

sessile, black stinking tumour. It is rounded in outline and flattened, about 6 c.m. in diameter. The surface is thrown into multiple lobes by the many fissures and crevices present. These are filled with greyish-black, smeary, foul smelling substance, mixed with necrotic matter. It is covered by thick, hard, partly dried out scabs, which on being removed with some little force, leave the tumour parenchyma exposed and bleeding profusely. The latter consists of a soft, black mass, streaked in places by the presence of greyish connective tissue. The animal appears to suffer considerable pain when ear is handled.

23.6.27 The tumour is much the same, only it is covered with blood-clots and crusts, evidently bleeds frequently when head shaken or ear knocked against objects. Smear preparations show no spirochaetes but numerous bacteria with racquet shaped spores and cocci.

The dry scabs and the gangrenous matter curetted lightly and tumour generally cleaned. A small piece was then removed for histological examination. The operation was done without anaesthesia, and proved rather painful. The cut surface was extremely vascular and bled profusely, haemorrhage had to be stopped by cautery. The stroma was extremely rich in blood vessels. The tumour was cleaned with tincture of iodine and a protective, suspensory bandage placed on it to prevent unnecessary injury and bleeding. In order to try and get the tumour fairly clean to facilitate transplantation, the whole affected area was kept in a bandage regularly cleaned, bathed, and packed with disinfectants. Many disinfectants were tried, long baths with Dakins solution, Magnocid ichthiol and alcohol, and finally corrosive ^bsuplimate in alcohol strength 1 in 100. The result of all this was that, after two months the tumour had grown tremendously, more than doubled its size, but was as septic as ever.

9.9.27 The newgrowth now presented a pitch black, cauliflower appearance, the size of a man's fist. It evidently caused considerable irritation judging by the frequent attempts of the animal to scratch it, even through the bandage. The growth is now so heavy that, unless constantly kept in a suspensory bandage, great injury and haemorrhage is caused by animal shaking its head and scratching. The crusts still form over the surface, and from some of the deeper fissures ~~some~~ greyish stiff, thin blades of cartilage up to 1.5 c.m. in length grew forth. Once or twice when bandage was not renewed every two days, maggots invaded the tumour under bandage and seemed to cause greatly increased irritation.

Condition of animal is very poor, in spite of fairly good feeding.

20.9.27 The whole newgrowth bathed in warm magnocid solution for half an hour, and carefully cleaned. As much of the surface as possible was curetted free of gangrenous matter. Examined the regional lymph glands for metastases but none could be seen or felt.

The growth was then removed surgically by a simple linear incision, severing the ear just proximally to the tumour. The skin was first retracted toward the head. The main blood vessels were ligatured and the edges of skin approximated by a few interrupted sutures. Pieces of this tumour selected, as clean as possible, were cut out, or punched out with a canula and were transplanted subcutaneously into (a) the other ear of the same animal, (b) ears of other animals, and (c) perineum of other goats. See transplantation experiment No. 6.

Complete healing of the left ear stump with minimum of attention was rapid and uninterrupted. The right ear with transplant developed a swelling at first, this became fluctuating, and discharged thick, pus-like matter, smears of which were swarming with short coccobacilli and chain-

like organisms.

19.10.27 Condition of animal distinctly improved
Seat of transplant on right ear practically healed up, too.

28.11.27 Gaining in condition. Ear stump completely
healed up, epithelium again covers edge of ear.

14.1.28 Condition very good, otherwise healthy.

30.11.28 Same, no signs of recurrence or other dis-
turbances, i.e. after 14 months.

Histological Findings. Specimen No. 7385.

A strong connective tissue stroma arises from the subcutaneous tissue of the ear at various points in the form of multiple strands branching and curling round to enclose or support the round masses of tumour tissue. This gives the surface its lobulated appearance. At the base the tumour practically lies on the conchal cartilage, separated from it only by a thin connective tissue layer. Towards the edge of the tumour the skin seems to have been lifted up, and pushed out or distended by the growth under it. The epidermis has a thin stretched appearance. It covers the tumour externally for a short distance only. At intervals long, slender, processes of epithelium from epidermis are ^{dip} sent in, deep into the tumour to join some stroma strand, or to become lost in the parenchyma of tumour. The appearance of the tumour itself is monotonous in its uniformity, and very much like a sarcoma. Melanin is distributed in rather irregular fashionⁿ in the tumour cells, some lobules having quite a fair amount in a few cells, while others again have none at all. Extensive hoarding is seen in the stroma at various points, even in the connective tissue outside the tumour itself. This produces the mottled greyish and black colour, seen macroscopically. Under higher magnification the tumour cells have a very uniform appearance mostly arranged in a loose fashion i.e. separated by empty space as if the delicate and sparse cytoplasm of each cell had

partly shrunk around the nucleus. Near the edges covered by epithelium, the cells of the tumour take on an elongated spindle-shape. The basal cells of epidermis are likewise elongated, at right angles to the basal membrane, and appear as if "shelling out" and merging into the tumour parenchyma. It is at these places in connection with epidermis, that pigment formation in the subjacent tumour cells is most marked. Numerous mitoses can be clearly seen, but nowhere is any indication of keratinisation visible. One or two tough processes which grew out of the tumour fissures consist of fibrous and cartilaginous tissue. Their significance is not understood, as the pieces were cut out from the living animal, but could not be seen again after removal of tumour.

Diagnosis.

Pigmented baso-cellular carcinoma.

Comments.

This tumour was allowed to grow to a considerable size. In spite of the rapid growth and numerous mitoses present, no metastasis occurred, nor did any of the transplant take. With regard to the latter it should be said that owing to cauliflower-like structure, it was practically impossible to obtain any aseptic material from the tumour for transplantation. It seems thus that, although numerous mitoses are usually associated with fast growing tumours, they are not necessarily the factor concerned in causing malignancy.

Clinical Observation No. 21957.

17.11.28 Angora she-goat. Aged, condition rather poor. Many pigmented maculae on ears, face, udder, perineal skin, and also on body skin generally. Incisors stumps worn very short and covered with tartar. Right eye shows a catarhal discharge, and the inner two quadrant show a smoky opacity of cornea and a small ^{len} butill sized shallow ulcer.
 The hair round tail and perineum is soiled with partly

dried exudate, blood, faeces, and dirt. On lifting the tail a large pink, granulating growth is seen filling the whole recess under the tail, so that the anus is only visible as a slit in the middle. To the left the tumour consists of a flat, granulating, pink, moist swelling 1 c.m. thick, while on the right it is rounded and bulging, reaching a thickness of 2 c.m. The greatest width is 5 c.m. from side to side, and 3 c.m. from top to bottom. It thus extends between the two tail folds, and reaches practically to the level of the upper vulva commissure. Here it recedes to the level of the skin, but a few shallow ulcers or excoriations are seen on the vulva. See Fig.

The tumour is covered by slimy, greyish, stringy matter mixed with faeces and dirt. This keeps the tumour moist and gives off a very foetid odour. The animal is very sensitive to handling of the parts and flicks its tail and stamps its feet when flies settle on or near tail region. It is also fairly tender when the tail is lifted.

The udder is enlarged and lactating so that the supramammary lymph glands cannot be easily palpated. Urination takes place normally. Defaecation is fairly painful, but the anus dilates to normal extent, the tumour reaching the edge but not affecting its elasticity. Smear from the surface of tumour reveals mixed forms of bacteria but no spiral organisms.

20.11.28 A small piece about 2 x 1 c.m. was removed from the left edge of the tumour for histological study. Local anaesthesia was complete after deep injection of $\frac{3}{4}$ grain of cocaine and 3 drops adrenalin. The parenchyma of tumour is firm and somewhat tough to knife, and has a streaky greyish appearance on section. Bleeding from tumour wound was stopped by application of ferric chloride solution, followed by a thin tampon of absorbent cotton wool as no bandage could be conveniently applied. There was a slight

increased swelling on the two following days. Bleeding was negligible and in 4 or 5 days the seat of incision could not be distinguished from the rest of tumour.

4.12.28 The condition of animal remains the same, it feeds well and is fairly lively, but resents flies settling near tail region. There are no maggots. Tumour shows no appreciable progress.

Histological Findings. Biopsy Specimen No. 8639

This tumour presents a fairly uniform appearance. The stroma supports a fan-shape arrangement of crypts and strands, solid or hollow tubes of epithelial cells. In some places undifferentiated cell types, in others going over to the spinous cell, with horn pearl formation. The surface is covered by a thin layer of necrotic tissue and exudate cells. Directly under this is a zone consisting of a rich network of small blood vessels. This tumour presents no other striking characteristics.

Diagnosis.

Baso-cellular and spino-cellular carcinoma (Mixed form).

Comments.

On account of the restricted horn pearl formation and the tubular arrangements of basal cells, this tumour might also be classed as a carcinoma baso-cellular parakeratodes. It falls under the group of ill-defined or mixed form discussed in classification. From the clinical appearance it seems quite probable that the basal cell part was the primary tumour while the spinous cell form developed later.

Histological examination of tumours removed surgically
at Vogelstruislegte 20.8.27. Specimen 7256A.

Aged Angora she-goat. Small pedunculate tumour 1 c.m. in diameter, non-pigmented, attached superficially to skin at perineum. The tumour consists of a delicately branched connective tissue stroma arising from the short stalk. It gives support to large round masses of rather loose very uniform tissue, at first glance somewhat resembling a spindle cell sarcoma. At the base i.e. around the stalk the epidermis with sweat and sebaceous glands are arranged in normal fashion and numerous blood vessels are present. In places the epidermis is markedly thickened and sends long projections into the subcutis. In others it seems to fork out sending long thin arms surrounding the above mentioned round masses of tumour tissue. In many places one can distinctly see the cells of basal layer becoming as it were dislocated, elongated, and merging into the parenchyma of tumour.

This parenchyma is made up of very uniform, loosely arranged cells supported by a fine reticulum or stroma, running in all directions in trellis-like formation. The cells have rather large nuclei, round, oval or spindle shaped with a moderate amount of granular chromatin. There is very little cytoplasm and mitosis is very rare. The stroma varies from place to place, in parts it consists of few fibroblasts with thin strands of fibrous tissue, in others the fibroblasts form thicker strands along which strings of tumour cells can be recognised, resembling the germinal layers of epidermis.

At various places near epidermis small restricted areas are present in which the tumour cells show hoarding of granules of black pigment (melanin). The tumour is only partly covered by a thin layer of epidermis, the rest is exposed and shows a layer of necrosed cells with

haemorrhages and profuse exudate. The neutrophiles and lymphocytes infiltrate the parenchyma to variable depths. The blood supply is relatively rich.

Diagnosis.

Carcinoma baso-cellulare.

Comments.

This tumour is not quite identical with the solid type of base-cellular carcinoma described in textbooks. It is, however, closely allied to it and for ordinary purposes can be considered as such. It is a good example of the very lightly pigmented tumours which form a link as it were between the non-pigmented basal cell carcinoma and the melano carcinoma.

Specimen 7256 B.

Angora she-goat, 4 tooth. The greater part of vulva swollen and hard. It shows a deep ragged ulceration^{superficially}, black in parts and painful. ^{This} It was removed by a deep incision, but the swelling and black pigmented parts not being circumscribed, some of the black tissue had to be left behind. The material removed was thus for the greater part vulva tissue with the deep ulcer in about the centre extending to, but not involving the vulva mucosa. The pigmentation was general, but very marked under the mucosa of vulva. Under the low power the following features can be noted superficially a very vascular^{superficial} zone with numerous fairly small blood vessels. Here and there shreds of epidermis penetrate into the deeper parts to become lost in single strings or small strands of epithelial cells further down. Beneath this is a very heterogenous mass of tissue. Connective tissue, muscle fibre bundles, blood vessels and nerves, ~~are frequent~~. Much convoluted sweat glands are present, and throughout one sees black granular pigment (melanin) in larger or smaller clumps. On account of this pigment it is very difficult to distinguish the

types of cells present or even to say definitely in which cells the pigment is contained. Under higher magnification the surface presents a peculiar appearance, as if the cells of the rete malpighi were flattened and separated out. The interstices are occupied by blood and exudate cells; in parts there is loss of substance so that a layer of fibrin and blood exudate forms a sort of crust over the underlying tissues. There is, however, no keratinisation of the squamous cells. Below the vascular zone one sees epithelial cells in strands or isolated, some distinctly squamous in type whereas others, especially along the course of the numerous vessels and capillaries in this region, are difficult to differentiate from endothelial cells. The presence of much exudate round cells, and pigment greatly mars the picture. The melanin either lies free in between the cells (probably artefact) or a few granules lie round the nucleus of the epithelial cells. Large irregular, closely packed masses of pigment are often aggregated together in places, thus completely obstructing the view of the cells concerned. It seems thus that the germinal cells which actually produce melanin only, show a small amount of finely divided pigment, whereas the large closely packed masses of pigment represent hoarding by the melanophores in the stroma. Judging by the presence of pigment in the perivascular tissue, deep in the intermuscular spaces where no epithelial cells have yet penetrated, it is probable that most connective tissue cells become involved in pigment hoarding.

Diagnosis.

Pigmented baso-cellular carcinoma.

Comments.

This tumour has the characteristics, clinically at any rate, of the so-called "Rodent ulcer". It is, however, deeply melanotic and very vascular. The cellular

elements resemble endothelial^{um} cells. One might, therefore, be justified in calling this a type of melano-haemangio-endothelioma. This fact illustrates the difficulty of arriving at a satisfactory diagnosis in many cases.

Specimen 7256 C.

Angora-she-goat. Aged.

Small stalked tumour, blackish appearance, about 1.5 c.m. in diameter, situated on perineal skin, above anus. The stalk stump is very short and consists of fibrous tissue and a few bundles of muscle fibres with blood vessels and here and there well developed sebaceous glands. On the left the stalk is covered by skin for a very short distance. The epidermis is slightly thicker than normal, the papillary projections well developed, and in parts the basal layer of cells contains granules of melanin in varying amounts. The basal layer is well defined and lies on the normal corium. A little further on the corium becomes infiltrated with numerous round cells and merges into the tumour tissue proper. In a corresponding manner the basal layer becomes less and less distinct, the malpighian layer becomes thinner until they finally become lost altogether in the tumour tissue. Towards the end the more compact epidermal cells are in direct contact and seem to merge into the looser cells which form the tumour.

The tumour tissue itself is composed of medium sized cells with little cytoplasm and nuclei either spindle shaped, oval or round, but with about the same chromatin contents and arrangement as the basal cells of epidermis. These cells are supported by a network of fibroblasts and fibrous tissue. They are not packed together, but are separated from each other. In some cases, however, they seem to lie in rows on the stroma. The cells are further characterised by containing clumps of granular pigment (melanin). The pigment is distributed throughout the tumour, but some cells

contain much more than others. The stroma is well provided with blood vessels, especially near the surface. The parenchyma is infiltrated throughout with inflammatory exudate, the surface being also covered by a necrotic layer and small haemorrhages. The right side of stalk instead of the skin as on other side shows an isolated stretch of tissue very similar to a squamous cell carcinoma. It consists of solid strands of squamous cells. These are separated by stroma rich in blood vessels and with numerous small round cells. There are a number of swollen and vacuolated cells, with so-called inclusions, and ill-defined pearl nest formation. Although this portion is continuous with the tumour, it is entirely different in structure and furthermore, contains no melanin. This portion forms only a small fraction of the whole tumour. It is noteworthy that the appearance of the tumour is exactly similar to that of 7256 A, except for the presence of larger amounts of melanin.

Diagnosis.

Pigmented baso-cellular carcinoma, combined with a non-pigmented focus resembling a squamous cell carcinoma.

Comments.

It would be interesting to know whether this focus originated independently, or whether it is a transitory stage developing from the pigmented tumour. The absence of pigment from this focus and its very circumscribed nature seem to indicate independent development, from a different epidermal layer. One might think of the primary basal cell carcinoma acting as an irritant and stimulating the adjoining epidermis to true canceroid formation.

Specimen 7256 D.

Angora she-goat. Full mouth. Small pedunculated tumour, less than 1 c.m. in size, situated on skin under tail just above anus. On section greyish and rather soft,

covered by dry necrotic crusts. This tumour is somewhat similar in appearance to 7256A with certain differences. In the first place there is no epidermis at any point by which an indication could be obtained as to origin of cells. There is less connective tissue stroma. This appears to be younger, the tumour cells are larger and more closely packed together. The cells have the typical epithelial nucleus, rather poor in chromatin, round or oval in shape with prominent nucleolus, frequently two and even three. There is very little cytoplasm. Melanin is seen in small granules in a few cells only. No mitosis can be seen. Blood vessels are fairly numerous. The arrangement of the tumour cells has nothing characteristic, it reminds one somewhat of a large, round cell sarcoma. In places, however, the cells tend to aggregate into nests, and the ones next to the stroma are more or less in string formation. Numerous neutrophils and round cells infiltrate the whole tissue, but are particularly numerous near the surface where a fibrinous partly necrotic layer forms the external covering.

Diagnosis.

Base-cellular carcinoma. Slightly pigmented.

Comments.

This is probably a very early stage in the development of this tumour. Unfortunately, the adjoining skin from which more information might have been obtained, was left behind in the process of removal.

Specimen 7256 E.

Angora she-goat. 6 Tooth, very poor condition. Tumour situated superficially on nape of neck (skin) just to the right of median line, size 6 x 3 x 3 c.m. elongated and rounded, covered by stinking and moist, sticky exudate. The attendant states that this tumour originated as a simple "wart" of the skin. From injury by scratching the wart

started bleeding, and ultimately developed to its present state. The tumour certainly causes irritation. The animal frequently scratches it with its hind leg, the maggots present are probably responsible for part of the irritation. The tumour is hard and greyish in section with fine convoluted striations. Arising from the base of stalk, a thick connective tissue stroma branches out in all directions in tree-like formation. On these branches and twigs of stroma are arranged chains or strings of rather large epithelial cells, in layers either single, or several cells thick, resting on a basement membrane. These cells have a round or oval nucleus, poor in chromatin, cytoplasm is rather abundant and stains with ^{ha}hemalum and Eosine, the purplish mauve characteristic of epithelium. The outline of the cells is either polyhedral or flattened. The arrangement of these strings of cells give rise to crypt-like or even gland-like formation, the lumina of which are filled with degenerated cells of the same type. Little or not keratinisation has taken place, but some swollen cells containing large vacuoles, and inclusion bodies are frequent. These cells closely resemble prickle cells of epidermis but their cytoplasm stains deeper and the prickles are not distinct. They appear to be a stage in between the basal cell proper and the prickle cells. They certainly show no tendency to keratinisation or pearl nest formation. The covering epidermis may be traced, from the base of stalk for a little distance over the tumour; here it becomes lost in the ulcerated part of the tumour. At first it is of normal thickness with sweat and sebaceous glands beneath it. Then it thickens (acanthosis), the interpapillary projection become longer and dip deeper into the subjacent tissues. In several places it is possible to note a swelling and loosening of germinal layer of the epidermis. Such cells are similar in appearance to

these forming the tumour (See Fig), and in others the continuity of the altered epidermis with the strings of tumour cells appears well established. Apart from the short distance covered by epithelium the rest of the tumour is covered by a necrotic layer of inflammatory exudate, blood and dirt. The inflammatory cells of course infiltrate the tumour practically throughout, especially in the deep crypt-like cavities mentioned above.

Diagnosis.

Carcinoma baso-cellulare (Adenoid type.)

Specimen 7256 F.

Angora she-goat. Aged. Superficial tumour of skin situated just under tail, above anus ^{and} measures about 6 x 4 c.m. ^{It is} elongated, cauliflower-like, stinking, partly necrotic hollowed out and full of maggots. It is attached to skin by a short stalk 2 c.m. across. The tumour is covered by thick crusts and on section has a greyish colour and is somewhat hard to cut. A strong connective tissue stroma arising from the stalk of the tumour branches out in irregular fashion to support solid elongated or rounded masses of squamous epithelium which form the tumour parenchyma. Frequently the larger masses show in their centres the typical hornified, lighter red staining cells, or pearl nests. They are arranged in concentric fashion and are surrounded by more or less flattened squamous cells. The small amount of epidermis which covers the stalk on one side and extends over the tumour for a short distance presents an interesting aspect. In the first place, it is much thickened, with many blunt projections dipping into stroma. The epithelium is entirely unpigmented. In places the thickened epidermis appears to shed cells which are in parts more or less loosely arranged, or in strings of single cells (compare this with 7256E). The tumour cells themselves show frequent mitoses and most of them also have 2, 3 or 4 nucleoli

keratinisation is distinct. The "horn-pearls" are composed of typical faint staining keratinised substance with clumps of granular matter (eleidin). There are large swollen cells often containing dark staining bodies and neutrophiles, or showing several nuclei. Occasionally one sees a giant cell at the edge of one of the pearl nests. The superficial parts of tumour shows extensive haemorrhages with inflammatory exudates pervading its substance to varying depths. The surface is covered by a necrotic layer of exudate, blood and cell debris.

Diagnosis.

Carcinoma spino-cellulare (Canceroid)

Comments.

Although this tumour has so many characteristics typical of the canceroid, there are certain points which give one the impression that the tumour elements are derived to some extent from the epidermal basal cells. It is, therefore, not a straight forward canceroid, but has certain tendencies towards the mixed forms which have already been mentioned.

No. 14770.

6.9.26 Angora she-goat. Full-mouth, rather poor condition. Hair round anus soiled and matted together by dark, brownish black, foul smelling, smeary material. On lifting the tail a large tumour occupies the recess under the tail and extends down covering anus and upper half of vulva. The tumour is roughly quadrangular, measuring 6 c.m. in length by 4 c.m. across and 1.75 c.m. thick. It is attached by a short stalk to the skin over an elongated area above and to the left of anus. The tumour is very irregular and lobulated in outline, somewhat resembling unhealthy granulation tissue. Its surface is covered by above dark smeary sticky material. The central part shows a depression and is of a lighter colour than the periphery. The colour