ON A NEW FORM OF EPIDEMIC SKIN DISEASE.

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PART II.

In July¹ of last year I called attention to a contagious malady the chief lesion of which was a dermatitis sometimes attended by the formation of vesicles, always resulting in desquamation of cuticle, accompanied by a certain amount of constitutional disturbance, and running a more or less definite course of seven or eight weeks.

One hundred and sixty-three cases of the disease occurred under my own care, being 19 per cent. of the inmates of the infirmary and sick wards of the work-house adjacent. Four of these cases were described and illustrated in the BRITISH MEDICAL JOURNAL of December 5th, 1891. The narration of these cases concluded with a summary of the main facts of the epidemic, abstracted from the paper I read before the Medical Society; and it is desirable to supplement this with a few remarks on the varieties of the affection, the diagnosis, etiology, and anatomy.

VARIETIES.

As regards the clinical varieties of the affection, beyond the two types founded on the character of the eruption, to which reference has already been made,² no other distinct varieties need be recognised. The two varieties may conveniently be called "Dermatitis humida" and "Dermatitis sicca." The division into these two classes seems to be a legitimate one, for there are other features which separate these groups besides the character of the rash. Of the total number attacked up to November 1st, 1891, 100 belong to the moist type, 45 to the dry, and 18 were of a mixed type, different parts of the body presenting different varieties of the eruption.

It would seem that the variety of eruption was determined to some extent by the idiosyncrasy of the patient in possessing what would be called a dry skin or a moist and easily perspiring one; for the former mostly resulted in dry or "pity-

riasis" cases, and the latter in moist or "eczematous" ones. The dermatitis humida generally ran a more rapid course than the dermatitis sicca, which was nearly always prolonged and chronic. Moreover, so far as my recollection serves me, weakness was a more marked feature of the dry variety than of the moist, possibly on account of the ages of the sufferers. The table showing the numbers and ages in the respective groups may need revision, but it shows the average age of the moist cases to be 62.6 years, and that of the dry to be 68 years, as compared with the 64.8, which is the average age of all the patients attacked.

Although it is inexpedient to make any other division than

the one mentioned, still the cases differed considerably from one another in detail, and especially in the extent and distribution of the rash and the severity of the constitutional symptoms. There is, for example, a wide difference between a slight attack such as I suffered from and a severe one like the second case published in the BRITISH MEDICAL JOURNAL (M 25). It is of great importance to bear this point in mind in searching for cases of the disease, and especially when it is a question of an isolated case.³ Some of my cases had only a small amount of the eruption, localised perhaps to one side of the face, or to the ears (as in my own attack), or to the hands, or to the flexures of the joints. In these the constitutional symptoms were generally, though not always, of quite a trivial order, and if seen alone, apart from the epidemic, might (excepting, perhaps, the exfoliation) have been taken for eczema, had it not been for other instances of the disease

Fig. 1.—G. C., aged 49. Cast of left hand.

spread on successive days to other parts of the body, so that at the end of a week all but the legs below the knees had been affected; lastly, these and the feet were involved. The epidermis of the body generally was exfoliated in flakes and scales, that of the hands and feet in pieces measuring an inch or more. Large pieces were coming off the feet at the time I saw her. Nothing but scarlatina could have produced such an exfoliation, and this was negated by the slow march of the rash, the total absence of pyrexia, sore throat, characteristic tongue, or contagion, to a large family of brothers and sisters. There had been some thirst, but no history of anorexia, nor of other constitutional symptoms in this case, and the patient suffered only trifling discomfort. The eyes had been a little sore at one time. How widely different is such a picture from that of some of my elderly male patients; yet it was evidently the same disease.

¹ The Lancet, August 1st, 1891.

² BRITISH MEDICAL JOURNAL, vol. II, 1891, p. 1201.

³ As an instance a case may be mentioned which I have since seen in consultation with Dr. Evans. A little girl, aged 8, had developed, three weeks before, a redness of the face and head which soon became scaly. The rash

which, occurring in the same place and at the same time, linked them step by step with those of a severer type, where the whole body was covered by inflamed skin and the constitutional symptoms were extreme.

DIAGNOSIS.

Bearing in mind this variation amongst the cases, it is not surprising that some of them required most careful differentiation, although a well marked type presented no great difficulty. The leading feature of all, the pathognomonic symptom, was the desquamation or exfoliation of the epidermis.

A. *Erysipelas*.—When the chief part involved was the face only, or indeed any part containing much loose cellular tissue, the tumefaction of the parts, sufficient sometimes to close the eyes, bore a strong superficial resemblance to erysipelas. But the gradual advent, the absence generally of pyrexia, the often vesicular nature of the eruption in some part of the body, and the fact that the rash occurred in other parts in a more typical manner, were among the features which served to distinguish the cases from erysipelas.

B. *Rötheln*.—We have seen that the rash in 8 males and 6 females began with blotches, and in these cases before the maculæ became confluent, it was exceedingly suggestive of German measles. No one could look at the photograph of Case M., 45, or F. 33, without immediately thinking of that disease. But these maculæ were of a more persistent nature than rötheln, and very soon took on an eczematous or scaly character; and further, the absence of pyrexia with such an extent of rash served to distinguish these cases from rötheln. One case presented much difficulty, F. 18. In her the patches were not very extensive, did not become confluent, and only became a little scurfy. This case would undoubtedly have passed for rötheln, had it not been linked step by step with the other cases of the epidemic.

C. *Pityriasis rubra*.—The fact that the disease was an exfoliative dermatitis, brought it within this class of malady; and all the cases belonging to the "dry" type had a striking resemblance to the descriptions of pityriasis rubra of Willan and Wilson.⁴ But in the first place my cases were evidently contagious, or at any rate occurred in the epidemic form, whereas no mention is made of this in the description by these authors. Secondly, Dr. Liveing says, "the affection (pityriasis rubra) is very commonly met with in children, and persons possessed of a delicate skin and fair complexion," whereas the great majority of my cases occurred in adults and old people. There were very few amongst children, and these very slight. Thirdly, there is the difficulty of reconciling the "moist" cases, which were in the majority, with the recognised type of pityriasis rubra. Liveing⁵ describes the skin in pityriasis rubra as not infiltrated nor thickened, but in my worst cases the skin was very decidedly so, and in all there was distinct induration. Nevertheless, in many respects my cases tally with this author's description of pityriasis rubra.

Pityriasis rubra, says the same author (page 98) "is really a rare and peculiar form of eczema, as it is now regarded by Erasmus Wilson, Neumann, and even Hebra himself, who was the first to describe the affection as a distinct disease. It differs from common eczema chiefly in the entire absence of moist exudation on the surface of the skin, and in the extraordinary exfoliation of cuticle. The first distinction I consider more apparent than real, for I have detected traces of dried exudation on the under surface in several cases."

It may be here mentioned that I examined some of the flakes shed by those cases apparently quite free from any exudation, and, by the aid of a lens, dry secretion was distinctly visible on the under surface, a fact which tends to bring the cases under consideration within the category of vesicular or eczematous diseases.

D. *Eczema*.—Let us therefore inquire in what respects these cases resemble eczema in its acute general form:

1. Both diseases usually start as a papular or papulo-erythematous rash.

2. Both diseases are prone to become vesicular, and to be attended by exudation. We have seen that altogether 118 cases out of 163 had a definite amount of exudation.

3. Both diseases have a marked tendency to select as a

starting place the flexures of joints and folds of skin—for example, beneath the mammæ or behind the ears; and here also, in many of my cases, the rash predominated.

4. Both diseases are apt to begin in one part of the body, and then, as fresh patches appear in another part, the first one either runs an independent course or fades away, and thus different parts of the body present different stages of the eruption at the same time.

There is no doubt that many of the cases, especially in their early stage, bore a striking resemblance to eczema; and when, at the commencement of the epidemic in July,⁶ I directed attention to it, I fell into the error, and so did others who saw the cases, of supposing that it was a variety of eczema, hitherto undescribed, occurring in an epidemic form; but further scrutiny and the observation of many more cases, especially in a more advanced condition, have led me to doubt whether it is eczema in any form that we have to do with; and this view is now shared by others⁷ much more competent to speak.

The differences between the two diseases seem to be:

1. That the amount of dermal thickening and inflammation is certainly far greater than is usually seen in eczema of even a severe kind.

2. The exfoliation of flakes of epidermis, which occurred in both "moist" and "dry" cases, as the disease advanced, is different from any other skin disease, excepting pityriasis rubra and scarlatina.

That a proportion of the cases (about one-third) were apparently free from exudation from beginning to end is not a point on which too much stress should be laid as differentiating them from eczema, for, as we have seen, exudation could be discovered on the under surface of the scales; and thus, in the same way as Dr. Liveing had brought pityriasis rubra into the category of eczema, so could my "dry" cases be brought into a class of vesicular diseases.

3. The definite course of six to eight weeks which most of the cases ran is certainly a notable feature. They were, like eczema, liable to relapse, but the primary attack had a definiteness which differs widely from the clinical history of eczema, either localised or general, so far as I am aware.

4. In cases of acute general eczema there is generally a certain amount of *malaise*, but nothing like the severe and uniform constitutional disturbance present in the majority of these cases, and resulting in a fatal issue in 12.8 per cent.

5. Eczema attacks all ages, and especially the delicate skins of children; but this disease, as we shall see, is almost entirely confined to persons at or beyond the middle period of life.

6. The occurrence of this disease in an epidemic form distinguishes it at once from any variety of eczema hitherto described.

Nevertheless, the resemblance of some of my cases, especially the slighter ones, to eczema, and certain others to pityriasis rubra, was so remarkable as to render it *highly probable that the malady, at least when occurring in a sporadic form, might be, and probably has been, classed as one or other of these diseases*. Moreover, whatever be the true explanation of this outbreak, here is a fact worthy of record—namely, that one pathological cause (for whatever it be, we cannot but believe that all these cases were the result of one proximate principle or influence) can produce clinical results under varying conditions of time, place, and individual, which closely resemble the appearance of an eczema in one instance and a pityriasis rubra in another.

It is possible that there are other diseases from which these cases ought to be distinguished, but I have purposely abstained from reading authorities lest my mind should become confused or biased in the observation of these cases, and prevented, by preconceived notions, from a realisation of the true type.

ETIOLOGY.

A. *Predisposing Causes*.—1. *Age*: Most of the sufferers were in advanced life, indeed there were none but quite trivial cases in children and young adults. The average age of all males attacked was 63.67, and of females 66.17, and of both sexes 64.8. But not only were all the pronounced cases in persons past the middle period of life, but instances might be

⁴ Wilson, *Diseases of the Skin*, 5th Edition, 1863, p. 111.

⁵ *Diagnosis of Skin Diseases*, 1878, p. 100.

⁶ *Vide Lancet*, August 1st, 1891, p. 266.

⁷ *Vide Discussion at Medical Society of London, BRITISH MEDICAL JOURNAL*, December 5th, 1891, p. 1207.

Table showing Proportion between the Number of the Cases at a Certain Age and the Number of Persons in the New Infirmary at that Age.

Age...	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	Totals at all Ages.
	M F	M F	M F	M F	M F	M F	M F	M F	M F	M F
Number of patients under treatment at that age	27 29	8 16	24 33	23 18	29 29	26 17	43 30	37 42	5 14	227 228
Number of cases affected with the disease	1 0	0 1	2 2	2 1	8 2	9 2	16 12	18 9	1 4	57 33
Proportion between cases of the disease to patients under treatment at that age (per cent.)	3.7 0	0 6.25	8.33 6.06	7.14 5.55	27.58 6.89	34.61 11.76	37.20 40.00	48.64 21.42	20.00 28.57	25.11 14.47
Proportion attacked in both sexes combined	1 out of 56 = 1.78 %	1 out of 24 = 4.16 %	4 out of 57 = 7.01 %	3 out of 48 = 6.52 %	10 out of 58 = 17.24 %	11 out of 43 = 25.58 %	28 out of 73 = 38.35 %	27 out of 79 = 34.17 %	5 out of 19 = 26.31 %	90 out of 455 = 19.78 %

mentioned where, of several patients equally exposed to contagion, the younger ones escaped and the elders contracted the disease. More than one example is within my recollection where the disease, in its spread along the side of a ward, would skip over a bed containing a younger person. Nevertheless, it may be objected that there is a larger proportion of elderly people in the infirmary, and, therefore, it is necessary to know the number of inmates in each decade of life who were equally exposed to the morbid influence, so as to ascertain the relative proportion of each attacked. The above table, prepared by Dr. Hugo, gives the information required:

From this it will be seen that while only 1, 4, 7, and 6 per cent. were attacked among the earlier decades of life, 17, 25, 38, 34, and 26 per cent. suffered in the decades from 40 upwards. This is especially noticeable among the males, for whereas the percentages in the first four decades were 3, 0, 8, and 7, the percentage of the fifth decade leaps suddenly to 27, the sixth to 34, seventh 37, eighth 48, and ninth 20. Hence, one may fairly conclude that advanced life is an important predisposing cause of the disease, and that the predisposition gradually increases up to 80 years of age.

2. *Sex:* It will be seen from the above table that out of a total of 227 males under treatment in the infirmary, 57, or 25.1 per cent., were attacked, but out of the 228 females only 33, or 14.4 per cent., were attacked. The figures of the sick wards do not show quite such a contrast, for of the males 22.14, and the females 16.94 per cent., were attacked. If both places be taken together, it is found that 23.67 per cent. of the total males, and 15.74 per cent. of the total females were attacked; showing that the male sex exhibited a marked predisposition to the disease. Moreover, the type of disease was more severe amongst the men, and their death-rate was greater; 20, as compared with 4 per cent. amongst the women. The death-rate of both sexes combined was 12.8 per cent.

3. As to the *occupation* of the patients, it seemed to have no particular influence apart from other causes.

4. *Previous ill health* and "hospitalism." Among the patients of the infirmary, 19 per cent. were attacked, but among the healthy staff only 2 (myself and a housemaid), or 3 per cent., were attacked.

Again, out of 391 patients in the workhouse sick wards, 18.6 per cent. suffered from the disease, whereas out of 169 aged and infirm, but otherwise healthy inmates of the workhouse proper, only 11 were attacked, or 6.5 per cent., and of these latter 7 (2 males and 5 females) were "helpers" in the sick wards, and constantly tending on patients already suffering from the disease. From these facts it would seem that sickness and "hospitalism" are almost as important factors in the causation as advancing years.

5. A careful examination of a tabulated statement of the diseases for which the various patients were under treatment at the time when they were attacked with the eruption, did not lead to the suggestion that any particular disease was more prone to be complicated by the eruption than another, with the possible exception of ulcer of leg. A rather larger proportion of cases of this disease were attacked with the eruption. A few of the cases exhibited evidences of a gouty diathesis, either in themselves or their family history, but not a sufficient number to show any connection. Some of

the epidemic cases had had *influenza* during the twelve months preceding the outbreak, but not any considerable number, and so far as I have been able to discover, this produced no marked predisposing influence.

B. *Exciting Causes.*—1. Turning next to the possible exciting causes of the epidemic, the first to be examined is food. A careful examination of a table showing the articles of dietary partaken of by those affected about the time when they were first attacked, prepared for me by Miss Annette Benson, M.B., the clinical assistant, entirely fails to connect any particular article or articles with the epidemic, and the mere fact that instances of the same disease have occurred at the Marylebone Infirmary, St. Mary's Hospital, and elsewhere, in which places not only was the dietary scale different, but the articles were procured from different sources, is alone sufficient to preclude the dietary from any participation in the etiology. It may not be out of place to remark that the dietary at the Paddington Infirmary is exceedingly liberal, and prepared with greater care than is usual. The food, both in quantity and quality is superior to any hospital or infirmary with which I am acquainted. The only articles which the Paddington and Marylebone Infirmaries procure from the same contractors are milk and fish.

2. *The soap* was suspected by some, and inquiry made. But the same soap was in use at the time of the outbreak that had been used for a long time previously without harm. And here again a different soap from a different contractor was in use at the Marylebone Infirmary.

3. *Scabies* was another suggestion in the earlier days of the epidemic. But no burrows or other signs were ever found, though careful search was made.

4. *The water supply* is a possible source of evil either internally or externally. The water supply of the Paddington Infirmary and Workhouse is derived from the West Middlesex Water Company, that of the Marylebone Infirmary from the Grand Junction Water Company.

Moreover, if any local irritant, such as soap, scabies, or water were the exciting cause, how is it—*a.* That the delicate skins of children and infants escaped in so marked a manner, while the proneness to the disease increased *pari passu* with advancing years. *b.* That the parts first attacked by no means always correspond with the parts most exposed to these influences. A considerable number started on the back, chest, or abdomen. *c.* That the Marylebone Infirmary, obtaining its food, water, and soap from different sources should, at the same time, be subjected to a precisely similar outbreak as the one we are considering. The question therefore remains: Is the disease due to some obscure epidemic influence such as climate, atmosphere, season, or contagion?

5. *Climatic or Atmospheric Causes.*—It certainly is a remarkable circumstance that the two neighbouring metropolitan infirmaries which are the newest, and which are therefore, if one may say so, renowned for their sanitary perfection, should be simultaneously subjected to the ravages of the disease. A few cases occurred at Lambeth, but nothing like the outbreak at either of the other two. The remaining twenty-two metropolitan infirmaries seem to have been exempt. Dr. Downes stated that those of the rest of England were also exempt.

6. *Season.*—Superficial examination of the occurrence is

somewhat suggestive that an obscure seasonal influence, though certainly not the proximate and only cause, may take some part in the etiology, for at Paddington the outbreak has been strictly limited to the summer and autumn months, and has now spent its virulence. Further, Mr. Lunn and Dr. Richards stated⁸ that cases of a similar disease occurred at the Marylebone Infirmary and Hanwell Asylum respectively last autumn (1890), only of a milder type, and fewer in number. The following table shows the numbers which were attacked in the various months, from which it will be seen that the greatest number occurred in July and August.

	May.	June.	July.	August.	September.	October.
Males	2 (?)	11	37	29	6	4
Females	0	9	22	27	9	7
Totals	2	20	59	56	15	11

Note.—This table may need revision.

7. *Contagion.*—There are many features in which this malady resembles a specific infectious disease, but the absence of pyrexia almost alone forbids its being grouped with this class of disorder. The absence of fever is a point of considerable interest, and will merit further investigation. Nevertheless, there are certain features in the clinical history of the epidemic, and of the cases, which support the view that it is contagious, and due to the presence of a specific living organism.

1. The more or less definite course of seven or eight weeks through which the primary attack runs in well-marked cases of the disease.

2. The symptoms of constitutional disturbance which attended the skin lesion.

3. Although, as we have seen, the cases differed widely in detail, the marked general resemblance between them all was a fact which struck the most casual observer, and the inference therefore is that the cause, whatever it be, is specific.

4. These three features, in presence of a cutaneous eruption, complete the resemblance to an eruptive fever.

5. The serpiginous rings with which some of the cases started were almost identical in appearance with *tinea circinata*, a malady known to be due to a living organism.

6. The marked effect of germicides in modifying the skin lesion when applied at an early stage.⁹

7. The wavelike manner in which the outbreak rose and fell, strictly limited to the summer and autumn of months 1891.

8. Clear instances of direct contagion are always difficult to establish, but it is worthy of note that 7 of the 11 persons who, out of the 193 healthy aged inmates of the workhouse proper, contracted the disease, were acting as "helpers" or pauper nurses, tending on, and in direct contact with, patients already suffering from the complaint. The facts that I and my little dog contracted mild but undoubted attacks of the disease are particularly interesting in this connection. Whether the specific organism, which existed so plentifully in some of the cases, is always present remains to be seen.

Nevertheless, the disease is not malignantly contagious, for it does not, as we have seen, attack the sick and healthy indiscriminately. Certain predisposing conditions would seem to be absolutely essential to the propagation of the disease in a well-marked form.

Whether there exists a period of incubation, and whether one attack confers immunity, are questions which cannot be answered at present, but there would seem to be a prodromal period in some cases.

There are certain features which seem to be highly suggestive, though not more than suggestive, that the specific contagion, whatever it be, attacks the unbroken skin, and is introduced into the system by these means:

1. The ringed, serpiginous character of the eruption at the outset, which was definitely observed in five cases.

2. The marked effect of local germicides in controlling the disease, if applied in the early stage of many of the cases, and of absolutely cutting it short in at least one case.

3. The eruption showed a tendency, albeit not invariable, to start on exposed parts, such as the face and ears, and to spread thence.

4. The proneness of the eruption to assume an eczematous character, eczema being the form of skin disease which most often comes from local irritation (for example, "bakers' itch," etc.).

ANATOMY.

The essential lesion is an inflammation of the derma or dermatitis. No other special morbid change was found after death. There is considerable effusion of cells and fluid between the derma and epidermis; and as a result, the latter is shed in flakes, scales, or dust. It always seemed that if, by reason of the thickness of the cuticle, the upward resistance was too great for the fluid to collect around the papillæ into vesicles, therefore vesicles did not form, and no exudation was visible on the surface. Nevertheless, the exudation was there, and it might, as already stated, be discovered, by the aid of a simple lens, on the under surface of the flakes. Under these circumstances, it made its way laterally beneath the cuticle, and caused separation of the latter in flakes of larger size. This was what frequently happened in the skin of the palm, where the epidermis is comparatively thick, and also to a less extent in the general skin of old people, in whom the cuticle is thicker than in childhood, though the derma is atrophied.

This, I take it, was the explanation why the "dry" type should tend to prevail among the old, and the "moist" variety among the middle-aged sufferers. Out of the 89 males available for observation on this point, the average age amongst the "dry" cases was 72, that amongst the "moist" cases 60, the average age amongst all these 89 males being 63.6. Nevertheless, the two types are clearly the result of one and the same pathological change. Fig. 1 represents the entire cuticle of the palm and palmar surface of the fingers of Case M 25 (a man, aged 49) the second case described in the BRITISH MEDICAL JOURNAL.¹⁰ There was very copious formation of vesicles, and exudation on the face, trunk, and flexures of the limbs of this case, and it was evidently one of dermatitis humida. No vesicles were ever visible on his hands, and the only appearance of rash in this position was a uniform redness with tumefaction of the skin. In some cases the cuticle was shed in large flakes like this, sometimes in smaller branlike scales, and sometimes it took the form of impalpable powder. The larger flakes always came from the extremities of the limbs, the smaller from the trunk. It is worth noting that desquamation occurred occasionally in some parts without any previous rash, as in Case M. 38, and like the falling out of the hair in the fourth case narrated in the BRITISH MEDICAL JOURNAL.¹¹

The changes in the derma consisted, in the earlier stage, of a large excess of leucocytes; in the later stage, of a large excess of fibrous tissue.

In most of the fatal cases which were examined after death the lungs revealed intense hypostatic congestion; but, inasmuch as the immediate cause of death was either asthenia (in most cases) or coma, this condition is rather to be regarded as part of the latter than a pathological change proper to the disease.

A Preliminary Note on the Bacteriology.

When the epidemic was at its height I happened to be doing some bacteriological work in Professor Klein's laboratory at the College of State Medicine, where I had the advantage of commencing my investigations under his supervision. The following are a few rough notes, made at the time, of some of the experiments then performed, which, albeit of an incomplete nature, may be of interest to some:

Experiment I.—July 25th. The ear of the patient, M. 12 (the eruption being then at its height, twenty-two days from the commencement) was carefully wiped with cotton-wool dipped in carbolic lotion, 1 in 60, and then pricked with a sterilised needle. After waiting a few minutes a sterilised cover-glass was applied to the exudation, passed through the flame, stained with Weigert's methyl blue, and examined under the microscope. Numerous micrococci seen. A capillary tube filled with the serum taken to the laboratory, and gelatine and agar tubes inoculated. Two organisms obtained by cultivation, one a small mobile bacillus,

¹⁰ Loc. cit.

¹¹ Loc. cit.

⁸ At the discussion at the Medical Society.
⁹ A similar fact of much importance was mentioned by Mr. J. R. Lunn in the discussion. If collodion were applied to a patch of the eruption at an early stage, it checked the progress of the disease.

growing rapidly on and liquefying gelatine, giving a glistening yellowish green culture, evidently bacillus fluorescens, and a coccus growing very much like staphylococcus albus, only smaller and slower.

Subcultures were made from the latter, but unfortunately they became contaminated with bacillus subtilis, and were therefore spoiled.

Experiment 2.—July 29th. Eruption at its height in the patient, M. 17, selected by hazard; twenty-first day of the disease. A good deal of exudation around ears. After the part had been repeatedly wiped with cotton wool, dipped in absolute alcohol, and after waiting for a few minutes for the exudation to appear again, cover-glasses applied to surface, dried over flame, and stained, some in Weigert's methyl blue (aniline solution), some in a watery solution of methyl blue. The latter show scarcely anything, but the former are very instructive. In one place a very few small bacilli¹² seen, granular—that is, the protoplasm in them being segregated—but the prevailing organism is a micrococcus, which is present in vast quantities, some of them larger than others.¹³ Cannot be sure that they are separate kinds because some may have grown more than others. Most of the cocci are in masses; some are free in pairs, and a great many seem to bear a definite relation to the epithelial cells, for they are arranged more or less definitely in the cell, either around its nucleus or in the periphery of the cell. There are also many diplococci or cocci, arranged in masses, in hyaline material, which may be some substance of their own. The following cultivations were made: 2 gelatine streak and 2 stab for cold chamber (20° C.); 2 agar streak and 2 stab cultures for hot chamber (35° C.); 2 broth and 2 potato; also gelatine and agar plates—all labelled β.

July 31st (second day). Gelatine cultivations: surface covered with a delicate powdery film, amongst which are minute tiny white grains seen with a lens, size of a pin's point; no growth in depth. Agar cultivations (hot chamber): both tubes contain extensive crescentic yellow growths with a white edge, having the appearance of staphylococcus aureus.

August 4th (sixth day). Gelatine plate cultivation (cold chamber) shows minute white grains, like grains of sand on surface and in depth, uniformly scattered. Subcultures made. Agar plate (hot chamber) contains two sorts: (1) numerous scattered tiny white colonies, on surface and in depth; (2) cloudy-looking colonies almost solely on surface, not solid looking, more or less irregularly circular, and white. The cloudy colonies under the microscope consist of many myriads of minute diplococci, some dumb-bell shaped and some close together. Brownian movement very active, almost suggesting a mobile organism. The sand-grain colonies do not differ materially from the cloudy colonies under the microscope, only the cocci are apparently more separated, and in some places single cocci can be seen which did not occur in the other.

Subcultures made from cloudy colonies on gelatine and on agar. August 6th (eighth day). Some of the gelatine and agar subcultures just like staphylococcus albus, and some staphylococcus aureus, liquefying the gelatine on the surface, only much less rapidly than a known staphylococcus albus and aureus, which were made on the same day. Some of the subcultures do not liquefy the gelatine at all. In one of the original tubes there is considerable liquefaction, and a greenish fluorescent look, showing under the microscope bacillus fluorescens.

NOTE.—The white paint-looking cultivations did not liquefy gelatine until about the fourteenth or sixteenth day. Those on agar remained permanently like the illustration.

Experiment 3.—July 29th. On the leg of M. 5 (35th day from commencement of attack), was an unbroken vesicle about as big as a millet seed. A carefully sterilised capillary tube was plunged into this and allowed to fill, hermetically sealed, and taken to the laboratory. Some of the serum thus obtained is used for cover-glass specimens, stained in Weigert's methyl blue (aniline solution), and others in a 2 per cent. watery solution of methyl blue. Examined under the microscope are found diplococci, arranged chiefly in the periphery of the protoplasmic cells, and some close around the nuclei. There are also very few free. A few pigment cells from the rete Malpighii are also seen. The following cultivations also made (July 29th) from the serum thus obtained, labelled α:—3 tubes gelatine and placed in a cold oven, 5 tubes agar placed in a hot oven, 1 gelatine plate, and 1 agar plate.

July 31st (second day). Gelatine cultivations: Nothing visible. Agar cultivations: 2 tubes, no growth; 1 tube, circular white growth on surface; 1 tube, two circular yellow growths one-third of an inch in diameter; 1 tube, with one circular yellow growth about half inch in diameter; gelatine plate still quite clear; agar plate, 1 white colony size of a pin's head. Subcultures on gelatine and agar made from this single colony and marked α.

August 4th (sixth day). Original gelatine tubes: One spot of liquefaction in tube 1; two spots in tube 2; no liquefaction in tube 3: a white crescentic growth on surface; all contain diplococci, and all contain cocci, excepting tube 3.

August 6th. The ear of a rabbit inoculated (by Dr. Klein) from subculture of Smith's vesicle (a subculture from plate α 6 days old), which grows like thin white paint on the surface of gelatine without liquefaction.

Next two days the animal showed no signs.

August 9th (fourth day). Not looked at.

August 10th (fifth day). Ears distinctly scurfy, just like "eczema," and slightly red. Parts of the body also covered with minute scurfy scales. Some of these latter taken and inoculated on gelatine and agar. Also some blood from one of the vessels of the ear.

August 16th (eleventh day). The scurfiness and eczematous condition of the ears and skin have somewhat subsided. The animal has appeared in its usual health all along.

August 17th (twelfth day). Animal found dead this morning. No post-mortem signs. No signs of ulcerative endocarditis.

NOTE.—Similar cultivations to those already described were obtained from the epidermal scales, and also from the blood (ante mortem).

August 6th. Subcultures made from plate on July 31st, developing sand-grain and cloudy colonies on surface, some of the gelatine tubes liquefying, some not. None liquefy gelatine so rapidly as common species of staphylococcus albus and aureus, which they otherwise resemble in many respects.

August 8th. Several of the subcultures are probably staphylococcus aureus and albus, but others, though they are white and crescentic, do not liquefy. Plates are growing spherical sand-grain colonies in the depth and cloudy colonies on the surface, like clouds blown by the wind.

Experiment 4.—Exudation taken from patient, M. 22, on August 2nd. Results exactly the same as in Experiment 2.

REMARKS.

Several other experiments were performed (altogether 97 cultures were made), always with the exudation, or serum derived by pricking the skin, and always with the same result. Experiment 3 was the only one in which I was so fortunate as to find an unbroken vesicle. This important circumstance alone is my excuse for publishing such crude results. Specimens of blood, both from living patients and from the heart after death, were procured, hermetically sealed, and set aside for future examination.

But as regards the conclusions to be drawn from the experiments with the serum, whether exuded, obtained from

Fig. 2.—J. C (cultivation on glycerine agar, sixteen days old.

a vesicle, or by pricking, the organisms constantly present were staphylococcus albus, S. aureus (less constant than albus), and another micrococcus. The bacillus fluorescens and B. subtilis were accidental contaminations; but the cocci were uniformly present, and were exceedingly plentiful.

It is a matter for regret that more is not known of the organisms normally present in or on the human skin. The two staphylococci named are, I believe, known to be present on the skin; and at first it seemed as though they were these organisms that we had to deal with. But it may be seen, even from the above rough notes, that several of the cultivations did not behave like ordinary staphylococci.¹⁴

This coccus grew, it is true, on all media, but some of the cultivations did not liquefy gelatine nearly so quickly as S. albus, and some not at all. The surface cultures resembled S. albus in shape and in crescentic outline, as may be seen from the illus-

¹² Shown on cultivation to be bacillus fluorescens.

¹³ Specimen shown at Medical Society, November 30th, 1891.

¹⁴ As described by Ro-enbach and Garré, Microparasites in Disease, New Syd. Soc., Klein, Crookshank, and others.

tration, which represents a culture sixteen days old from a patient, M. 22; but if compared with a cultivation of *S. albus* grown side by side, it seemed to have a whiter, almost a bluish-white, translucent appearance; it was thinner, and the cultures never grew in tiers, such as a *S. albus* culture sometimes does. Plate cultivations of gelatine or agar presented at the end of three to six days two sorts of colonies—cloud-like colonies (resembling cirrus or cirro-stratus), and spherical or sand-grain colonies—which may or may not resemble *S. albus*. But such cultivations were slower to mature than others of *S. albus* made for the sake of comparison, taking about three days in the cold chamber (20° C.), and about five or six days in the hot (35° C.). Under the microscope the cocci were apparently smaller, though this may have been from immaturity, and they seemed specially prone to occur as diplococci; though when met with in masses it is sometimes difficult to tell whether they are cocci or diplococci. I wish to speak with all reservation, because these experiments require extension and control, but it seemed almost as though one had to do either with a new diplococcus, or with a mixture of such and staphylococcus albus; or possibly the phenomena are the result of a modified or unhealthy form of staphylococcus.

These cocci were uniformly present in the serum; whether they are always to be found in the blood, skin, and tissues remains to be seen. The intimate relation which many of them bore to the epithelial cells which adhered to the cover-glasses is another interesting feature, as Professor Klein pointed out.

The experiment with the rabbit is interesting, but standing alone proves nothing. The desquamation of the epidermis, in an animal whose skin was previously quite smooth and healthy, is a suggestive fact, and will serve to indicate the line for further research.

A SUCCESSFUL CASE OF GASTRO-ENTEROSTOMY.

By ARTHUR E. BARKER, F.R.C.S.,
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THE following case of gastro-enterostomy for disease about the pylorus offers sufficient points of interests to justify its publication. It is only the second in which this operation has been performed at University College Hospital within the last five years, which in itself is a point worth noting. It furnishes some evidence as to the frequency with which we may expect to meet with cases in which the patient's condition seems to demand relief by this operation; for though my first case,¹ which was also the first successful one in this country, showed the operation in its best light both as to immediate recovery, relief of distress, and prolongation of life, and so far encouraged us to look out for others in which it might confer a similar benefit, no such case has occurred until the present, although doubtless many instances of malignant disease of the stomach must have been under observation in the hospital within the period mentioned. This tends to confirm an impression I have always had—namely, that gastro-enterostomy will only be called for in a comparatively small proportion of cases of disease about the pylorus; but, on the other hand, I fully believe that in certain cases this operation is capable of giving great relief, and also probably of prolonging life. Other points of interest about the case will best be discussed after it has been described from a clinical point of view.

J. H., aged 55, an engine fitter, was admitted into University College Hospital on June 10th, 1891, under the care of Dr. G. V. Poore. He complained of loss of flesh, anorexia, general weakness, and constipation. Three weeks before admission patient had to take to bed on account of extreme prostration and inability to do his work. He began to feel unwell a year ago, complaining of indigestion and pain in the stomach, and later of vomiting. The latter symptom ceased after a time, but he never regained his digestive powers. There was no family history of cancer, and he has lived well and wholesomely.

After admission he was observed to vomit frequently, and

the ejected matter was sometimes like "coffee grounds." He could take no food except a little milk or cocoa, and complained of epigastric pain. The stomach was moderately distended. The temperature was usually subnormal. On July 1st a tumour the size of a small orange was felt just above the umbilicus. This was hard but fairly movable, and there could be little doubt, in view of the symptoms, that it was a mass of carcinoma about the pylorus obstructing the latter. As the patient was becoming very emaciated and unable to digest any food capable of keeping up his strength, his condition was explained to him by Dr. Poore, and also the possibility of relief by gastro-enterostomy. To this the patient at once responded by asking that the operation should be done as soon as possible. Dr. Poore then kindly placed the case in my hands, and I again explained to the patient, who was a most intelligent man, the whole bearing of his case. He expressed himself as anxious for the operation at once.

Having made all the usual preparations for this operation, first by frequent cleansings of the whole surface of the body, and then by washing out the stomach with hot water in large quantities, followed by a solution of sod. salicylate gr. x to ʒj, the operation was performed on July 10th, at 1.30 P.M., the patient being wrapped up in cotton wool from head to foot—as is the case with all my cases of abdominal operations.

I first made a 4-inch incision in the middle line above the umbilicus, and, having checked all bleeding points, opened the peritoneum. The growth was immediately seen beneath the wound, seated in the anterior wall of the stomach, its centre being about 1½ inch from the pylorus. It was about the size of a small apple. A few adhesions fixed it to the abdominal wall, and these were torn through and the mass was drawn out of the wound with the stomach wall, which was white and considerably puckered over the growth. Feeling sure that the patient, in his very weak state, could not bear the long operation of pylorotomy, I at once proceeded to perform gastro-enterostomy.

The anterior wall of the stomach having been caught up and held by an assistant, I turned the omentum and colon over to the right side, and caught up the jejunum about 12 or 15 inches from its origin, which could be clearly seen by myself and colleagues when the wound was held open. Having then packed the latter with sponges I opened both viscera by incisions about 1½ inch long. Little or no fluid escaped, and what came away was easily taken up by sponges. Senn's decalcified plates were then inserted and brought together in the usual way but with some little difficulty, the silk threads having been crossed by inadvertence. When the latter were drawn tight and knotted it was quite plain that the plates slid over one another laterally, and did not bring the incision directly together one over the other. I therefore sutured the walls of the viscera round the plates by continuous sutures of fine silk. The junction now seemed to be secure, and after careful toilet of the surrounding parts the wound was closed in the usual manner by hard twist silk. The operation lasted from beginning to end exactly 48½ minutes, and the patient bore it on the whole well. When he recovered from the chloroform he expressed himself as feeling much better than he expected. At 8 P.M. he had 2 minims of inj. morph., and at 11 P.M. 2 minims more. There was no sickness at all, temperature 96°, pulse 120.

July 11th, 10 A.M. Temperature 97.6°. Has had no food since operation. Was now ordered ʒj of peptones every two hours, and a peptonised beef and milk suppository every six hours, alternately with an injection of plain hot water at 105° every six hours, only 5 ounces at a time. At 3 P.M., temperature 98.2°. In the evening he passed water for the first time since the operation to the extent of 13 ounces. He looked very weak, but had no pain. For the following night he was allowed ʒij of peptones every two hours by the mouth, alternating with ʒij of water. Rectal feeding as before.

July 12th. Patient is stronger; temperature 98.4°. In addition to former nourishment to take ʒss of arrowroot on water with ʒj of brandy every two hours. In the evening arrowroot stopped, as patient felt distended. Temperature 98.8° (the highest point recorded during convalescence). Two minims of liq. morph. To take ʒss peptones every two hours. Rectal feeding as before.

July 13th. Distinct improvement. Temperature 98.4°, pulse 112. Peptones increased to ʒss every hour.

¹ Vide BRITISH MEDICAL JOURNAL, February 13th, 1886.