"Nov. 13th.—Discharged. Having been refused a pass, he insisted on going out, apparently quite convalescent; but, from the circumstance of his going without leave, not particularly examined before dismissal."

FURTHER OBSERVATIONS

ON

THE POINTS OF RESEMBLANCE BETWEEN CATTLE PLAGUE AND SMALL-POX.

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THE opinion expressed in THE LANCET of Dec. 30th, that the cattle plague may be a malignant form of small-pox, has naturally attracted considerable attention and provoked much discussion. I purpose in this communication to consider certain objections which have been urged against that view, and to adduce additional evidence of an experimental character in its favour.

I. It is alleged that there exists the widest possible difference between the eruptions of cattle plague and small-pox. In my former communication I stated that the eruption in cattle plague is pustular; and, notwithstanding what has been asserted to the contrary, I see no reason to alter this opinion, while I am glad to find that it is confirmed by the independent observations of no less an authority than Mr. Ceely.* I am well aware that the eruption in rinderpest is not identical in every respect with the typical eruption of human variola. The differences are mainly two—viz., (1) the absence of well-developed pus-corporcles, and (2) the absence in most cases of a distinct vesicle preceding the pustular stage. The fluid in the pustules of rinderpest consists of altered epidermal cells, granular matter, and rounded nuclear bodies, evidently derived from the epidermal cells, about the size of pus-corporcles, but differing from them in some particulars. The commonly received notion, however, of the pus-corporcles in a human pustule is that they are nuclear bodies derived from the pre-existing epidermal cells; and we know that even in the ripe pustules of human variola characteristic pus-corporcles are not necessarily present, but the contents occasionally "consist entirely of epidermic scales."† If a thick yellow opaque fluid containing altered epidermal cells and numerous uniform rounded nuclear bodies about the size of pus-corporcles, confined above by a crust or lamina of epidermis, with a corresponding depression in the cutis, and often leaving behind a distinct scar, be not the characters of a pustule, it would be difficult to assign an eruption so constituted to any division of Willan's classification. Again, according to Virchow, the drop of clear fluid in the vesicle of human variola is not an exudation which is converted into pus, but only serves to loosen the rete mucosum;‡ and if this be so, it is obviously not necessary to the development of the variolous pustule. True vesicles, however, are not invariably absent from the eruption of rinderpest, as has been stated. Lancisi long ago observed, "*Haud pauci pellem habent aquosis tuberculis distinctam.*"§ And Mr. Ceely describes acuminate pimples "whose summits soon yield a limpid fluid."

It has been argued that the differences between the skin of cattle and men cannot account for the differences between the eruptions of rinderpest and small-pox, because the eruption of sheep's small-pox agrees with that met with in man. There can be no doubt that the eruption of variola ovina is very different from that of rinderpest, but differences also exist between it and that of man. Among other differences referred to by Professor Simonds, it may be mentioned that the vesicles in sheep rarely become pustular. "The formation of pustules," he says, "ought to be regarded as an adventitious rather than an essential feature of the disease."|| It is necessary to bear in mind that the vaccine virus, like all other animal poisons, may assume very different aspects, which are apt to confuse

observers who look to results rather than to the primary cause. One illustration, having a most important bearing on the subject under discussion, may be cited. The eruption in rinderpest is believed by some observers to be of a purely aphthous character. Now French experimenters have recently shown that true vaccine vesicles may be produced on the udder of a cow by inoculation with matter taken from an "aphthous stomatitis" occurring in the horse. Children have been successfully vaccinated from the eruption thus induced in the cow; so that the conclusion arrived at by several eminent members of the French Academy of Medicine is that "the *maladie aphtheuse*, as it is described by several modern writers on veterinary medicine, is nothing else than variola."*

Lastly: I have only to repeat that the eruption in rinderpest, like that in severe cases of unmodified human variola, consists of three elements—namely: 1, patches of roseola; 2, pustules; 3, petechiæ.

II. It is asserted that the anatomical lesions of the mucous membranes found in rinderpest are foreign to variola. Cases of variola, unmodified by vaccination, are happily at the present day of uncommon occurrence, and are still more rarely examined after death. But if we compare the lesions found in such cases by eminent pathologists with those of the cattle plague, the resemblance is complete. Every writer on small-pox alludes to the frequent occurrence in that disease of inflammation of the respiratory passages. "The condition of the larynx and trachea," says Dr. G. Gregory, "in small-pox, on the eighth day, is unique. The mucous membrane, if then inspected, appears covered with a copious, viscid, puriform secretion of a grey or brownish colour. On detaching this, the membrane itself is seen deeply congested with blood, thickened, pulpy, and, in the worst cases, black and sloughy, exhaling a most offensive odour. These appearances may be traced to the third division of the bronchial tubes."† Dr. Craigie, also, speaks of the interior of the larynx being occasionally "covered with fragments of white membranous coating."‡ Wrisberg found, in most bodies of persons dead of small-pox, the mucous membrane of the whole alimentary canal inflamed, in many affected by gangrene and sphacelus, so that large patches were abraded or converted into dingy-coloured eschars. He speaks also of the intestines as studded with numerous petechial spots, containing dissolved blood extravasated into the cellular tissue.§ In several of the autopsies of small-pox recorded by Reil, the mucous membrane of the stomach and intestine is described as inflamed and gangrenous-looking, and mottled with petechiæ and patches of ecchymosis.|| Dr. Morehead, also, has recorded the autopsy of a case of small-pox with gastritis, where the inner surface of the stomach was coated with lymph, which could be peeled off as a distinct layer.¶ In another case, recorded by Dr. M'Pherson, "the colon was on the eve of gangrene, and studded with small conical ulcers."*** Dr. Craigie describes the genito-urinary mucous membrane in small-pox as reddened and injected; and Reil states that it may even present patches of gangrene. Lastly, it may be added that, in the bodies of several persons who have died of malignant small-pox in the London Fever Hospital, I have found the respiratory, the alimentary, and the genito-urinary mucous membranes all intensely inflamed, and studded with petechiæ and large patches of ecchymosis. The resemblance of these lesions of variola to those of rinderpest, as described in my official report, is so obvious as to require no comment. It must be borne in mind that the remarkable patches of ecchymosis and gangrene found in the third and fourth stomachs of animals that have died of the cattle plague, are far from being invariably present in that disease. Of the stomachs of eight animals examined by me in one day, in only one was there any trace of ulceration or gangrene. It is important to add, that in sheep affected with

* Gaz. Méd. de Paris, Nov. and Dec. 1863, and Brit. and For. Med-Chir. Rev., Jan. 1864, p. 258.

† Lectures on the Eruptive Fevers, 1843, p. 55.

‡ Elements of Practice of Physic. By David Craigie, M.D. 1836. Vol. i., p. 554.

§ In plerisque cadaveribus villosa totius canalıs alimentaris inflammata fuit, in multis gangræna et sphacelo correpta, ut magna villosa frustula abrasa essent, aut in luridas escharas, uti in dysenteris mutata. In multis cadaveribus copiosæ intermixtæ erant maculæ petechiales variæ magnitudinis et coloris, sæpe fusci, sanguinem gangræna resolutum, et vere in cellulosa nervæ tunica extravasatum continentes. — WRISBERG: Comment., vol. i., p. 77.

|| Aperto abdomine amplæ jejuni partes fusco et nigricante colore notatæ conspiciantur. Gangrenosum intestinum te videre crederes, nisi illud reclusum omnino superius, quo duodeno necitur, cum spissa viscida et atroviridi pulve oblita, repertum esset, quæ in transparentibus parietibus, maculas nigricantes extrorsum formabat. — RERI: Memorabil. Clin., Fasc. iii., p. 121.

¶ Clinical Researches on Disease in India, 1st edit., 1856, vol. i., p. 321.

*** Report on Small-pox in Calcutta. By Dr. Duncan Stewart. 1844. p. 82.

* British Medical Journal, Jan. 6th, 1866.

† Clinical Lectures, by Dr. T. K. Chambers, 3rd edition, p. 118.

‡ Cellular Pathology, Chance's translation, p. 447.

§ De Bovilla Peste, 1715, p. 194.

|| Simonds on Variola Ovina, pp. 77 to 80. London, 1848.

variola ovina the mucous membrane of the fourth stomach or *abomasum* "is, in some cases, infiltrated with blood, and ecchymosed."*

III. The odour given off by animals affected with rinderpest has been said to differ from that of human variola. But the perspiration and other secretions of healthy cattle smell very differently from those of man; so that we can readily understand how the same disease may generate very different odours in the two animals. It would be a difficult matter to found any analogy between two diseases on a similarity of odours, but it may be mentioned that a medical practitioner writing to me from the country compared the odour of rinderpest to that of variola several weeks before there was any reason to believe in their identity. The remarkable fact, however, is that any peculiar odour at all is given off in the two diseases.

IV. A very natural objection to the identity of rinderpest and variola is the fact, that the small-pox of the cow, or vaccinia, is commonly regarded as a very mild disease, whereas rinderpest is extremely fatal. Variola vaccina, however, is not of necessity a mild disease.

Cattle in Bengal have long been subject to a malignant small-pox, and it is a significant fact that the natives designate it by the same terms as human variola—viz., *bussunt*, *mhata*, or *gotee*. Mr. Gibson, in a sketch of the province of Guzerat, published in 1838, after speaking of the great prevalence of human variola, remarks, "The same disease is at times very fatal among cattle; they become so weak and feverish as to be unable to eat, in consequence of the effect of the pustular eruption on the lips, tongue, and throat."† English medical men in India have frequently noticed that the human and bovine diseases prevail at the same time, and have come to the conclusion that "variola and *mhata* or *gotee* owe their origin to the same cause."‡ The Committee of the Provincial Medical and Surgical Association, in their Report on Vaccination read at Liverpool in 1839, maintain that the malignant distemper amongst cattle so common in India is the same disease as the cattle plague described by Ramazzini and other Italian writers in the early part of last century; and its resemblance to modern rinderpest is shown further by the fact, that in the Reports of Small-pox in India I have frequently found statements similar to that here quoted from Mr. Monteith, the head of a large tannery in Sealdah—viz., that the hides of cattle dying of the disease "are of less value, on account of their being marked from brands, sores, &c."‡ It may be argued that the disease amongst the cattle in India is not variola, but a different disease—"rinderpest." That it is really small-pox is proved by the fact that human beings have frequently been inoculated with the virus, and that the result has been either cow-pox or severe and even fatal small-pox. In 1837, Mr. Brown, a surgeon in Assam, inoculated four children with matter taken from cattle labouring under a very severe epizootic of *mhata*. He made use of the "scales or scabs taken from the back or abdomen," reducing them to a pulp with water. "In all four, vesicles in every respect resembling, in their progress and when mature, genuine vaccinia made their appearance, and went through the same regular course; the constitutional disturbance on the eighth day only being more severe than I have usually seen it in the latter. From these, many other native children were inoculated, and no doubts of the genuineness of the lymph were excited until two English children were punctured from one of them, and it was then found that small-pox supervened in both of these cases; and this was more than suspected to have happened in many of the native children, who had generally dispersed a few days after the operation, and were not afterwards heard of. One of the English children unhappily died."§ In 1837 another series of inoculations was performed by Mr. Macpherson, in Bengal, "with virus from diseased cows, on which occasion an eruptive complaint of the true variolous nature was produced. The same phenomena were observed at Gawalpara by Mr. Wood. In several of his cases the symptoms were so severe as to excite apprehension that the disease would terminate fatally. He was so strongly impressed with this fact that he thought it would be better to take human small-pox rather than cow small-pox for inoculation when the latter assumes its dangerous and fatal form."|| This severe form of small-pox in cattle is not altogether unknown in England. One instance, which occurred at a dairy in Gloucestershire in 1825, may be cited. "The veterinary

surgeon who saw it described it as an aggravated case of cow-pox, the whole skin from the base of the horn to the end of the tail and to the hoof being covered with the disease. It destroyed the animal, and spread through all the other cows in the dairy—between forty and fifty in number."*

It is generally conceded that human variola and ordinary vaccinia are essentially the same disease. The researches of Mr. Ceely of Aylesbury and Mr. Badcock of Brighton place this beyond a doubt. They have shown that when cattle are inoculated or infected with human variola, the result is ordinary vaccinia; and that when men are inoculated back again with this vaccine matter, they are in future protected from small-pox. Here, then, we have the same disease assuming two very different forms—a mild and a severe one—in man. From the evidence above given, it is obvious that the same thing occurs in cattle. Two circumstances seem to contribute to make small-pox assume the mild form: 1. The introduction of the poison by inoculation, instead of by infection. The knowledge of this fact was the foundation of the old practice of inoculation for small-pox. 2. The main cause, however, is the transmission of the poison from one species of animal to another. We know that human variola produces in the cow ordinary vaccinia, and there are grounds for believing that the vaccinia of the cow came originally from the horse. So also rinderpest, when communicated to sheep and other animals, produces a less fatal disease than in cattle; and the malignant small-pox of Indian cattle produces in man sometimes undoubted variola, but at other times ordinary vaccinia.

V. But, as before stated, the identity of rinderpest and variola can only be determined by experiment. If it can be shown that cattle which have passed through the cow-pox, either naturally or artificially, are proof against the rinderpest, either entirely or in a severe form, not only is the pathological nature of rinderpest solved, but a certain means of preventing it is placed in our hands. Already vaccination is being practised throughout the country from Cornwall to the north of Scotland, so that we shall not have long to wait for a decisive answer to the question. In the meantime, the following cases communicated to me, in support of the view which I have advocated, I believe to be thoroughly reliable.

CASE I.

"Truro, Jan. 6th, 1866.

"Dear Sir,—I send you a fact in support of your theory respecting the cattle plague. At a meeting of the board of directors of the Truro Water Works on Thursday last, Mr. Tweedy, the banker, and our chairman, mentioned the following. He had a short time ago four fine cows. Three are dead, all of decided cattle plague. One is alive and well. This one had, about three years ago, decided cow-pox. The nipples were so sore that she could not be milked, and the girl who milked her had such bad hands from several decided vesicles that she could not work. This cow has been with the diseased ones throughout. Without a word of comment, I send you these facts.

"Believe me, dear Sir, yours very truly,
"Dr. Murchison." "HENRY S. LEVERTON, M.R.C.S.

CASE II.

The particulars of this case were communicated to me by Wilbraham Tollemache, Esq., High Sheriff of Cheshire, and have since been partly published in *The Times*.

"I had a herd of sixteen cows, ten of which had been vaccinated, and six not. The unvaccinated are all dead; the vaccinated are all up to this time healthy and well. The vaccinated and unvaccinated were kept in separate shippons; but the shippons were within twenty yards of each other, and in the same yard. The six smitten cows were immediately separated as soon as they showed the slightest symptoms of uneasiness, and placed in a kind of hospital, where they were treated with the greatest care, and variously according to the directions of several eminent authorities, whose directions were scrupulously observed. They all died notwithstanding. The healthy cows were vaccinated from matter procured from the Vaccine Hospital at the upper part of the tail." (Six were vaccinated on Dec. 16th, and six more on Dec. 28th. Two of the last were seized with rinderpest on the following day, when virtually unvaccinated. In all the remaining ten cows the vaccination was successful, and with lymph procured from them above 200 cows were vaccinated on Jan. 6th in the neighbourhood of Nantwich.) Mr. Tollemache adds: "I purpose in the course of this week to place a vaccinated cow amongst a very infected stock to see if she is susceptible of the disease."

* Ibid.

* Simonds, op. cit., p. 89.

† Transactions of the Medical and Physical Society of Bombay, vol. i., 1838, p. 70.

‡ Report on Small-pox in Calcutta. By Dr. Duncan Stewart. 1844. p. 107. § *Ib.*, p. 148.

|| Report of Section of Provincial Medical and Surgical Association on Vaccination, read at Liverpool 1839, p. 18.

CASE III.

For the particulars of this case I am also indebted to Mr. Tollemache. On Jan. 7th he writes thus:—"This morning a case of no little interest to you was mentioned to me, and it is perfectly reliable. A farmer of the name of Thomas Glassey, residing at Chinnel Farm, Whitechurch, Salop, holds two farms, each of about twenty-five cows. The cow-pox broke out in both farms early in October. The thighs, the briskets, and the udders of the cows were a mass of pimples. The hands of the milkers became quite sore from milking. About the 26th or 27th of December some of Glassey's herd presented appearances of the cattle plague—namely, running from the eyes, which from a watery became a mattery discharge. *The cows are nearly all well now, and are free from all other symptoms of the cattle plague.* I may add, that the disease exists in the most virulent form all round Mr. Glassey's farm, and yet his stock is comparatively unharmed." I have ascertained from Mr. Glassey that the milkers in October had a breaking-out in the face as well as in the hands; and that all his stock are still in perfect health (Jan. 10th). He also tells me that Mr. Cartwright, a veterinary surgeon, had informed him that of several cows in his neighbourhood which were known to have had the cow-pox, all, so far as he knew, had hitherto escaped the rinderpest.

CASE IV.

"St. Andrews, N.B., Jan. 6th, 1866.

"Sir,—I have to-day read your article in THE LANCET of Dec. 30th, on the 'Points of Resemblance between Cattle Plague and Small-pox;' and I imagine I need make no apology for at once communicating to you some facts bearing on this question which I heard the other day from Mr. Spence, of Craigsanquhar, a landed proprietor of this neighbourhood. Mr. Spence had fourteen cattle of different kinds, including several milk cows. During last summer the cows were affected with cow-pox pustules upon their udders. As it was not then a matter of any interest, the other animals were not examined to see whether they also were affected. Ten weeks ago, one of the cattle (*not a cow*) took rinderpest. It was attended by an experienced veterinary surgeon, who also made a post-mortem examination of its carcase, and pronounced the disease to be *undoubted rinderpest*. The beast with rinderpest was three days among the other cattle in a court, and was purging all that time. It was removed from them on the third day, and died in sixty hours after. From that time till now no other animal in Craigsanquhar has taken the disease...

"I am yours truly,

"Dr. Murchison."

JOHN ADAMSON, M.D.

Cows are said to suffer from an eruption of the teats, communicable to the hands of the milkers, but which is different from true vaccinia. Hence it may be argued that, in the above cases, there is no proof that it was not the spurious pox with which the cattle were affected. Still it is sufficiently remarkable that in Case I. the cow so affected was the only one to escape the rinderpest, and in Case III. that the course of the rinderpest was so remarkably modified.

While thanking those gentlemen who have communicated to me the above cases, I would take this opportunity of soliciting from members of the profession further information of a similar character, either in support of the view which I advocate or opposed to it. Many correspondents throughout the country are helping in the great national experiment which is now being carried on, and I trust ere long to have fresh facts to communicate.

For the information of many gentlemen who have written to me on the matter, I wish to state that it is extremely difficult to produce vaccinia in cows by inoculation of the lymph of human variola; for one case that succeeds, very many will fail. Vaccine lymph from a child is more likely to succeed; but that which is most certain of all is lymph from the cow itself (not the virus of rinderpest, but of ordinary vaccinia). Authorities are divided as to the frequency with which vaccinia can be artificially induced in the cow. Some say that it is done with ease; others, with difficulty. I am informed by Mr. Marson, of the Small-pox Hospital, however, that if lymph from the cow, which has not passed through the human subject, be employed, there ought to be no great difficulty in the matter. The punctures may be made on the teats, but better at the sides of the vulva, care being taken to select a spot which is not likely to be rubbed by the tail. I need scarcely add that, before drawing conclusions as to the immunity or non-immunity from cattle plague attained from vaccination, it is necessary to be certain, not merely that the operation has been performed, but that it has been successful.

Wimpole-street, Jan. 8th, 1866.

CASE OF SUDDEN DEATH BY CHOKING:

PARALYSIS OF MUSCLES OF DEGLUTITION AS A
SEQUEL TO DIPHTHERIA.

BY R. UVEDALE WEST, M.D., F.R.C.S. EDIN.

PARTIAL or local paralysis has frequently been observed as one of the sequelæ of diphtheria. This paralysis shows itself in various ways, and is as variously accounted for by writers who have observed and described it. Thus (I quote from the "Bibliographical Appendix" to the New Sydenham Society's volume "Memoirs on Diphtheria") :—1. Hamilton, in 1826 (*Edinburgh Journal of Medical Science*, vol. ii., p. 235), "On a Peculiar Modification of Sore-throat which occasionally affects Children," notices, as one mode of fatal termination, "a sinking of the animal powers attributable to the paralyzing effect produced by the absorbed morbid secretions upon the respiratory nerves." 2. J. H. Hoffman, in 1831 (*Rust's Magazin*, b. xxxiii., s. 341), describes "a severe case of diphtheritis followed by paralysis of the nerves of the senses, but eventually recovering." 3. Landsberg, in 1844 (*Hufeland's Journal*, b. xcvi., s. 3), asks the question, "whether the inflamed condition of the nerves was an accidental or essential feature....the diphtheritis being, in the latter case, a neurophlogosis, as it is considered to be by Schönlein." 4. Morisseau, in 1851 (*L'Union Médicale*, No. 126), describes five cases of paralysis of the velum, following diphtheritis, four of them, in adults, yielding to galvanism, the other lasting many years. 5. Trousseau and Lasègue, in the same year (*L'Union Médicale*, No. 5), mention paralysis of the soft palate as a sequence of diphtherite. 6. Dehaennes, in 1857 (*L'Union Médicale*, No. 41), "Nouvelle observation pour servir à l'histoire des accidents consécutifs de l'angine couenneuse," relates his own case, in which the diphtheritis was followed by partial paralysis of the muscles of deglutition. 7. Faure, in the same year (*L'Union Médicale*, Nos. 15 and 16), treats especially of the paralytic symptoms remaining after the diphtheritis is cured. 8. Gull, in 1858 (THE LANCET, July, p. 4), "Lesion of the Nerves of the Neck and of the Cervical Segments of the Cord after Faucial Diphtherite." In this form of the disease Dr. Gull believes that death may be caused by asthenia, induced by the injury done to the nerves through inflammation of the areolar tissue of the neck. 9. Kingsford, in the same year (THE LANCET, Nov., p. 484), refers to the local paralysis which sometimes follows the disease, recommending enemata to be resorted to as soon as insufficient food is taken. 10. Sellérier, in the same year, in a paper entitled "Paralysie suite de l'Angine Couenneuse" (*Gazette Hebdomadaire*, t. v., p. 107), gives brief notes of three cases of consequent paralysis occurring in adults.

The list given above would seem to comprise an enumeration of all the cases of consecutive paralysis on record up to the date of the publication of the volume from which I have extracted them, 1859. I have numbered them for facility of reference. The two cases which I will presently relate supply us with other varieties in the phenomena or symptoms of this peculiar sequence of diphtheria; the former, it is true, appearing to resemble No. 9—a full report of which I regret is not accessible to me,—the latter differing from them all by having had a termination probably unprecedented, although resembling in other respects Nos. 4, 5, 6, and 9.

In addition to the causes assigned by the writers above-named for the paralysis following diphtheria, such as (1) *morbid absorption*, (3) *inflammation of the nerves themselves*, (8) *inflammation of the areolar tissue "injuring" (compressing?) the nerves*, I find that Dr. Copland, in his recently published abridged Dictionary of Medicine, art. "Diphtheria," attributes the paralysis to a waste of the nervous tissue brought about by the anæmic and other deteriorations of the blood which constitute the primary pathology of the disease. And such, I would venture to think, is as nearly as possible the true explanation. Diphtheria is surely a specific disease. It has its specific sequelæ. And I think there is as much specificity in diphtheria and in its sequel, paralysis, as there is in "mumps"—cynanche parotidæa—and its frequent sequel, orchitis. For at the first view there would seem to be as little pathological connexion between sore-throat and paralysis as there is between mumps and an inflamed testicle.