have no boundaries which will serve to delimit the territories of the various functions."

[That the fissures may be accepted as homological land-marks was shown by diagrams (most of which were copied from Krueg's papers) of developing and adult brains.]

"If, however, we allow that the amount of brain-substance is the only test of its working capability, and that the fissures are an absolute guide to relative amount, we still have many difficulties to overcome before we can answer our original question. We cannot find two animals of the same order and the same family, which differ from one another strongly in some single feature; the sense of smell, for instance. The difference in the development of the sense of smell will point to wide differences in habit, necessitating great differences in general structure; and when comparing animals phylogenetically remote, we have to take into consideration the family type of brain-structure. We have to see the special divergence in development through the divergence in type, and it is only when we are thoroughly conversant with the type-structure that we can presume to point out particular aberrations from it, coincident with the sensory or muscular peculiarities of the animal.

"Again, there is a difficulty in comparing brains of different size, for this alone affects not only the depth, length, and complexity of the fissures, but also their position upon the mantle; which in larger brains rolls in towards the longitudinal fissure (pronation), in small brains rolls outwards on to the convex surface (supination). Notwithstanding these difficulties, it is impossible to resist the conclusion, that there is a distinct correspondence between the size of the various peripheral nerves and of particular regions of the cortex respectively."

[The lectures were illustrated with diagrams, and with numerous specimens from the exceedingly rich collection of brains in the Hunterian Museum. Without these, it is almost impossible to follow up the conclusions of the lecturer in detail. The brains principally chosen were from the ungulate and carnivorous types. Herbivora, it was pointed out, depend for safety almost entirely upon the eye, and upon rapidly repeated but simple movements of the limbs; carnivora depend for their food upon the sense of smell, and upon complex co-ordinated movements of the whole body. Pointing to a drawing of the cat's brain, the lecturer remarked that the cat was the last animal he would have chosen as a typical carnivore; he attempted to obtain a supply of foetal and new-born foxes, but found that landowners have a superstitious veneration for this vermin. Kittens were, however, abundant, and he was obliged to have recourse to them *faute de mieux*. In one respect the cat is an admirable representative of its order; its complex muscularity is beautifully exhibited, as "it bursts all claws upon its foe." Of its mental attributes, he was not prepared to attempt an analysis, but he would remark that we are too much in the habit of projecting our own inner consciousness into the lower animals, we imagine that they feel and think as we do. Thought is the comparison of sensations, and while we speak of our own idle reveries as pleasant pictures, we ought to refer to those of the dog as suggestive smells. With great muscularity is associated a large sigmoid gyrus. Animals in whose daily life sensations of smell play a large part present long brains, with considerable development of the gyrus hippocampi, and of a part of the temporo-sphenoid lobes; the prolongation forwards of the latter over the fossa Sylvii being very characteristic. The development of the inner part of the occipital lobes varies with the sense of sight. Particular attention was called to the brain of the pig, as intermediate in many respects between the ungulate and carnivorous types, and the departure from its own class was correlated with the small size of its eyes, and the use of its nose in seeking food. Any attempt at an exact delimitation of the different areas on anatomical grounds is impossible, until a method has been invented by which the percentage superficies of different regions can be obtained in a large number of brains.]

FURTHER NOTE ON RHINOSCLEROMA.

By MORELL MACKENZIE, M.D. Lond.,

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THE case of rhinoscleroma which was described by Drs. Payne and Semon at the last meeting of the Pathological Society (see BRITISH MEDICAL JOURNAL, March 7th, p. 485) having been for a short time under my observation, a few remarks from me upon it may not be inappropriate.

Señor L. was placed under my care towards the end of last December by a Spanish gentleman resident in London. The case was one of especial interest to me, as being the first example of rhino-

scleroma which had come before me, and also because it had formed the subject of a valuable communication from Professor Cornil (see *Progrès Médical*, July 28th, 1883), to which I had been indebted in my published account of the disease (*Manual of Diseases of the Throat and Nose*, vol. ii, p. 416). There was no family delicacy of any kind, and the patient himself had enjoyed good health until the beginning of his present ailment, which had first shown itself four years before, and had slowly but steadily gained ground ever since. The patient looked older than he really was (18), and had a sallow, unhealthy complexion. His general appearance was far from robust. He stated, however, that, with the exception of the local trouble, he felt perfectly well. He ate and slept normally, and was free from pain, except when the affected parts were touched. There was occasional spontaneous bleeding from the nose, but never to the extent of more than a few drops at a time. His chief sources of annoyance were the complete obstruction of the nasal passages at the posterior part, and a slight but constant discharge from the anterior nares. The voice was decidedly "nasal" in tone, and the utterance was thick and indistinct. He had no dyspnoea, no cough; there was neither pain nor difficulty in swallowing. The sense of smell was almost entirely lost.

On inspection, the nose was plainly seen to be much thickened, especially about the alæ, and across the bridge. On the upper lip, close to the openings of the nostrils, were two small slightly raised patches, red in colour, smooth and glossy on the surface, and having the appearance of scars. The nostrils were altered in shape, being almost circular, and quite rigid, owing to thickening and induration of their margins. On looking into the nasal fosse, the septum was seen to be almost completely destroyed. The two fosse thus formed, practically, one cavity, the walls of which were irregular and roughened throughout with new growth. The neoplasm was firm and inelastic to the touch, but not absolutely hard. It gave, indeed, a sensation resembling that caused by glue that is not quite "set;" a comparison, moreover, which was naturally suggested by the somewhat glutinous appearance of the surface. Here and there the nasal walls were excoriated, and in several places shreds of thick mucus and blood-stained crusts were adherent to them. The whole cavity was exquisitely tender, and bled easily when touched. Pressure on the outside of the nose was also very painful, especially at the bridge. The posterior nares were blocked up by masses of growth springing from the septum on each side, and spreading some little way into the nasopharyngeal space along the posterior surface of the velum.

On looking into the mouth, the uvula was found to have completely disappeared, and the soft palate was partially destroyed in the middle line, so that it looked somewhat like a pointed arch across the fauces. The whole substance of the velum was thickened and rigid, and its anterior surface had a scarred and shrunken appearance. There was some ulceration along its lower edge, more particularly on the left side, where the margin had a bevelled look, owing to the anterior layer being rather more eroded than the posterior. The ulceration extended on that side to the fauces along the anterior pillar, which was thickened, especially at its junction with the side of the tongue. Owing to this, probably, the mobility of that organ was somewhat impaired, and the patient complained of great pain when it was pulled forwards or pushed down.

Laryngoscopic examination showed the other parts of the throat to be quite normal.

TREATMENT.—This had consisted in attempts to destroy the new growth with the galvano-cautery and various caustic agents. Interstitial injections of salicylic acid—said by Ed. Lang (*Wien. Med. Wochenschrift*, No. 24, 1883) to have been successful in his hands—had also been tried. None of the various measures adopted had apparently in any way checked the progress of the disease. My own endeavours were entirely directed to the relief of what the patient stated to be his most troublesome symptom—namely, the stoppage in the nasal passages. With this view, I attempted to force a way into the nasopharynx with the galvano-cautery. The patient having been placed under the influence of ether by Mr. Bailey, I succeeded in penetrating the obstructing mass with a large porcelain-knobbed electrode. A pretty free passage for the air was thus established on the left, and also, as I believed at the time, on the right, side. After a day or two, however, it was found that, whilst the left side was in a very satisfactory state, the right was still impervious. The patient was with much difficulty, induced to submit to a second operation, when I renewed my previous attempt, but without succeeding in destroying the obstacle. The patient declared himself so much satisfied with the comparative freedom of nasal respiration which he now enjoyed, that he declined to have anything further done; otherwise, I had intended to destroy the tissue with a dentist's drill, as modified for use within the nose by Dr. Goodwillie of New York (*Medical Record*, New York.

November 12th, 1881). Señor L. was directed, before his departure from England, to provide himself with a set of my nasal bougies, with which he was instructed to keep the passage as thoroughly dilated as possible.

THE CHOLERA COMMA-BACILLUS, AND ITS FUNCTIONS.

By G. F. DOWDESWELL, M.A., etc.

TOWARDS the end of last year, I obtained from Dr. Roux, of Paris, through the kind intervention of Dr. Maddox, cultivations of the so-called cholera comma-bacillus, with a view to ascertaining whether it possesses any specific action on the lower animals, as asserted by MM. Nicati and Rietsch, and others. I found the organism to be identically similar to that of preparations obtained from Dr. Koch, and its habit of growth in artificial cultivations, in all essential points, the same as described by him. In nutrient gelatine, of various composition—pepton, with and without sugar, *bouillon* of pork, beef, or rabbit, with or without the admixture of sodic chloride (Dr. Miguel's formula)—it grew in the typical manner described by Koch (*Deutsch. Med. Woch.*, 1884, p. 191, etc.); as readily, however, in neutral as in faintly alkaline media, whether liquid or solid, at temperatures ranging from 10° to 14° Cent., or at 35° to 37° Cent., beyond which I have not tried it. In different conditions of temperature and nutrition, the form and habit of growth of this organism are subject to greater modifications even than in the case of most others. The occurrence in certain conditions, of multiplication by longitudinal fission, as observed and described by Dr. Klein, is one of the most remarkable circumstances yet recorded in the morphology of the lower fungi, and would alone render this microbe worthy of further most careful study and observation, not only from a pathological, but from a biological, point of view, in respect to the weighty question of the constancy of species, and the occurrence of variations of form and function; these will be more fully described hereafter, in relation to the question whether its characters prove it to be specifically distinct from all other similar forms. It stains readily with the usual aniline dyes, both blues and reds.

Continuing the cultivations obtained from Paris through some "generations," as a first experiment, a rabbit and two guinea-pigs were injected, the former with three divisions (one division equals 0.09 cubic centimetres), and the latter with two each, of a Pravaz's syringe, of a liquefied gelatine-culture of the microbe, into the duodenum, a small incision being made in the abdominal wall to the right of the median line, and a loop of the intestine drawn out, under narcosis. The operation throughout was performed, under strict antiseptic precautions, by the Brown Professor of Pathology, Mr. Victor Horsley, whom I have to thank for the facilities and aid he has afforded me in these investigations. The following day, all the animals were feeding well, and apparently unaffected; the rectal temperature in the rabbit and one guinea-pig was unaltered; in the other guinea-pig, it had risen about 1.0° Fahr., to 102.2°, and, on the second morning, in this animal, to 103.0° Fahr., from which it fell on the following day to the normal, the two other animals remaining unaffected in any way, while kept under close observation for fourteen days; in each case, the wound in the abdominal wall healed by first intention, and produced no inconvenience in any respect.

The next experiment, some days subsequently, was likewise upon a rabbit and two guinea-pigs, using about the same quantities of an active recent cultivation of the microbe, the operation being performed by Mr. Horsley in a similar manner to the former. In this case, there was no appreciable variation in temperature, or other disturbance, in any one of the animals used, and the operation seemed in no wise to have deranged them after the effects of the anæsthetic had passed off.

After four days, one of the guinea-pigs, which had continued perfectly unaffected, was killed, and the intestine examined. The site of puncture was perceptible in the duodenum, and there was a slight hyperæmia of the muscular coat in its vicinity; the mucous membrane was healthy, and the contents of the intestine quite normal, the feces, in the lower part, being as firm as usual. The other guinea-pig and the rabbit remained perfectly unaffected as long as observed. After this, a terrier dog was, in similar manner, under narcosis, injected into the ileum with three divisions of a syringeful of

a cultivation; the effects of the ether used were somewhat prolonged. The next morning the animal was dull, and fed but little. The rectal temperature was 103.2° Fahr., but on the second morning it was again normal, the animal feeding as usual, and unaffected in any way, as it remained till ultimately killed. Subsequently, the injection was repeated in another dog in similar manner, and also in a rabbit, each receiving two divisions of a syringe of an active cultivation. Both these animals recovered rapidly from the effects of the operation, and the next morning were as well in all respects as previously. The rabbit was then killed and examined; the puncture of the needle was not perceptible, but around its site the outer coat of the intestine was slightly hyperæmic; beyond this, nothing was to be observed. The feces were perfectly normal, and firm in the lower intestine. The dog remained unaffected in any way.

In these injections, the cultivations employed were liquefied gelatine. In each case they were examined microscopically, and found to be pure and active; their purity, too, was readily shown by their macroscopic characters; they were of different ages, four days, fourteen days, and one month.

An injection, in similar manner, was also made in another guinea-pig, but the animal never recovered the effects of the anæsthetic and the shock, and died within about four hours. On examination, pronounced peritonitis was observed, with a considerable effusion of serum with numerous red blood-corpuscles; the fecal matter was normal and firm as usual. A further experiment was made by feeding the dog last mentioned and two guinea-pigs with liquefied gelatine-cultivations of the microbe, the dog receiving about one cubic centimetre of it, and the guinea-pigs each about half that quantity. Twenty-four hours afterwards, one guinea-pig was killed, and the stomach and intestine minutely examined. Neither in the stomach nor in the duodenum, the reaction of which was neutral, was a single comma-bacillus to be found, and in the jejunum and ileum only one or two here and there, but very rare. Amongst the large numbers of septic organisms, in different spots of the large intestine, it was the same thing, one or two here and there, but never more. The next day, forty-eight hours after they had been fed with the cultivations, the other guinea-pig and the dog were killed, and examined in a similar manner, but in neither was a single comma to be found.

In another experiment, two guinea-pigs, both starved for twelve hours previously, received each by injection into the duodenum 0.10 cubic centimetre of an active cultivation of the microbe. No. 1 never recovered the effects of the operation, was dying in the evening, and found dead the next morning. On examination, the stomach and small intestine were found devoid of food, and only some feces, which were quite normal, in the lower bowel; the puncture of the needle in the duodenum was not perceptible, its outer coat was somewhat inflamed, with considerable desquamation of the mucous membrane; its reaction was distinctly alkaline. Examined by the microscope, a few commas were observed here and there, but not in any number; only one or two in several fields of view, and none in the jejunum or ileum. The animal had evidently died from the effects of the operation and exhaustion; but even under these conditions of depression of the vital powers, the microbe had not developed to any extent. The other animal operated upon recovered, though slowly, and by the evening was running about and feeding. The next morning, it was killed; the incision in the abdomen had not healed as usual, the dressing was displaced somewhat, apparently by the animal scratching at it; the duodenum was slightly inflamed externally, but the mucous membrane was healthy; the puncture of the needle was not perceptible. In the stomach was a little partially digested food, but the animal did not appear to have fed as much as usual. Neither in the duodenum, the reaction of which was faintly alkaline, nor in the rest of the small intestine, could a single comma be observed with the microscope amongst the other microbes.¹ The contents of the intestine were perfectly normal.

The result of these experiments appears to show clearly that the microbe here in question is not pathogenic when injected directly into the small intestine of the animals here employed, and with the results of feeding, raise a presumption that it does not find a congenial soil for development in this situation. It is, too, well known to all who have resided in India, that dogs and pigs at least, are not susceptible to this disease by feeding on choleraic excreta; for, throughout the native towns and villages, in the absence of any latrines and sewers, these animals are the principal scavengers, but possess perfect

¹ There is often to be met with, in the intestines of these animals, a comparatively large curved cell, apparently fungoid, but two or three times the size of Koch's commas, less thick in proportion, and more acuminate; it cannot be confounded with the latter; their occurrence, in moderate numbers—five, ten or more in a field, is frequent but not universal.