On the left of this section the circulation has been obliterated, as the lacunæ are occupied by concentric layers of fibrin containing blood corpuscles and pigment.

Fig. 203 represents a more enlarged view of the cavernous spaces with their divided septa. The stratum corneum is also shown to be considerably thickened.

An examination of the sections shows that the lesions consist of lacunar spaces filled with blood occupying the papillary portion of the derma, some of which are enclosed in the rete Malpighii. These cavernous spaces are evidently the essential feature of the disease and the primary pathological condition.

Etiology.—The disease, when it occurs on the hands and feet, as it most frequently does, is an affection of early life, and caused by repeated attacks of chilblains.

Some cases have been associated with tuberculous affections of the lungs, glands, and other regions. An attempt has been made by Leredde to show that it is caused by the toxins of the tubercle bacilli.

In my case, in which the skin of the scrotum was affected, the tendency to dilatation of the blood-vessels as manifested by a double varicocele, and the degenerative state of the vessels and surrounding connective tissue incident to old age, were probably the most potent causes in bringing about the condition.

Diagnosis.—A well-developed case of the disease could hardly be mistaken for any other affection. The color of the lesion and the presence of the vascular points should differentiate it from tuberculous or ordinary warts.

Treatment.—The tumors may be removed by excision or by the application of the Paquelin or galvanocautery, with the production of slight scarring. Less deformity results from electrolysis. *John A. Fordyce.*

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ANGIOMA.—(ἀγγεῖον, a vessel.) The angioma, a neoplasm representative of the connective-tissue or histoid type of tumors, is a new growth composed wholly or in great part of blood-vessels or of lymph vessels. The term angioma is sometimes, though inaccurately, employed to designate one of the varieties of the species of tumor bearing this name, the hæmangioma, a growth consisting of blood-vessels.

Classification: According to the character of the vessels entering into the structure of the tumor, angiomata are classified into—1. Hæmangiomata; 2. Lymphangiomata.

1. Hæmangioma.—The hæmangioma is a tumor the essential structural components of which are newly

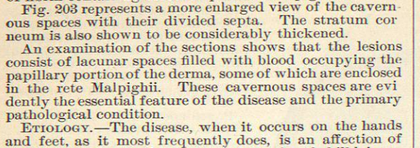

Fig. 204.—Angioma Cavernosum Cutaneum Congenitum. (Müller's fluid; hæmatoxylin.) *a*, Epidermis; *b*, corium; *c*, cavernous blood spaces. × 20 diameters. (After Ziegler.)

formed blood-vessels. It is to be distinguished from other blood-containing tumors, such as hæmatoma and certain forms of aneurism, notably aneurisma racemosum and varix racemosum. These latter are the result of dilatation and hypertrophy of pre-existing vessels, and bear no relation to structures whose component elements are essentially the product of new growth. The hæmangiomata have been designated *erectile tumors* by reason of their analogy to the corpus cavernosum penis and to other erectile structures. The size and consistence of one of these tumors may vary greatly from time to time, such variation depending upon the amount of blood contained within it; this may be increased by exercise, during a fit of weeping, and, in women, during the menstrual period. When from any cause the amount of blood in the tumor is diminished, the latter may become soft and flaccid, to regain its firmness and elasticity when the former condition is restored.

Varieties: Two varieties of hæmangioma are recognized, the distinction between them being based upon differences both in structure and in location. These varieties are:

(*a*) *Hæmangioma Simplex* (nævus vasculosus; birth mark; telangiectatic hæmangioma). This form of hæmangioma comprises the small vascular nævi, and most of the so-called mother's or birth marks. It occurs in two forms: (1) As flat, round, or irregularly outlined, usually sharply contoured, red or bluish-red patches on a level with, or but very slightly elevated above, the surface of the skin; in size, varying from that of a flea-bite to that of the side of the face. The skin over these patches is either smooth or thickened, and is sometimes covered with lanugo hairs. (2) As round, more or less lobulated tumors, in size varying from that of a hemp-seed to that of an apple, situated primarily beneath the skin, the larger growths projecting above it. The skin over them is rarely normal, usually thin, transparent, dark red or purple, and traversed by vessels. They are sometimes covered with hair.

Occurrence. This variety of hæmangioma is very common; it is nearly always congenital. From observations made by Depaul, it appears that one-third of all the children born in the clinic of the Faculty of Medicine in Paris have such hæmangiomata at birth. The tumor is situated most frequently in the skin of the face, neck, back, chest, abdomen, sometimes of the extremities. More rarely it occurs in mucous membranes, and beneath the serous surfaces of the internal organs. It may be single or multiple, and may attain a varying size. The congenital forms remain stationary.

Structure. Histologically, the hæmangioma simplex consists of newly formed, much convoluted, more or less dilated capillaries lying in a stroma composed of fibrous connective tissue or of fat tissue. This stroma varies in amount, and may be infiltrated with lymphoid cells, or contain pigmented connective-tissue cells. The newly formed vessels often correspond in distribution to the vascular districts of the sweat glands or the hair follicles. When the connective-tissue stroma of the flat form of the tumor becomes abundant, or is largely replaced by fat, the growth may assume more of the lobular type of structure.

(*b*) *Hæmangioma Cavernosum* (cavernous tumor; erectile tumor).—This form of hæmangioma consists of lobulated, sometimes fungoid tumors of varying size, bluish in color, single or multiple, tending to diminish or disappear under pressure. Pressure upon parts adjacent to the tumor causes it to swell by venous congestion; other conditions, such as change of position, weeping, sleep, digestion, the ingestion of alcohol, and the like, may cause alteration in size, owing to the erectile character of the growth.

Occurrence. The cavernous hæmangioma occurs most frequently in the *liver*, where it appears as a dark mass situated usually just beneath the capsule, and never elevated above the surface. The size varies from that of a pea to that of a whole lobe of the liver. The tumor is generally single, sometimes multiple. The livers of old people present this form of new growth in a great number of instances. Its occurrence in this organ seems to vary in frequency in different countries: according to the report of pathologists, it is not so frequent in Norway and Sweden as it is in Germany. By the rupture of the vessels of large cavernous hæmangiomata through the

capsule of the liver, extensive hemorrhage has taken place into the peritoneal cavity, and fatal peritonitis has been caused.

This tumor also occurs, although less commonly than in the liver, in the other abdominal organs, as, for example, the *spleen* and the *kidneys*, and also in the *brain*. It

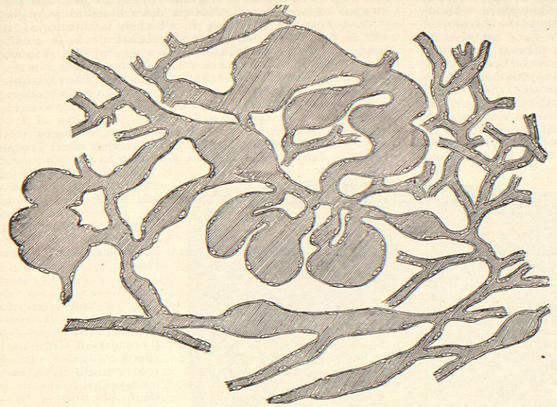

Fig. 205.—Dilated Capillaries from a Telangiectatic Tumor of the Brain, All the Attached Portions of Tumor Tissue having been Shaken Off in Water. × 200. (After Ziegler.)

is found in the *skin* less frequently than are the simple hæmangiomata. Esmarch has reported in Virchow's *Archiv* a very interesting case of its occurrence in this position. A single tumor developed upon the middle finger of a girl eight years of age, followed in subsequent years by the appearance of a great many others. At the time of the first menstruation there was a great increase in both the number and the size of the tumors. At each succeeding catamenial period they seemed to grow more than at any other time. In size they varied from that of a pea to that of a hen's egg. They were all successfully extirpated, and in most cases were found to be situated on the wall of a vein, with which they were in communication.

Cavernous hæmangioma is seldom congenital; it occurs mostly in the earlier years of life, and rarely develops at a later age. It grows very slowly, often remaining stationary.

Structure. The cavernous hæmangioma upon section presents an appearance quite similar to that of the cut surface of the corpus cavernosum penis. It is characterized by the presence of a firm, tough, white, meshwork, which in the recent state is empty or contains some irregular blood clots. The meshes frequently enclose small, round, calcareous masses known as phleboliths. In some instances this cavernous structure is sharply circumscribed and separated from the surrounding structures by a firm capsule. In others, where the tumor is small and to all appearances in a state of rapid growth, it is surrounded by a zone of lymphoid cells. The consistence of the tumor depends upon the amount of the fibrous connective-tissue meshwork, or stroma; when this is abundant, the tumor is relatively hard, and when scanty, soft and flaccid.

Microscopically, the tumor presents trabeculæ of fibrous connective tissue, in part newly formed, in part belonging to the structure in which the tumor is developed, of varying thickness, arranged in the form of a meshwork. The cells of this tissue are numerous, and it is usually infiltrated with lymphoid cells scattered singly or localized in groups. The spaces of this meshwork are lined with flat endothelial cells, and contain blood. These spaces are of varying size, but whatever their extent, they always represent capillaries, for they are interposed between an artery and a vein. Adjacent large spaces may be separated by but very thin partitions. The connective-tissue stroma in some cases has been found to contain nerves, smooth muscle fibres, and elastic fibres.

Etiology.—The cause of hæmangiomata, in common with that of most new growths, is not understood. A large proportion of all tumors of this sort are congenital, and when they do develop after birth, it is generally in the early years of life. It is seldom that hæmangiomata develop in adults, a fact which is remarkable in view of the frequency of dilatation of the blood-vessels in old age, and one which constitutes a strong objection to the theory that these tumors arise from a simple dilatation of pre-existing vessels. Heredity seems to play some part in their occurrence; numerous cases are recorded in which a child presented one of these tumors in the same place on its body as that in which one of the parents also had a birth mark. Popular belief in all ages has associated the presence of these growths in children with some influence exerted upon the mother during pregnancy; maternal impressions cannot, however, be regarded as definite factors in the development and growth of offspring.

Different views have been held regarding the genesis of the cavernous form of hæmangioma, and at one time the subject formed a ground of contention between two of the greatest pathologists, Virchow and Rokitansky. Virchow held that the development of a cavernous tumor was always preceded by the formation of granulation tissue, the newly formed vessels of which afterward became dilated, and the intervening structures atrophied. Rokitansky, on the other hand, did not regard the blood-filled spaces of the tumor as true vessels, but supposed that they were formed independently in the connective tissue, and

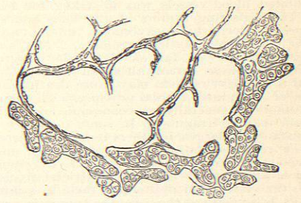

Fig. 206.—Section through the Margin of a Very Small Cavernous Angioma of the Liver at a Time When This Margin Was in Process of Active Growth. (Carmine preparation.) × 150 diameters. (After Ziegler.)

afterward came into communication with blood-vessels. The blood corpuscles he regarded as formed by an endogenous process within certain altered connective-tissue cells. These he called "Hohlkolben," and described them as large protoplasmic masses situated usually along the blood-vessels. These views of Rokitansky seemed to find confirmation in a description by Luschka of such

structures occurring in the small blood-vessels of the brain. It is now known, however, that these so-called blood cysts of Luschka are merely dilatations of the perivascular sheaths of the cerebral vessels. Other investigators at various times in the past have supported the theory of Rokitansky that blood corpuscles are formed in inflammatory tissues, but in the light of more recent knowledge it appears that this never takes place. Rindfleisch held that the hæmangiomata could be developed in any structure provided with blood-vessels, by what he termed "cavernous metamorphosis," a process characterized by the dilatation of pre-existing vessels, resulting either from fibroid degeneration of the capillaries or from the contraction of cicatricial tissue around the vessels. This theory, at least so much of it as depends upon the correlation of the development of cavernous tumors with the contraction of scar tissue, can hardly be regarded as tenable; for in the lung, where we most often find such tissue, hæmangioma almost never occurs, and in the liver, where the tumor is so frequent, its presence cannot be shown to bear any relation to cirrhosis.

It is probable, therefore, that none of the theories advanced to account for the origin of hæmangioma is acceptable other than that which asserts that the tumor is the result of an independent new growth of blood-vessels, the *cause* of growth not being as yet altogether explainable.

Mode of Growth; Clinical Aspects.—The hæmangiomata extend always by growth from within outward; they show no tendency to infiltrate surrounding structures; they do not cause metastases. Instances of seeming exception to these conditions are probably cases in which sarcoma with dilated blood-vessels was mistaken for hæmangioma. The pulsating tumors of the long bones, which have been described as cavernous tumors, are to be regarded as telangiectatic sarcomata. The hæmangioma is, therefore, so far as its mode of growth is concerned, a *benign* tumor, although the accidents incidental to its development may cause death from hemorrhage or from intra-cranial pressure. The growth of these tumors is generally unaccompanied by pain; it is slow, and may be irregular. In some instances the tumor constantly enlarges, in others it reaches a certain size and then remains stationary. It sometimes undergoes spontaneous cure by the ulceration of the overlying skin, and the subsequent formation of cicatricial tissue which includes the vessels and obliterates them by contraction. When, as is sometimes the case, the tumor is connected with the skin by a pedicle, the vessels in the pedicle may shrink, and the tumor become desiccated and drop off. In yet other cases a cure may be effected by thrombosis, and the consequent deprivation of the tumor of its circulation.

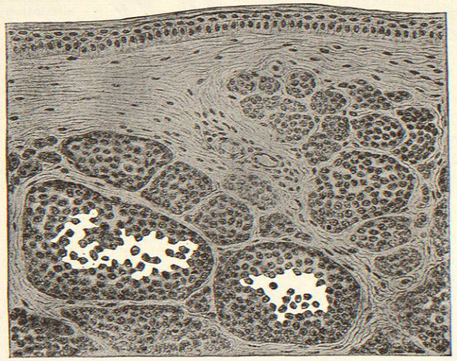

Fig. 207.—Lymphangioma Hypertrophicum. Rounded summit of a rather large, soft, smooth wart. (Formalin; hæmatoxylin; eosin.) Sharply limited nests of cells in the corium. × 250 diameters. (After Ziegler.)

2. Lymphangioma.—The lymphanigoma is a tumor composed of lymph vessels in a state of greater or less degree of dilatation, lying within a fibrous connective-tissue stroma. Strictly speaking, the term lymphangioma is applicable to those lymph-vessel tumors only in which the whole or the greater part of the vessels is newly formed; but inasmuch as in any single case it is often difficult to determine how far the vessels are newly formed and how far pre-existing ones, dilated and thickened, it is convenient to include under the lymphangiomata certain abnormal structures in which the essential pathological condition is lymphangiectasis. This form of new growth occurs in a great variety of *loci*, and presents an external configuration determined very largely by the organ or structure in which it is developed, as well as by its histological characteristics. It is seen in warty tumors and diffuse thickenings of the skin and mucous membranes, in macroglossia, in certain congenital cysts, and in various other conditions. The classification of lymphangiomata, based upon structure, according to Wegner, admits of the recognition of the following—

Varieties: (*a*) *Lymphangioma Simplex.* — As a true neoplasm this occurs in the form of a circumscribed tumor, composed of capillary and larger-sized lymph vessels. As lymphangiectasis, it is seen in the lymphatic varix, in dilatation of the lymphatics resulting from obstruction, in macroglossia and elephantiasis following erysipelas, and in elephantiasis due to filaria.

(*b*) *Lymphangioma Cavernosum.*—This variety is analogous to the cavernous hæmangioma. Histologically, it consists of larger and smaller spaces, lined with endothelium, and surrounded by a strong wall of fibrous connective tissue. Section of the tumor in the recent state reveals the presence of lymph. The stroma may contain fat, leucocytes, epithelioid cells, blood-vessels, and smooth muscle fibres; the presence of these last is regarded by Stiles as a means of distinguishing lymphangioma from lymphangiectasis. The contents of the spaces are clear and resemble lymph.

Occurrence. The cavernous lymphangioma occurs in the tongue, the lips, the skin, and rarely in the internal organs.

Macroglossia, lymphangioma of the tongue, when not due to obstruction to the lymphatics resulting from inflammatory processes, *e.g.*, erysipelas (Robin, Laredde), is congenital. The tongue is enlarged, and in extreme cases, especially those in which there is inflammation, may extend to the sternum. Its surface is covered with minute cysts. Histological examination shows that the enlargement is due to a new growth and dilatation of lymphatic vessels, and a hyperplasia of the surrounding connective-tissue elements. There is present usually a combination of the simple and the cavernous forms of lymphangioma. The enlargement may remain latent or stationary, and then suddenly increase.

Macrocheilia is a similar condition in the lips; it may be associated with macroglossia. It occurs more often in the upper lip than in the lower, but may involve both. Samte examined seven cases of lymphangioma of the mouth and oral cavity; one presented macroglossia, and the rest larger and smaller warty tumors containing watery contents, and situated in the mucosa and submucosa of various parts of the buccal mucous membrane.

In the skin, cavernous lymphanigoma occurs in the form of relatively circumscribed growths in the corium, characterized histologically by the presence of large round and oval spaces lined with flat endothelium. These lymphatic structures may press up into the epidermis. In the interstitial connective tissue there are many pigmented cells. Lymphangioma occurs also in the subcutaneous tissue, causing diffuse, rough thickening of the skin, and sometimes leading to an elephantiasis of the affected part. Such a condition may involve an entire extremity. On section, clear or slightly cloudy lymph escapes. Microscopically, the structure consists of large spaces lined with endothelium, and an interstitial stroma consisting of fibrous connective tissue or fat, and containing areas of lymphoid cells.

In the spleen, this variety of lymphangioma has been found in a few instances. Barbacci found upon the anterior edge of the spleen a row of small tumors, in size varying from that of a pin's head to that of a hazelnut. They consisted of a collection of cavities of various sizes, more or less completely combined with one another, and containing a yellow, transparent fluid. Microscopically, they presented the characteristics of cavernous lymphangioma.

(*c*) *Lymphangioma Cysticum.*—This form of lymphangioma differs from the cavernous only in that the spaces within it are larger and more cyst-like than are those of the latter. It consists in single or multiple cysts, which occur in various parts of the body, chiefly in the neck and near the sacrum, but also in the extremities, in the tongue, and on the face. More rarely it is found in the peritoneum, and as single small cysts in or between the abdominal organs. When located in the submaxillary region, the tumor not infrequently rapidly extends, becoming more and more pendant until it reaches the sternum. The cystic lymphangioma is known also under the names: hygroma cysticum congenitum, hydrocele of the neck, congenital serous cyst of the neck. By some authorities it is regarded as forming a distinct group of lymphangiomata.

The cystic lymphangioma of the neck is congenital; it is probably not derived from hæmangioma by the obliteration of connections with blood-vessels and the development of secondary communications with the lymphatic system. The fact that the cystic spaces are lined with endothelium and not with epithelium is evidence that these tumors are not derived from either the salivary glands or the branchial clefts. The tumor is situated upon the anterior or lateral surfaces of the neck; rarely upon the back; it may be unilateral or bilateral. Its size varies; it tends to burrow and to extend under the cervical fascia between the muscles of the neck. In this way it may travel down the sheath of the subclavian vessels to the axilla, or it may go into the mediastinum.

Histologically, this form of lymphangioma presents large cystic spaces lined with endothelium, separate or communicating, containing a clear fluid, lying within a stroma composed of fibrous connective tissue, fat, smooth muscle fibres, blood-vessels, and nerves. In some instances the number of blood-vessels is disproportionately great, so that the tumor may present a combination of hæmangioma with lymphangioma.

The cystic lymphangioma may remain stationary, grow rapidly, or undergo spontaneous involution. It is prone to recurrent attacks of inflammation, especially after aspiration. When superficial it may give rise to lymphorrhagia. The more dangerous positions of the tumor are the neck and the sacro-perineal regions.

Mesenteric cysts are usually the result of some obstruction, inflammatory or otherwise, in the mesenteric lymph vessels. In rare instances they may be attributable to the new growth and subsequent dilatation of lymph vessels.

The fluid contents of these cystic tumors are ordinarily clear, alkaline, and albuminous; when inflammation is present blood, cholesterin, and pus may occur. The character of the fluid may vary widely in different parts of the same tumor.

Etiology. — The lymphangioma is essentially a new growth. In exceptional cases only may any other condition, *e.g.*, inflammation, be associated with the cause of tumors of this sort. Lesser, in agreement with many authorities, affirms that simple lymph stasis can never give rise to a lymphangioma, citing in support of his opinion the fact that tying of the thoracic duct and other large lymph vessels has never been followed by this sort of tumor formation, and further that lymphangiomata often occur in regions where there are but very few lymph vessels. The *cause* of the new growth Krynsk believes to consist in local changes in the lymph-vessel walls, changes which he regards as of embryonal origin, as attested to by the congenital character of the growth and its development in childhood. The mode of new growth he describes as chiefly of the heteroplastic sort, *i.e.*, a process in which fibrous and fat connective tissue furnish the cells from which the endothelium of the newly developed spaces originates. Wegner describes another mode of origin, according to which the formation of new lymph vessels takes place in a previously formed granulation tissue. This theory, while difficult to prove, is quite generally accepted. *George Burgess Magrath.*

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Angioma Serpiginosum.—This rare cutaneous disorder was first described by Mr. Jonathan Hutchinson, in his "Archives of Surgery," in 1891, under the title of infective angioma or nævus lupus. Crocker's name, angioma serpiginosum, would seem to be on all accounts the more appropriate. But a handful of cases, six or seven in all, have been reported, and it may be doubted if one or two of these are really entitled to a place in this group. Hutchinson has also published a short account of three other cases, those of Lassar, Tay, and Jamieson. Besides White's case one other, incompletely reported, has been described in America, and Leslie Roberts refers to a case that may belong in this category, although differing from the type in many respects.

In all the cases thus far reported the affection began in early life, in four of them before the age of two years. Small bright red papules, firmly seated in the skin, are the first manifestations. These papules do not disappear on pressure, and have been likened to Cayenne pepper grains. They increase in size slowly, and may reach the size of a pea, when central involution occurs, while the edges continue to spread so that circinate figures are produced. Outside these circles, small new lesions, called satellites by Hutchinson, are continually making their appearance, which also enlarge and undergo central involution so that new rings are formed, which may unite with the original ones. There is no apparent atrophy in the central part that has undergone involution, but in White's case there was a dull pigmentation in this portion. In none of the cases thus far reported has there been any breaking down or ulceration of the papules.

In Hutchinson's cases the lesions were situated on the back of the arm, spreading upward to the shoulder and downward below the elbow. In the other cases, the arm and side of the thorax, the face and upper extremity, and the lower extremity, have been the portions affected.

White's case, which was seen and studied by the writer, concerned a boy of twelve years, who had always been delicate and of a very nervous temperament. At birth a semilunar red mark was noticed below the right shoulder

blade, which increased very slowly in an upward direction until he was four years old, when another spot the size of a pin's head made its appearance near the first one, which gradually grew larger, and since then other spots have continually appeared and grown larger. When the patient was first seen, the affection formed a band three inches wide, which extended from the anterior edge of the right scapula about six inches forward toward the nipple, and was composed of about twenty-four different lesions, which varied in size from a pin's head to circular patches more than two inches in diameter. Minute elevated points, of a bright red color, first made their appearance, which increased slowly in size until they were from one-eighth to one-twelfth of an inch in diameter. They were of firm consistence, and only partially disappeared under long pressure. Involution in the centre then began, while the growth spread peripherally, so that circles were produced, until by confluence with other lesions near by this shape was lost. The skin in the centre of the lesions appeared normal except for the presence of a distinct pigmentation. New lesions were continually appearing at a little distance from the older areas, and in one or two instances small foci were apparent in the old central portions. The anterior group of lesions, some seven or eight in number, were at one time destroyed by the Paquelin cautery. Pale cicatricial tissue was formed at the side of the cauterization, and it looked as if the operation was successful, but after a time the lesions appeared on the borders of these scars, and the original condition was produced. In this case there was the greatest sensitiveness to slight pressure upon the affected region, but it is not improbable that this was due to the extreme nervousness and fear of the patient. There was also some itching complained of.

The only careful histological examination that has been made of this remarkable disorder was that of White's case. A typical lesion was excised and one-half was studied by Darier of the St. Louis Hospital, Paris, and the other half by Councilman and the writer. Microscopically, the epidermis and the epithelial appendages of the skin, such as the hair follicles and sweat glands, were unaltered. The lesion was characterized by groups of cells throughout the corium, which were fairly well circumscribed, and ran in their general arrangement parallel to the surface of the skin. They were sometimes round, but more often elongated in shape, and sometimes extended out in long ribbon-like masses, which seemed to be formed by a coalescence of neighboring groups. The papillary layer of the corium was only here and there invaded by the process. Under a high power the nuclei were seen to be oval in form with a general direction parallel to the course of the mass. They were surrounded by a small amount of protoplasm, and the boundaries of the individual cells could not always be distinctly made out. The cells of all the groups were arranged in smaller groups or clumps, concentric in form, and in the centre a lumen could sometimes be seen, showing their connection with the vessels of the skin. There were also various changes in the vessels, consisting in a swelling and proliferation of both endothelial and perithelial cells. A striking feature was the presence of small granular masses here and there in the cell groups, which showed no definite structure, and which were evidently produced by a degeneration of the cells, as there was every gradation from slightly granular, poorly staining cells to a total necrosis. In some places the cell groups were situated about spaces and fissures which evidently corresponded to lymphatics. Taken as a whole, the process is evidently one connected with the vessels of the skin, affecting certain groups of vessels, notably the blood-vessels. It seems to begin by a proliferation of the endothelium of the vessels accompanied also by a proliferation of the perithelium, which is followed later by a degeneration and necrosis of the central cells. There is apparently no complete new formation of blood-vessels. Histologically, the growth is to be compared to an angiosarcoma, and its cause is possibly that underlying tumor formation in general, and due to some congenital condition of the vessels. Darier, from his investigations of the case in question, proposes the name Sarcome Angioplastique Réticulé. He considers that we have to do with a peculiar form of sarcoma which is not massed to form a single tumor, but has a reticulated structure following the vessels of the skin, and that there is a tendency to form clusters of capillaries, approaching in this way the characteristics of a true angioma. He refers to the fact that in some of the soft nævi cell forms are found very similar to those of this case.

The number of reported cases of this disease is too small to warrant any general conclusions as to its course. In Hutchinson's case there was a recurrence of the growth after cauterization. In White's case the nodular infiltration made its appearance in the normal skin beyond the scar left from cauterization. This patient was seen six years later, when he had reached the age of eighteen. There had been some treatment by cauterization in the mean time, and again the appearance of lesions jumping over the part treated, to reappear beyond the cicatrix in the sound tissue, was seen. There had been no breaking down in any part, and on the whole it seemed as if the process was gradually becoming less active.

Treatment of this affection has thus far proved most unsatisfactory. Caustics or excision may convert the territory occupied by the lesions into a cicatrix, but hitherto they have failed to stop the peripheral spread of the disorder, and sometimes new lesions have recurred in the scar tissue itself. Electrolysis applied along the edges that are progressing has been advocated, but no successful results from this or any other method of destruction have been reported. *John T. Bowen.*

ANGIONEUROTIC ŒDEMA.—Definition.—A vasomotor neurosis or an angioneurosis, characterized by the appearance of circumscribed swellings on various portions of the surface of the body and the mucous membranes, by preference the face, throat, and extremities, without apparent cause or premonition, and non-inflammatory in character.

Synonyms.—Acute circumscribed œdema; acute idiopathic œdema; periodic swelling; urticaria tuberosa, or giant swelling; acute non-inflammatory œdema; Australian blight.

History.—Although references to this affection may be found here and there in medical literature since 1827, it is only during the present generation that it has been recognized as a disease possessing sufficient individual characteristics to have a history and special designation of its own. It is to Quincke, and his pupil, Dinkelacker, that we are indebted for calling the attention of the profession to this disease in such a lucid manner that it was soon generally recognized.

Etiology.—*Age.*—The period of early life furnishes the greatest number of cases, the average age in a series of ninety-three cases examined by the author being twenty-four. It rarely occurs for the first time in individuals upward of sixty years of age. Childhood, however, is by no means exempt; a case is reported by Dinkelacker, in which a child, whose father suffered from the disease, had an attack for the first time when it was three months old.

Sex.—It occurs oftener in males than in females. The disorder is seen as often in women as in men when the former are exposed to conditions that produce bodily and mental exhaustion.

Heredity.—This is one of the most important and interesting elements in the genesis of the disease. Angioneurotic œdema has been seen to occur in families one generation after another. In a remarkable series, reported by Osler, the disease was demonstrated to be present in five generations, including in that time twenty individuals. Its occurrence in several members of one family has recently been reported by Meige.

Previous and Present Condition of Bodily Health.—No relationship can be traced to previous, immediate, or remote disease, and the majority of cases presenting themselves with this disease are in fairly good health. It

occurs in neuropathic individuals and occasionally in those who suffer from hysteria, neurasthenia, and Graves' disease.

Exciting Causes.—Of the directly exciting causes, cold, traumatism, and psychical disturbances are the most obvious. Fright, grief, anxiety, worry, and the ingestion of certain kinds of food, such as apples and fish, have all been found to be exciting causes in some patients. The relationship of an attack to the use of alcoholic liquors and tobacco can sometimes be made out. An attack is often precipitated by cold, as in passing from a warm into a cold atmosphere, although it does result after severe muscular exercise with consequent sweating and then becoming cool very rapidly. In women attacks are more liable to occur during or near the menstrual period. The period in the twenty-four hours when attacks are most likely to show themselves is during the time between 1 and 5 A.M., when the tide of life is at its lowest ebb and the parts are least resistant.

Area of Distribution and Primary Point of Manifestation.—In a total of 83 cases studied by the writer the swelling showed itself for the first time: in the face in 33 cases; on the extremities in 24; in the pharynx, uvula, and larynx in 6; on the genitals, penis, and scrotum in 6; on the body in 6; on the gums and palate in 2; in the stomach in 4; on the neck in 1; and behind the ears in 1. Of the cases in which the swelling showed itself upon the face, in 5 it was restricted to the forehead; in 3 it occurred first on the eyelids, in 9 on the lips, and in the remainder it was distributed over various portions of the face. Of the extremities, the hands were by far the most often attacked, and after these the forearms were the next most frequent seat. The occasional occurrence of this variety of œdema in the gastro-intestinal mucous membrane seems to be sufficiently attested by characteristic symptoms.

The occurrence of the swelling in one spot seems to predispose the part for future attacks, and it is the exception for it to be once seen in a place which thereafter remains free. Parts of the body which have received injury or have been the seat of protracted pain seem occasionally to be favorite places for the development of the swellings. Occasionally there seems to be a periodicity in the appearance of the swelling. It has been contended that the pia, and even the brain substance itself, may be the seat of this variety of œdema. No proof of such occurrence has been given, and the only testimony is inferential from certain rather obscure clinical data.

Symptomatology and Clinical Course.—The manifestations of the disease generally present themselves without warning, and the suddenness of their appearance and departure is rather characteristic. Possibly the patient may complain, for a short time before the appearance of the swelling, of vague feelings of malaise, general disinclination to do anything, and a feeling of depression associated with ill-defined gastro-intestinal symptoms. The œdema comes on quickly, generally reaching its full development in a few hours, and gives the patient very little trouble, except by its mere presence; there is a feeling of stiffness and unwieldiness and a sensation as if the parts were on the stretch, but this sensation is not attended with pain or distressing throbbing, or any of the subjective symptoms of inflammatory swelling. The swelling is distinctly circumscribed and plainly differentiated from the surrounding surface, and of varying color. In some cases, but probably not in the majority of them, the skin is of a dark-red, dull roseate hue, while in others the marked contrast between the pale, almost waxy color of the swollen surface and the skin around it is very striking. The œdematous part does not pit on pressure, or if it does, only in a few cases, and in these not to any marked extent, so that the indentation produced by the forcible pressure of the finger is quickly effaced.

The subjective symptom of which the patients complain most is a sensation of scalding or burning during the occurrence of the swelling, this being probably due to the marked tension under which the skin is suddenly placed; and after this, there is generally a feeling of itchiness. Outside of these, if the swelling does not encroach on any organ, such as the eye, the stomach, the penis, and the testicles, or does not block up the conductivity of a passage, such as the pharynx or larynx, as it sometimes does, and so produce trouble, it is not likely that the patient will complain of any other subjective symptoms. Frequently the surface temperature of the swollen part has been found to be slightly elevated, while, on the other hand, carefully made observations have demonstrated that the specific heat of these parts is considerably lowered. It is probable that at the beginning of an attack the surface temperature of the part is somewhat elevated, while later, or just before the swelling begins to wane, the temperature falls.

The swelling generally reaches its height in any one part in a few hours after its appearance, in some cases in a few minutes, while in others from six to eight hours will elapse. After remaining for a period varying from a few hours to days, it will begin to disappear, ordinarily with a rapidity corresponding to that with which it showed itself. Frequently its disappearance from one part is the signal for its appearance in another, which may have no anatomical or physiological relation to the part previously affected. As a rule it does not show itself in more than two or three localities at one visitation, and frequently only in one. The disease recurs, and in the analysis of the cases spoken of above, the time between the attacks averaged twenty-one days. Occasionally a patient will have three or four attacks in a month, while others go for three and four months, and even longer, before they have a recurrence. Just before and during an attack the patient is often depressed, anxious, possessed of forebodings of evil or calamity similar to those of neurasthenia. I have noted these psychical or emotional symptoms peculiarly in those in whom excessive use of tobacco and alcohol seemed to have something to do with causing the condition.

The symptoms of the disease when some of the mucous membranes are attacked are well marked and suggestive. As has already been said, the mucous surfaces most often attacked are those of the stomach and of the larynx. In about one-third of the cases gastro-intestinal symptoms are prominent. These symptoms are at first a feeling of uneasiness and tension, as if something indigestible had been taken and had remained in the stomach. With this there is loss of appetite generally associated with constipation, which is soon followed by a distended appearance of the epigastrium; and then follows a sharp colicky pain, often attended with profuse vomiting and great thirst. The pain may be so severe as to demand the administration of morphine. The character of the material vomited consists at first of the contents of the stomach, but later it becomes watery and somewhat stringy from the mucus which it contains, and it is frequently profuse in quantity. When this continues for any length of time the thirst becomes greater, and large quantities of urine are frequently passed, which, however, contain nothing abnormal with the exception of increased amounts of earthy phosphates. Transient hæmoglobinuria has been noted in two or three cases. After this exacerbation in the symptoms has ceased, the reaction sets in, and there is frequently diarrhœa of a colliquative nature, with apparent retraction of the abdomen and a general feeling of lassitude and prostration, and the characteristic symptom of the disease shows itself in another part of the body, or, if it has already done so, it now begins to disappear.

When the swelling appears in the larynx, it of course produces symptoms in proportion to the amount of encroachment that it makes. This is often so great as to cause distressing symptoms of suffocation, and, indeed, in some instances death has taken place in consequence of the œdema. In others the symptoms are so severe as to demand liberal scarification, or, more rarely, tracheotomy. As a rule the swelling does not pass by continuity from the pharynx to the larynx, but when the latter region is affected by the disease the swelling develops there with the same degree of abruptness and vigor as in other