅓ inch in diameter similar to those in the liver. The lungs and the other abdominal viscera were free. Sections of the nodules in the liver and spleen examined microscopically showed a structure similar to that of the original tumours.

Dog E, a small wire-haired puppy, was inoculated in both flanks from C at the same time as Dog D. At the end of 7 days a nodule about the size of a pea was felt on both sides. At the end of a month there was a nodule about ½ inch in diameter on the right side, and a bilobed nodule ½ by 1 inch on the left side. At the end of 2 months there were lobulated growths on both sides, that on the left side being 3 by 1½ inch and that on the right side 2½ by 1½ inches. At the end of 3 months there was a mass 4 by 2 inches on the right side, and a mass 3 by 2 inches on the left side. A fragment was removed, and Dog F inoculated. A fortnight later both growths had considerably diminished and were very flabby. At the end of 4 months the growth on the right side had completely disappeared, and a few days later that on the left.

Dog F, a long-haired brown puppy bitch, was inoculated in both flanks from E. During the first few days after inoculation a small nodule was felt, but this quickly disappeared and no tumour developed. The tumour on Dog E at the time of inoculation was flabby and just beginning to dwindle.

Dog D, a bull terrier puppy bitch, was inoculated in both flanks from C at the same time as E. At the end of a fortnight there was nothing to be felt on either side. At the end of a month, several nodules, forming a mass about $\frac{1}{2}$ by 1 inch, were felt on both sides. At the end of 6 weeks there was a growth on the right side 1 by 1 inch, that on the left side being $\frac{1}{2}$ by 1 inch. A fragment was removed from the left side to inoculate G and H. At the end of 2 months there was a globular mass on the right side $\frac{1}{2}$ by $\frac{1}{2}$ inch, with the skin over it red and shiny; on the left side growth $\frac{1}{2}$ by $\frac{1}{2}$ inch. At the end of three months both growths were adherent to the skin, that on the right side being 2 by 2 inches, and that on left side $\frac{1}{2}$ by $\frac{1}{2}$ inch. At the end of 4 months the growth on the right side had completely disappeared, and that on the left side was the size of a walnut, soft and puckered. At the end of 5 months nothing was to be felt on either side.

Dog H, an old wire-haired terrier bitch, was inoculated in both flanks from D at the same time as G. No tumour developed on either side. This dog was subsequently shown to be naturally immune.

Dog G, a young terrier bitch, was inoculated in both flanks from D at the same time as H. Some ulceration occurred on the right side, which healed in 10 days, leaving indurated tissue behind; at this date there was a distinct nodule on the left side $\frac{1}{2}$ inch in diameter. At the end of 3 weeks there was nothing to be felt on the right side, on the left side a nodule $\frac{1}{2}$ inch in diameter. At the end of 6 weeks nodule on left side was $\frac{1}{2}$ by $\frac{1}{2}$ inch. At the end of 7 weeks a fragment of growth was removed, and Dog I inoculated. The wound healed in a few days. At the end of 9 weeks the growth was firm and smooth, $\frac{1}{2}$ by $\frac{1}{2}$ inch. At the end of 11 weeks the growth was 2 inches in diameter, it was breaking down, and the skin over it had given way. At the end of 3 months a fragment was removed from the edge, and J inoculated. Two months later the growth had completely disappeared.

Dog I, a young wire-haired terrier, was inoculated in both flanks from G. At the end of 3 weeks nothing was to be felt on either side. At the end of a month a few minute nodules were felt on both sides. At the end of 5 weeks there was a string of small nodules, $\frac{1}{2}$ by $\frac{1}{2}$ inch on the right side, and on the left side a similar mass $\frac{1}{2}$ by 1 inch. The animal died at the end of 48 days from an inflammatory swelling on the face having no connection with the inoculation.

Dog J, a young, short-haired terrier, was inoculated in both flanks from G. Some inflammatory swelling occurred, and at the end of a fortnight there was a small nodule the size of a pea on each side. These completely disappeared in the course of a week, and no tumour developed. It will be observed that this dog was inoculated with a fragment of a tumour which was breaking down.

The following table represents the series of subcutaneous inoculations:

Tumour in vagina			
A	.	.	.
B	.	.	.
C	.	E	F
D	.	H	unsuccessful
E	.	J	unsuccessful
F	.	.	unsuccessful
G	.	.	unsuccessful
H	.	.	unsuccessful
I	.	.	successful, but died from other causes

This series shows quite clearly that the tumours can be transmitted by subcutaneous inoculations through a number of dogs. The series came to an end owing to the death of Dog I from cellulitis of the face in no way connected with the inoculation. The unsuccessful inoculations were F, H, and J. Of these, F was inoculated from a tumour which was flabby and beginning to dwindle, J from a tumour which was breaking down, and H was one of the two dogs we have previously mentioned as naturally immune.

There is no evidence of an increase in virulence by passage through the series, but the number is not sufficient to draw conclusions from.

We will now describe the course taken by the tumours in the subcutaneous tissue, our description resting partly upon the above series and partly upon other inoculations which we have made.

THE COURSE TAKEN BY THE TUMOURS AFTER SUBCUTANEOUS INOCULATION.

For the first few days after inoculation a swelling can be felt due partly to the fragments of tumour introduced and partly to inflammatory exudation. In some cases this swelling completely subsides, so that nothing can be felt until the appearance of a small nodule indicates that the inoculation has been successful. In other cases the swelling persists, and it is difficult to decide whether the inoculation has been successful until a definite increase in the size of the swelling has taken place. The usual time at which there is

distinct evidence of the first appearance of the growth after inoculation is about 3 weeks, but it varies between 12 days and a month. The tumours from some sources seem to be more active than from others. Thus in our first series of inoculations made from a pedunculated growth in the vagina the secondary growths were noted as being $\frac{1}{2}$ inch to $1\frac{1}{2}$ inch in diameter 16 days after inoculation. In a recent series made from a vaginal growth of very malignant type a definite increase in the size of the swelling following inoculation was observed 12 days after inoculation. In a third series made from an infiltrating but very slow growing vaginal growth the time was invariably longer, varying from 3 to 4 weeks.

Portion of tumour in subcutaneous tissue showing alveolated character. Highly magnified.

The small firm nodules which first appear gradually increase in size and form rounded lobulated masses. At the commencement they are freely movable beneath the skin, but at a later period the latter becomes thinned out, of a bluish-red colour, and firmly adherent to the growths. In consistence the growths are firm and elastic, and as a rule they remain fairly movable on the deep parts. The size ultimately attained varies; it usually reaches from $1\frac{1}{2}$ to 3 inches in diameter. The maximum growth is attained in about 3 months. A curious regularity obtains in this respect. Of 7 animals in one series in which the growth was allowed to reach its full development, in 6 the maximum growth was reached in, as nearly as possible, 3 months, while in the remaining one the maximum was reached in 2 months. Having reached this stage retrograde changes are not long in appearing. The growth becomes soft and flabby, and slowly dwindles until nothing is left to indicate its former presence. This on an average takes 3 months, the tumour running its entire course in about 6 months. In one case disappearance of the tumour occurred within a fortnight after attaining its maximum growth, while in another it took as long as 5 months. In nearly half the cases the subsidence of the tumour was accompanied by ulceration. The thinned-out reddened skin gives way over the growth, which has previously undergone softening, and there results a deep ulcer from which a thin grumous discharge flows.

Even when these retrograde changes are occurring, fresh growth occasionally takes place at the periphery of the tumour. This was marked in Dog C, where the growth, which

had ulcerated, and had considerably diminished in size, commenced to grow again.

In one instance—Dog B—recurrence took place even after the growth had apparently disappeared. A fortnight after we had noted the complete disappearance of the growth, a recurrence was observed at the site of the old tumour. A fortnight later it had reached the size of a walnut; it then became flabby, and 17 days later, when the dog was killed, it was represented by a small fibrous mass.

In one case—Dog C—the growth persisted till the death of the dog, which took place apparently as the direct result of the tumour and its secondary deposits in the viscera. The animal was thin and weakly before the inoculation, and to this is probably to be attributed its want of resistance.

Microscopical examination of the tumours in the subcutaneous tissue produced by inoculation and of the secondary deposits in the organs showed that they had a structure identical with that of the primary growth on the genitals. They were composed of small round cells, sometimes loosely packed, preserving their round form, sometimes more closely packed, assuming a polyhedral shape. There was a delicate stroma enclosing the cells in spaces of variable size. Numerous thin-walled blood vessels were to be seen not only in the supporting framework, but also between the cells. The growths presented the characteristics of a round-celled sarcoma. Nothing of an inflammatory character was to be made out in the actively-growing tumours, and it was only when ulcerated or diminishing in size that an infiltration of the growth with inflammatory products was to be seen.

Dog showing subcutaneous tumours the result of inoculation.

ACQUIRED IMMUNITY.

An animal which has once recovered is immune, and we have never been successful with subsequent inoculations.

1. An old black and tan terrier was successfully inoculated in the flank. The resulting tumour, which in 6 weeks formed a lobulated mass $1\frac{1}{2}$ by $1\frac{1}{2}$ in., completely disappeared in 10 weeks. A month after the disappearance of the tumour the dog was unsuccessfully inoculated in both flanks from a vaginal tumour. A second dog was successfully inoculated from the same tumour at the same time. Seven weeks later it was again unsuccessfully inoculated from a vaginal tumour. Another dog was successfully inoculated from the same tumour at the same time.

2. A young fawn bitch was successfully inoculated in one flank. The resulting tumour reached the size of a filbert. It was removed, and was used successfully to inoculate another dog. A month after the disappearance of the tumour the dog was unsuccessfully inoculated from a vaginal growth. Another dog was successfully inoculated from the same growth at the same time.

3. A white wire-haired puppy was successfully inoculated in both flanks. The resulting tumours, which reached the size of $1\frac{1}{2}$ in. in diameter, had completely disappeared in 3 months. The dog was then unsuccessfully inoculated from a growth in the subcutaneous tissue. Two other dogs were successfully inoculated from the same growth at the same time. Five weeks later the dog was again unsuccessfully inoculated from a subcutaneous tumour. Another dog was successfully inoculated from the same tumour at the same time.

4. A black and white terrier puppy was successfully inoculated from a vaginal growth in both flanks. The resulting tumours reached the size of about 2 inches in diameter and then ulcerated, and completely disappeared in 6 months. The dog was then unsuccessfully inoculated from a subcutaneous tumour. Another dog was successfully inoculated from the same tumour at the same time.

CONCLUSIONS.

1. The tumours in question are infective round-celled sarcoma occurring in dogs.

2. The tumours can be transplanted from the genitals, where they naturally occur, to the subcutaneous tissue of other dogs.

3. The tumours can be transplanted from subcutaneous tissue to subcutaneous tissue through a series of dogs.

4. The tumours after reaching the maximum of growth may disappear spontaneously with or without ulceration.

5. The tumours may continue to increase, and may cause death by secondary deposits forming in the viscera.

6. If the tumour should disappear the animal is then immune to subsequent inoculation.

REFERENCE.

1 *Journal of Pathology and Bacteriology*, January, 1898.

THE COLD-BATH TREATMENT OF TYPHOID.

By F. E. HARE, M.D.,

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I HAVE read the able paper by Dr. Sidney Phillips on the treatment of typhoid fever with much interest and instruction. Some of his arguments however, more especially such as apply to the treatment by systematic cold bathing, call for comment.

Though pyrexia may not now be regarded as one of the chief dangers of enteric fever, this does not in any way weaken the case for cold bathing. While I am personally of opinion that the mere reduction of temperature is in itself of considerable importance, yet cold bathing has been repeatedly shown to act in many other ways, all more or less conducive to the welfare of the typhoid patient. So well recognised is this, that both in the Brisbane Hospital and in the German Hospital, Philadelphia, bathing is frequently continued during defervescence; that is, after the rectal temperature has ceased to attain the bathing point, 102.2° F. J. C. Wilson,¹ of the latter institution, states:

Every now and then a patient whose temperature no longer rose to 101.4° F. (in the axilla) would ask to have the bath repeated, saying that it made him feel so much more comfortable. In consequence of this we have adopted the rule of giving one or two plunges a day during the defervescence..... The result has been entirely satisfactory, and has seemed to us to hasten the convalescence.

At Brisbane² bathing is frequently continued after the temperature has ceased to demand it, to dispel such symptoms as slight delirium, insomnia, thirst, dryness of the mouth and tongue, etc., and almost invariably with success.

Dr. Phillips says that "The chances of recovery of a person contracting typhoid to-day are little or no better than they were fifty years ago, notwithstanding the advances in medical knowledge and improved nursing and hygienic conditions." Although he does not say so, it is to be presumed that he intends this statement to be restricted to the British Isles, and those countries in which systematic bathing is not resorted to. Otherwise it is difficult to reconcile it with the following: