open, somewhat relaxed; motions greyish-white in colour. She is very restless, and gets but little sleep. The urine is very dark, and contains bile. The liver is felt below the ribs; the upper line of dullness is lower than natural (at seventh rib) owing to increased lung resonance, so that the liver dullness only measures vertically three inches in the nipple line. At the junction of the umbilical and right lumbar regions, and about three inches from the edge of the right ribs, a hard mass about the size of a large walnut is felt on deep pressure; it is somewhat tender and quite immovable. Ordered iced milk, milk and soda-water in small quantities with brandy, and a mixture containing bismuth, hydrocyanic acid, and opium.

Oct. 15th: Sickness somewhat less. Has kept a little down. Medicine has not been returned.—17th: Not so well; sickness is worse; has not been able to keep anything down. Ordered nutrient enemata of beef-tea, egg and brandy, three times a day.—19th: Sickness still continues; is very restless; cannot sleep at night. Ordered white of egg by mouth, as well as the enemata, also a pill containing half a grain of opium every four hours.—20th: No diminution in sickness. Ordered an effervescing draught, with hydrocyanic acid and opium.—21st: She is much worse, and in a semi-unconscious condition, from which she can be roused to a certain extent. No sickness since 3 A.M.; pulse frequent and very feeble. Ordered two drachms of brandy every hour. From this condition she never rallied, but, becoming more unconscious, died at 5 P.M.

Necropsy.—Body fairly well nourished; skin and conjunctivæ intensely jaundiced. On opening the abdomen, a good layer of fat was noticed in the abdominal wall. The liver was seen to project about an inch below the edge of the right ribs; it was somewhat larger than natural, and the increase was most marked in the left lobe. On section, the central zone was well marked, the outer being pale. The gall-bladder was small, and adherent to the under surface of the liver; its walls were much thickened. On opening it, it was found to contain about a tablespoonful of thick greenish fluid, and thirteen or fourteen gall-stones, varying in size from a small pea to that of a hazel-nut; most of the stones were marked by facets. The cystic duct was much dilated, and contained two gall-stones about the size of small hazel-nuts. The common bile-duct was much dilated, and was at least as large as a man's thumb. At the point of entrance into the duodenum three large gall-stones were impacted in a triangular fashion, two being in front and one behind; they completely blocked the opening into the duodenum, were of the size of large hazel-nuts, angular, and marked by facets; the remainder of the common duct contained three stones, rather smaller than these. The hepatic duct was dilated, and contained two stones, which were angular and marked by facets. The duct from the left lobe was much dilated, and contained one stone about the size of a large pea; the duct from the right lobe was not much larger than natural, and contained no stone. The spleen was congested and very friable. The kidneys were slightly puckered, and the capsules somewhat adherent. The glands in the lumbar region lying to the right of the bodies of the vertebrae, and behind the duodenum and head of the pancreas, were converted into a hard calcareous mass about the size of a walnut. There was no bile stain on the mucous membrane of the duodenum.

Remarks.—The rarity of death from impaction of gall-stones uncomplicated by other disease alone makes this case interesting, only two cases being quoted in Murchison's "Diseases of the Liver," and these do not occur in his own experience. The diagnosis was in some degree complicated, owing to the small tumour felt at the junction of the umbilical and right lumbar regions. This, which proved to be a calcareous mass of glands, suggested some malignant disease of the pylorus, duodenum, or head of pancreas; but the character of the pain, the interval between the patient's illnesses, and the freedom from symptoms, together with the fact that there was comparatively very little loss of flesh, pointed to gall-stones as the chief element in the case. Another point of interest was the cessation of pain for so long a period before death, without any improvement in her other symptoms. Then there was no enlargement of the gall-bladder, owing to the obstruction of the cystic duct—a point which usually helps the diagnosis. As to the immediate cause of death, it was no doubt due to cholæmia and the exhaustion consequent upon the continued sickness. Bile had evidently not entered the intestines for some time. In conclusion, could anything have been done in the way of an

operation (cholecystotomy) in this case? In my opinion decidedly not, as the gall-bladder was small and firmly adherent to the under surface of the liver.

Brixton-hill, S.W.

GOITRE IN ANIMALS.

By ALLEN THOMSON SLOAN, M.D. EDIN.

THE question of goitre among animals appears to have been little studied, and it is difficult to get any literature on the subject. For my present information I am indebted to the works of St. Lager and Baillarger, and also to the kindness of Principals Williams and Walley of the Veterinary Colleges, Edinburgh, whose opinions, however, are rather opposed to each other. According to St. Lager, the thyroid gland exists in all mammiferous animals, birds, and reptiles. It is wanting among many fish—such as the perch, mackerel, salmon, herring, turbot, and sole; but it exists in the carp, sturgeon, eel, and shark. In many mammals—as the camel, alpaca, nyghau, hartebeest, dog, warthog, porcupine, and kangaroo—the isthmus is wanting, and the two lateral lobes are quite disconnected; whilst in the female carnivora the isthmus is very small in relation to the size of the lateral lobes (Turner).

Naturalists have wrongly applied the term "goitre" to the enlargement of the throat seen in certain reptiles—such as the chameleon, iguanas, lizards, and some species of toads. Among these the skin of the neck hangs down in projecting folds. The term "goitre" has also been applied to the swollen necks found in certain birds—such as the pouter pigeon, the cormorant, the pelican, and some vultures, all of which have enlargement of the throat quite distinct from the thyroid gland. Aristotle, Pliny, Galen, and Ætius have remarked that pigs are subject to swellings of the glands of the neck. Galen expresses himself thus: "Graeci strumas appellant χοιραδες a porcis in quorum gutture adenosi quidam tumores reperiuntur." Paul D'Egine said that these referred to scrofulous tumours, but Pliny, in his Natural History, says positively that pigs are subject to goitre owing to the bad water they drink. Vegèce, in his "Treatise on the Veterinary Art," speaks of scrofulous tumours of the parotid, and goitres which are seen sometimes in mares. Goitre has been seen in dogs and pigs in many parts of Switzerland by various observers. It has been noticed in sheep and cattle in Switzerland, Wurtemberg, the valley of the Danube, in the Himalayas, in Siberia, in Brazil, and the United States. Rudolph and Rupp have seen hyænas goitrous. Gustave Ruddé has seen in Siberia, near the Chinese frontiers, antelopes with goitre. He thought at first they formed a new species, and called it "antelope gutturosa"; but as he only saw them in districts where goitre also affected man, and not in those where it was absent, he came to the conclusion that it was pathological.

In Russia, Central America, the United States, and in the Canton of Geneva horses have been seen goitrous. M. Baillarger, in a paper read before the French Academy of Sciences,¹ gives the result of his researches undertaken in the departments of the Savoy and of the Isère. In many localities in Maurienne, St. Jean, and St. Michael, he found among mules hypertrophy of the thyroid gland in much greater proportion than among man. In a stable of Modane, out of twenty mules nineteen had goitre. In the department of Isère, out of thirty mules employed in the mining works no less than twenty-three had goitre. In the normal state the thyroid gland of mules is about the size of a chestnut, but in these cases it had attained the size of a hen's or turkey's egg. As a rule, the goitres were very movable and caused no pain; but in three cases they compressed the trachea, and produced breathlessness during strong muscular effort, causing the animals to kick. The hypertrophy affected both lobes of the gland, or one only, and in the latter case more often the left. At Allevard, Dr. Niepce confirmed these observations. The existence among mules of a special tendency to hypertrophy of the thyroid seems to be placed beyond doubt, and does not exist to the same degree among other domestic animals. Horses are often attacked with goitre, but the proportion is much less. In certain conditions, however.

¹ Sur le Goitre des Animaux. Compte Rendu, Académie des Sciences, 1862.

the frequency is very great. At St. Jean de Maurienne four out of seven horses of the gendarmes were affected with goitre after a residence of less than two years in the place. This case was all the more remarkable because these horses were well fed, carefully groomed, and kept in a well-lighted and well-ventilated stable. After horses, dogs are most liable to hypertrophy of the thyroid. Finally, one finds it in cats, cows, sheep, goats, and pigs. It is impossible not to attach goitre in animals to the same endemic causes which produce it in man. Among a great number of these animals in Swiss localities, it was rare to find a thyroid of normal size. Professors of veterinary medicine have considered goitre excessively rare among animals. I believe this rarity only exists in healthy localities, but it is otherwise where goitre and cretinism are endemic. It is difficult to account for its special prevalence among mules, but it is interesting to note its occurrence among sterile animals, when sterility is one of the characters of cretinism. In regard to cretinism few observations have been made. Raynard has seen in goitrous dogs a stupidity comparable to idiocy, and Rougieux has observed the same degradation in dogs and horses. St. Lager asked several persons who possessed goitrous animals in Savoy, Switzerland, and Piedmont, and all have assured him that the hair becomes rough and coarse, the voice hoarse, and the memory obliterated. They become lazy, and finally reach a state of torpor which it is quite justifiable to compare to cretinism. Most interesting are the above observations when viewed in the light of the recent experiments of Mr. Victor Horsley, who, in showing the relative value of the thyroid gland in different animals, demonstrated how its removal produced sooner or later grave nervous effects in the donkey, pig, cat, and dog, according to the functional importance of the gland in each.² Alibert says that sheep and calves not unfrequently die from the effects of goitre.

Observers in India confirm the fact that goitre affects animals in those countries where it is endemic. Thus Mr. Greenhow³ says: "At Hissaurpore, a village on the Surjoo, about twelve miles distant from Seerora, dogs and other animals are affected with goitre. Mr. Bramley⁴ noticed the same curious circumstance in Nepaul, for he mentions, "on one occasion a goat brought forth a kid with a goitre as large as its head." Puppies of a month old, bred from English dogs, are very frequently affected by it, as are also lambs." In 1824 he observed this tumour in camels at Purneah, and crows are likewise said to be affected with it at the same place. Dr. Campbell⁵ has seen horses and lambs goitrous on the borders of Gunduk, and also many animals in Nepaul, among others buffaloes. Dr. MacClelland reports its occurrence among dogs and cats in the Himalayas. While Mr. Brett, in his "Surgery of India," says: "Bronchocele is congenital in animals in Nepaul; almost the moment the animal is born it expires"—a fact noted also by Dr. Campbell.

Principal Walley of the Dick Veterinary College, Edinburgh, is of opinion that goitre in animals is an extremely rare disease, and that the cases reported have been generally mistaken for struma. In horses especially it seldom occurs, and these also are very free from struma. The only typical case of goitre he has seen was in a horse belonging to the late Emperor Napoleon, which was bought by Mr. Pender, M.P. for Wick. Owing to the enlarged thyroid the animal was afflicted with "roaring," so its removal was attempted. During the operation, however, the horse in its struggles broke its back, and had to be killed. Mr. Walley thinks that true cases of goitre do occur among pigs, and these of all domestic animals are most commonly affected with scrofula. He considers it rare in dogs and cattle. I have never seen a case of goitre in an animal, but it is interesting to note that in Cumberland, where it exists as endemic disease among man, that cattle are notoriously subject to scrofulous enlargements of the glands of the worst type.

Principal Williams, of the New Veterinary College, Edinburgh, informs me that goitre is prevalent in horses, sheep, and cattle in Derbyshire and some parts of Wales, where magnesian limestone prevails, but that he has seen it pretty common in places quite independent of this. In his practice round about Edinburgh he finds it occasionally occurring in young foals, which fact he associates with bad ventilation. It is sometimes congenital; in one case a mare of his own gave birth to a foal that was goitrous. It is more rare among dogs, though it sometimes affects young ones, disappearing

as they grow older and under treatment. About twelve years ago an epidemic of it affected Lord Polwarth's lambs at Mertoun, Berkshire. In his "Principles and Practice of Veterinary Surgery," he writes thus: "Cysts in the thyroid body constitute bronchocele; they are said to be caused by the water which the animals drink, and that if the water be changed they will disappear. But I have some doubt as to the truth of the statement that bronchocele is solely caused by the presence of magnesian lime in the water, as I have seen well-marked cases in young foals and in large flocks of lambs where this could not possibly be the cause. Doubtless, it is found most abundantly on the magnesian limestone formations; but it cannot be denied that low situations, or a damp atmosphere upon elevated situations, will act as causes of bronchocele."

Both these professors have several times seen the thyroid completely destroyed by inflammation and suppuration, and the animal remain afterwards perfectly well. Neither of them have had any experience in regard to removal of the gland, as cases necessitating this operation are hardly ever met with.

Artificial production of goitre in animals—Various experiments have been made upon animals with the view of artificially producing goitre, but without any trustworthy results. According to St. Lager, both he and Baillarger administered preparations containing carbonate of lime and magnesia to dogs for a period of six months, without any enlargement of the thyroid gland ensuing. The same writer gave dogs and guinea-pigs sulphuret and sulphate of iron and other metallic salts for some months, but with negative results. One day, however, in his own house, he caught a mouse, and to his astonishment it had a goitre, which he thought might have been caused by its eating cinders of a certain coal which contained sulphuret of iron. Accordingly he experimented on a dozen mice, giving them sulphuret and sulphate of iron, baryta, fluorine, and natural bitumen. At the end of three months three only had enlargement of the thyroid perceptible both to sight and touch. These three had added to their food sulphuret and sulphate of iron. Many doctors of Lyons are reported to have seen these animals, but the experiments can hardly be said to be trustworthy or at all convincing. The salts of iron have been long administered in medicine, and for the last few years not only the sulphate but the sulphide of iron have frequently, and for lengthened periods, been given in the treatment of anæmia, with none other than a beneficial effect.

Edinburgh.

GENERALISATIONS REGARDING THE PATHOLOGY OF ABNORMAL GROWTHS IN MAN AND ANIMALS, AND THEIR EXPLA- NATION ON THE EVOLUTION THEORY.

By ALBERT GRESSWELL, B.M., B.A. OXON., M.R.C.S.

No branch of comparative pathology has received more careful study than that which deals with the mode of growth and variations in the histological structure of the various tumours, malignant and benign. In these short notes I propose to restrict myself to a cursory survey of the etiology of abnormal growths, not criticising views which are generally held, and not dealing with the actual or immediate cause, but suggesting a general basis which may be regarded as the ultimate cause to which such abnormal manifestations may probably be traced. In order to clearly explain my meaning and to illustrate it more fully, some remarks of my brothers, Dr. Astley and Professor George Gresswell, may, in the first place, be mentioned.

It may be said that all new formations, as instances of which the enchondromata may be taken, are characterised by the preponderance of cellular elements. These are, of course, variously modified. They may fibrillate, and, further, may be at length calcified; but very rarely, if ever, do they develop into the highest forms of tissue, the muscular and the nervous (Buhl). This latter fact is only to be expected, since the tissues of most important specialisation must necessarily be those which are produced, so to speak, with greatest difficulty. It is a familiar fact that all the tissues of organisms are to be regarded as having their origin in cells. Similarly, too, new formations in man and

² Brown Lectures. THE LANCET, Dec. 18th, 1886.

³ Indian Annals of Medical Science, vol. xii.

⁴ Calcutta Medical Trans., 1833.

⁵ Ibid, 1835.