

On the non-identity of the parasites met with in Favus, Tinea Tonsurans, and Pityriasis Versicolor : including, proofs derived from the occurrence of these diseases amongst the lower animals, and their transmission from them to man / by Dr. M'Call Anderson.

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Anderson, McCall, 1836-1908.
University of Glasgow. Library

Publication/Creation

Glasgow : [Printed by William Mackenzie], 1866.

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CONTRIBUTIONS TO DERMATOLOGY.

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ON THE

NON-IDENTITY OF THE PARASITES

MET WITH IN

FAVUS, TINEA TONSURANS, AND PITYRIASIS VERSICOLOR;

INCLUDING

PROOFS DERIVED FROM THE OCCURRENCE OF THESE DISEASES AMONGST
THE LOWER ANIMALS, AND THEIR TRANSMISSION FROM THEM TO MAN.

BY

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GLASGOW:

PRINTED BY WILLIAM MACKENZIE, 45 & 47 HOWARD STREET.

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ON THE
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It is curious to note the variety of opinion which prevails amongst scientific men as regards many points relating to the so-called vegetable parasitic affections of the skin. Thus some, with Wilson at their head—whose opinions must always command respect (a)—hold that there are no such diseases, the plant-like structures met with in favus, ringworm, &c., not being fungous growths at all, but mere degenerations of the normal elements of the skin. Others, while admitting the presence of fungi in these diseases, hold that they are not essential, but accidental formations; and many are of opinion that they are not peculiar to them, but are met with more or less in almost all chronic skin diseases (b). Then there are those, with Devergie for their leader (c), who lean to the theory of spontaneous generation as applied to them; and, lastly, the camp is pretty equally divided between those who believe that several fungous growths are concerned in the production of the parasitic

affections of the skin, and those who maintain that they are due to the presence of one and the same parasite.

It has been urged by some, whose opinion I value, that, in the volume published by me some years ago on the parasitic affections of the skin, this last point should have been fully discussed; but it appears to me that, in a work intended as a guide to diagnosis and treatment, it would have been wrong to have entered into details on this head, except in so far as they were necessary to the practical elucidation of the subject. In the volume alluded to, however, I endeavoured to prove the correctness of Bazin's view, which was contrary to the belief of dermatologists in this country—that herpes tonsurans (ringworm of the head), herpes circinatus (ringworm of the body), and sycosis parasitica (ringworm of the beard), are all due to the presence of one and the same parasite, the trichophyton (d); and all my subsequent experience has tended to confirm the opinion which I then expressed, an opinion which, it is gratifying to observe, has been pretty generally accepted by the profession. There are not a few, however, who go farther than this, who hold that there is only one parasite productive of *all* the vegetable parasitic affections of the skin, amongst whom may be mentioned the names of Hebra, Tilbury Fox(e), Lowe, and Jabez Hogg(f), to whose writings I must refer the reader for the arguments in favour of such an opinion, as the following pages are devoted almost exclusively to the arguments in favour of the opposite view.

But, before proceeding further, it may be well to state that, as there is a difference of opinion amongst those dermatologists who admit a group of parasitic affections of the skin, as to whether alopecia areata (porrigo decalvans) is a parasitic disease or not, it is advisable to leave that affection out of consideration in the present discussion in order to avoid confusion. So that the task which I propose to myself now is to lay before my readers the arguments in favour of the view that the *Tricophyton*, the parasite met with in the three varieties of ringworm (viz., herpes tonsurans, herpes circinatus, sycosis parasitica), the *Achorion Schönleini*, the parasite of favus, and the *Microsporon furfur*, the parasite of pityriasis versicolor, are not identical, but distinct fungous growths.

First of all, let us view the proofs of non-identity, as these are displayed in the *results of inoculation*.

(1.) *Results of inoculation with the Achorion Schönleini* (the parasite of favus).—This parasite has been repeatedly inoculated with success, and, amongst others, by Hebra, Rémak, Vogel, Bazin, Gruby, Köbner, and Deffis. Bennett thus describes a case in point :—

“In the summer of 1845 one of the gentlemen in attendance at the Royal Dispensary volunteered to permit his arm to be inoculated. A boy, called John B—, aged eight, labouring under the disease (favus) was at the time the subject of lecture, and a portion of the crust, taken directly from this boy's head, was rubbed upon Mr. M—'s arm, so as to produce erythematous redness, and to raise the epidermis. Portions of the crust were then fastened on the part by strips of adhesive plaster. The results were regularly examined at the meetings of the class every

Tuesday and Friday. The friction produced considerable soreness, and, in a few places, superficial suppuration. Three weeks, however, elapsed, and there was no appearance of favus. At this time there still remained on the arm a superficial open sore, about the size of a pea, and Mr. M— suggested that a portion of the crust should be fastened directly on the sore. This was done, and the whole covered by a circular piece of adhesive plaster, about the size of a crown-piece. In a few days the skin surrounding the inoculated part appeared red, indurated, and covered with epidermic scales. In ten days there were first perceived upon it minute bright yellow-coloured spots, which, on examination with a lens, were at once recognized to be spots of favus. On examination with the microscope, they were found to be composed of a minute granular matter, in which a few of the cryptogamic jointed tubes could be perceived. In three days more the yellow spots assumed a distinct cupped shape, perforated by a hair; and in addition to tubes, numerous sporules could be detected" (g).

Of three cases inoculated by Deffis, the epidermic variety of favus—the crusts exhibiting the achorion microscopically—was produced twice, and a typical favus cup once, and the average period of incubation was ascertained to be about forty days. The true favus cups are only formed when, by inoculation, some of the fungus can be brought into contact with a hair-follicle; hence the epidermic variety is more frequently produced. Köbner inoculated himself on the forearm with the parasite of favus, and there resulted well-marked favus cups (h), which he exhibited at the Medical Society at Breslau. Gruby also tried the effects of inoculation. He deposited some of the fungus on the bark of an oak in full vegetation, and there developed itself a favus cup identical with that which grows on the

head of infants, and which was exhibited at the French Institute (i).

(2.) *Results of inoculation with the Tricophyton* (the parasite of tinea tonsurans, or ringworm).—The experiments with this parasite have been on a much less extensive scale than those with the achorion, but, as far as they go, they lead to the same conclusion. Thus M. Deffis, encouraged by the success of his inoculations with favus matter, essayed some inoculations with the tricophyton in 1856, in which he was completely successful, characteristic patches of ringworm being produced; and similar inoculations were made with the tricophyton by Köbner on his own and on Dr. Strube's forearm, and also upon rabbits, which resulted likewise in the development of ringworm (k).

(3.) *Results of inoculation with the Microsporon furfur* (the parasite of pityriasis versicolor).—The inoculation of the microsporon furfur has not, as far as I am aware, been attempted, or at all events the results have not been communicated by any one, except by Dr. Heinrich Köbner, who inoculated himself with it upon the skin covering the sternum, and produced an eruption of pityriasis versicolor (l).

Now of all the inoculations which have been made upon man, animals, or plants, with the achorion, the tricophyton, and the microsporon furfur, many, of course owing to defective inoculation, unsuitableness of soil, or the like, have proved abortive; but I think I am equally correct in stating that amongst the many cases of successful inoculation, not a single one has resulted in the production of any

other parasitic disease than that from which the parasite was taken. In other words, when the inoculations were successful the achorion always gave rise to favus, the trichophyton to tinea tonsurans, and the microsporion furfur to pityriasis versicolor.

So much, then, for the results of inoculation.

In the second place, let us glance at the *clinical proofs* of the non-identity of these parasites.

There are very few dermatologists of note who now deny the contagious nature of favus, tinea tonsurans, and pityriasis versicolor. Amongst the 1300 cases of parasitic affections of the skin treated at the Dispensary for Skin Diseases, Glasgow, during the last four years, there were numerous examples of this; but there was not a single instance of one of those diseases giving rise, by contagion, to one of the others. And this is just what one would have expected, seeing that artificial inoculations point so conclusively the same way. And here it must be mentioned, that those who are not well versed in the diagnosis of skin diseases are apt to fall into the error of confounding the appearances of the first stage of favus with fully developed ringworm, and thus to arrive at the opinion that these two diseases are present on the skin at the same time. That there are instances of the coincidence of ringworm and favus on the same person at one time—a delineation of which is published by Hebra—no one can deny, but it is equally certain that they are very rare, for I have never met with a single case of the kind; so that they no more constitute

proofs of the identity of these diseases than do instances of the coexistence of psoriasis and ringworm—a case of which I met with the other day—of the identity of these two affections. Then, if we study the appearances of fully developed favus, tinea tonsurans, and pityriasis versicolor, it would be difficult to name any three skin diseases which are more dissimilar; and this I may say with the greatest confidence, that I have never seen a transition of one of these diseases into one of the others. It is but fair, however, to state that my experience differs in this respect from that of Dr. Tilbury Fox, who makes the following remarks:—

“Tinea favosa (favus) can be produced from bad cases of tinea tonsurans, on a minor scale, by keeping up such an amount of irritation as, being less than sufficient to destroy the fungus, shall lead to the effusion of blastematous fluid (be it pustular, vesicular, or other), in which the plant will vegetate rapidly for a while, producing a crust depressed in its central part, and completely riddled by hairs in various stages of disease; the crust itself being composed of the normal elements of the part, effused fluid, and parasitic growth” (m).

As I have just said, this state of matters is totally at variance with my own experience, and I cannot help suspecting that some error has crept into the inquiry.

In the third place, let us view for a moment the proofs derived from a *microscopic examination*, which I hold, however, to be of very secondary importance, and which cannot have nearly the same weight as several of those previously advanced, for in structures so minute it is difficult, even with all the light which is shed upon them by the most

perfect instruments, to appreciate with precision the differences which may exist between them. And yet, as far as my experience goes, the differences between the microscopical appearances of the *Achorion*, the *Tricophyton*, and the *Microsporon furfur*, are very considerable. Thus, to take an instance derived from the spores: those of the achorion are, on an average, about the 3000th of an inch in diameter, and many of them are oval; those of the tricophyton, on the other hand, are much smaller, being, on an average, about the 7000th of an inch in diameter, while the spores of the microsporon furfur, although nearly as large as those of the achorion, are more uniformly rounded, and have a remarkable and characteristic tendency to run together, so as to form clusters, like bunches of grapes. Other differences in the microscopical appearances I might mention, which must be familiar to those who have carefully studied the subject of parasitic diseases of the skin with the microscope; but it is unnecessary to enlarge further on this subject, holding, as I do, that the proofs derived from a microscopical examination are of secondary value in the determination of the point at issue, and I conclude with the observation, that if carefully prepared microscopical specimens of the *Achorion*, the *Tricophyton*, and the *Microsporon furfur*, and of these only, were handed to me, and I were allowed to use my own microscope, I think I could generally arrive at a correct diagnosis of the disease from the microscopical appearances alone.

Curiously enough, the morning after the above was written,

my friend Dr. Irvine handed to me a paper containing some epithelial scales and fine hairs, with the request that I should examine them with the microscope, and give him my opinion of the nature of the skin disease from which they were taken. This I did, and pronounced it to be a case of pityriasis versicolor, an opinion which proved correct. This fact is cited, not to show that I am possessed of any extra skill in the use of the microscope, but merely in verification of the above statement.

Lastly, we come to the proofs derived from a branch of inquiry in which I have for some time been deeply interested, namely, *the occurrence of vegetable parasitic skin diseases amongst the lower animals, and their transmission to the human subject*. And first of all, as regards favus, I may be allowed to transcribe the following case from a previous communication, a case which was first published by Bazin(n).

"In the course of the year 1854 several members of a family, amongst whom was a young physician, remarked that several mice, caught in a trap, were affected with a peculiar disease. Upon the head and front legs there were crusts of a sombre yellow tint, of a regularly circular form, and more or less elevated above the level of the neighbouring healthy parts. A manifest depression was likewise detected in the centre of each crust, just as one observes in porrigo favosa, and the parts where these had fallen off were ulcerated, and the skin appeared to be destroyed throughout its whole thickness. These mice were given to a cat, which exhibited some time afterwards, above the eye, a crust similar to those on the mice. Later still, two young children of the family, who played with the cat, were successively affected with the same disease, yellow crusts making their appearance on several parts of the body, on the shoulder, face, and thigh. The

physician who was summoned pronounced them to be cases of porrigo favosa."

Some of the fragments were sent to Bazin, who detected the parasite with its characters well marked.

The following cases, which came under my own observation, are of much interest:—

A patient of my late colleague's, who lived in lodgings in a newly-built house in the West-end of Glasgow, showed him his dog, upon whose fore-paw a peculiar disease existed. Dr. Buchanan examined the patch, and found that it corresponded in every particular with a patch of favus—an opinion which was amply corroborated by a microscopic examination of a portion of the crusts. This dog was in the habit of killing mice which abounded in the house, some of which were accordingly caught and examined by Dr. B. and myself. We had no hesitation in pronouncing the disease to be favus, and a microscopic examination showed distinctly the presence of the *Achorion Schönleini*.

This disease in mice has a special tendency to attack the ears, and from thence it spreads to the head and throat, and to other parts. It produces much greater destruction than in the human subject, as it not only destroys the hair but tends to eat into the deeper structures, and by slow degrees leads to exhaustion and death. One of the mice above referred to was stuffed, and is preserved at the Dispensary for Skin Diseases, Glasgow, where those who are interested may have an opportunity of studying the appear-

ances and of verifying the conclusions to which we arrived with regard to the nature of the disease. The complaint in mice had at this time attracted the attention of non-professional persons in Glasgow, as was evidenced by a correspondence in the columns of the *Glasgow Herald*, the writers having all seen in their houses mice so affected, and having been much alarmed lest they might be the means of poisoning the food or water, or of transmitting the disease to members of their family. No instance, however, was cited in which this had occurred. A still more interesting case than that above referred to occurred shortly afterwards in my own practice. A poor woman came to the Dispensary for Skin Diseases on the 1st February, 1864, accompanied by one of her children. They were both affected with favus of the non-hairy parts of the body. On each there were scattered here and there characteristic little round patches of eruption, on some of which numerous minute favus cups were detected, exhibiting the *Achorion Schönleini* microscopically. Two other children of this woman, as also their father, were similarly affected. Mice abounded in the house some time previous to this, and a cat was accordingly procured which killed all of them. I had therefore no opportunity of examining them, but the cat was brought to me, and on the tops of its fore-paws I detected numerous undoubted favus cups.

The next case, which is equally interesting, came under my notice a few days after the last. On the 22nd February, 1864, I was asked by Mr. Thomas Bryce, surgeon, to visit

along with him a family which he was attending. A number of mice had been caught in the house three months previous to this date, which had been much handled by the children. Five weeks afterwards an eruption was noticed on one of the little girls, which spread to one of the sisters, her mother, the baby, and a little girl who worked in the establishment. On examining the eruption, which was confined to the non-hairy parts, it was found to correspond exactly with the appearances in the previous case. On some of the patches distinct favus cups were seen which exhibited the achorion microscopically, and on those which were devoid of them the eruption corresponded to the variety described in my volume on the parasitic affections of the skin as "Favus of the Epidermis," and the scales were loaded with the spores and tubes of the parasite. There were no mice in the traps at the time, but shortly after my visit Dr. Bryce kindly sent me five, on the back of one of which near the tail a characteristic favus cup was seen, while the side and lateral aspects of the head and ears of another were eaten away by the disease. The crusts were examined with the microscope, and the achorion was detected in great abundance. Dr. Bryce informed me that the mice sent to me exhibited the same appearance as those with which the children had been playing.

But favus is not limited to cats and mice, for we read that Müller observed it in a Cochin-China fowl and in several chickens which had contracted it from the fowl; that Gerlach observed its transmission from fowls to the human

subject (o), and that Köbner succeeded in producing favus in rabbits by inoculating them with the achorion taken from the human subject; and there can be little doubt that as the question becomes more thoroughly ventilated, this disease will be found to be much more generally diffused amongst the lower animals than many suppose.

Now, in all these cases favus transmitted favus, and I have never read of, still less have I ever observed, any case in which either *tinea tonsurans* or *pityriasis versicolor* was the result.

Let us now glance for a moment at the occurrence of *tinea tonsurans* (ringworm) amongst the lower animals, in order to see if it gives us any information upon the point at issue.

In a paper on "Parasitic Skin Diseases in the Ox," by Gerlach, Professor at the Royal Veterinary School of Berlin, the author gives an account of ringworm in oxen. Having remarked that oxen which were put into the same stable with affected ones contracted the same disease, he determined to perform some experiments with the view of ascertaining whether it really was communicable to other animals. By successive inoculations he succeeded in the production of ringworm in oxen, in calves, and in horses, while his experiments in the case of pigs and sheep yielded a negative result. He likewise inoculated his own arm and those of some of the pupils with some of the parasitic matter from oxen, and in each case there resulted well-marked *herpes circinatus* (ringworm of the body).

Bärensprung's experience coincides with that of Gerlach. He rubbed on his forearm some scales containing an abundance of the spores and mycelium of the trichophyton taken from a case of ringworm in one of the lower animals. No effect was produced for the first few days, but after a longer interval his attention was attracted to the part by the supervention of itching, when he discovered a well-marked patch of herpes circinatus (ringworm of the body)(p). It is unnecessary to multiply cases of this kind, so that I may conclude with a case extracted from the volume published by me on the "Parasitic Affections of the Skin," and quoted from Bazin—

"A dragoon came to the dispensary of the St. Louis Hospital, affected with herpes circinatus of the front of the right forearm; the skin of one of the patches was denuded of hair. He stated that five or six of his comrades had contracted this affection, as well as himself, from grooming diseased horses. We went to the barracks, where, sure enough, we saw three horses which exhibited round patches, absolutely identical with those of herpes tonsurans (ringworm of the head) on the withers, shoulders, back, and belly. The hairs in the centre of each patch were broken off close to the skin, and there was, as in herpes tonsurans, a whitish, squamous, and even crust-like production which was traversed by the hairs. The presence of spores was detected with the microscope. The dragoon, who conducted us to see the horses, showed us also his young daughter, eight or ten years of age, the side of whose nose exhibited a patch of herpes circinatus."

We see, then, that as in the previous cases favus invariably transmitted favus, so in this tinea tonsurans invariably gave rise to tinea tonsurans.

I believe I am correct in stating that pityriasis versicolor has not been observed in the lower animals.

The following is a summary of the proofs adduced in favour of the non-identity of the *Achorion Schönleini*, the *Tricophyton*, and the *Microsporon furfur*, the parasites met with in favus, tinea tonsurans, and pityriasis versicolor respectively.

(1.) In all cases of successful inoculation with the *Achorion*, *Tricophyton*, and *Microsporon furfur*, the same parasitic disease has been produced as that from which the parasite was taken.

(2.) Of the innumerable cases occurring in the human subject illustrative of the contagious nature of favus, tinea tonsurans, and pityriasis versicolor, which have been recorded, there is no authentic case in which one of these diseases gave rise to one of the others.

(3.) The difference in the appearance of favus, tinea tonsurans, and pityriasis versicolor, when fully developed, is so very striking as to lead to the belief that they are produced by separate parasites.

(4.) There is no authentic instance on record of the transition of one of these diseases into one of the others.

(5.) The difference in the appearance of the achorion, tricophyton, and microsporon furfur is sufficiently striking to enable the observer in many cases to form a correct diagnosis from the microscopic examination alone.

(6.) Of the numerous instances on record of the transmission of favus and tinea tonsurans from the lower animals

by contagion or inoculation, favus has always given rise to favus, and *tinea tonsurans* to *tinea tonsurans*.

Before taking leave of our readers it may be well to refer to the opinion of Dr. John Lowe and others, that not only are the parasites in question identical, but also that they are one and the same with the *Aspergillus glaucus*. In confirmation of this view Dr. Lowe states, amongst other observations, that he placed in a bottle, exposed to a moderately cool atmosphere, a solution of brown sugar and some favus matter. In rather more than a month the *aspergillus glaucus* was detected in the solution, having been apparently developed from the favus matter. Dr. Lowe seems to have repeated the experiment several times with a like result. It must be remembered, however, that there are many sources of fallacy in experiments of this kind, and I am entirely at one with Dr. Lowe in the following remarks—

“In an investigation of this nature, where the objects to be examined are so minute, a considerable degree of difficulty is naturally experienced in affording satisfactory proof of the accuracy of the remarks concerning their development. For instance, in watching the germination of any given fungus, it may often be difficult to prove that no other plant of the same tribe is present to complicate the result; and this in consequence of the myriads of spores of various species which are constantly floating about in the atmosphere, ready to become located, and grow upon any suitable pabulum” (p).

Moreover, similar experiments were conducted by Rémak, who did not arrive at any definite conclusion; while

Köbner subjected the point to a more practical and satisfactory test by inoculating himself, Strube, and others, repeatedly with the penicillium glaucum, using the same precautions as in the experiments alluded to in a previous part of this paper, but without the slightest result. Now if the penicillium glaucum were identical with the parasites of favus, ringworm, and pityriasis versicolor, one would naturally have expected that he would have been as successful with it as he was in his inoculations with the *Achorion Schönleini*, the *Tricophyton*, and the *Microsporon furfur*. So that, while no one can withhold from Dr. Lowe the credit which is due to him for the interesting experiments which he has carried out, and for the scientific manner in which he has conducted them, I think it must be conceded that further proof is required before we can admit that the parasites productive of favus, tinea tonsurans, and pityriasis versicolor are identical with the *Aspergillus glaucus*.

(a) "On the Phytopathology of the Skin and Nosophytodermata, the so-called parasitic affections of the skin."—"British and Foreign Medico-Chirurgical Review," January, 1864. See also a pamphlet in answer to this paper entitled "The Nature of so-called Parasites of the Skin," by W. Tilbury Fox, M.D. T. Richards, 37 Great Queen Street. 1864.

(b) See an article by Mr. Jabez Hogg, in the "Lancet" for March 26, 1859.

(c) "Traité pratique des Maladies de la Peau," par Alph. Devergie, ed. ii., pp. 51 and 501.

(d) "The Parasitic Affections of the Skin," by T. McCall Anderson, M.D. P. 46. London: Churchill, 1861.

(e) "Skin Diseases of Parasitic Origin," by W. Tilbury Fox, M.D. P. 99 et seq. London: Robert Hardwicke, 192 Piccadilly.

(f) "Further Observations on the Vegetable Parasites, particularly those infesting the human skin." By Jabez Hogg, F.L.S., M.R.C.S., &c.—"Quarterly Journal of Microscopical Science," January, 1866, p. 10.

(g) "Clinical Lectures on the Principles and Practice of Medicine," by J. Hughes Bennett, M.D., ed. ii., p. 799. Edinburgh: Adam and Charles Black.

(h) "Klinische und Experimentelle Mittheilungen aus der Dermatologie und Syphilidologie," von Dr. Heinrich Köbner Arzt in Breslau. P. 21. Erlangen, 1864.

(i) "Traité pratique des Maladies de la Peau," par Alph. Devergie, ed. ii., p. 526.

(k) "Klinische und Experimentelle Mittheilungen aus der Dermatologie und Syphilidologie," von Dr. Heinrich Köbner Arzt in Breslau. P. 23. Erlangen, 1864.

(l) Ibid., p. 24.

(m) "Lancet," September 10, 1859.

(n) "Leçons Théoriques et Cliniques sur les Affections Cutanées Parasitaires," par le Docteur Bazin (1858). P. 119.

(o) "Klinische und Experimentelle Mittheilungen aus der Dermatologie und Syphilidologie," von Dr. Heinrich Köbner. Erlangen. 1864. Pp. 26 and 27.

(p) Quoted by Aitken, from "Brit. and For. Med.-Chir. Review" July, 1857, p. 263.

(q) "Transactions of the Botanical Society," vol. v., part iii., p. 193.



