

treated during a year not long ago, for an aneurism of the ascending arch, was so far benefited that he took a situation as a messenger. In spite of all warnings to the contrary, he soon undertook to handle heavy baskets and other packages. One day, shortly after, he experienced sudden pain in the chest, followed by the extraordinarily rapid development of an external tumor. This quickly attained the size of a child's head, and proved fatal, with great suffering. Hardly less important than physical rest is mental quietude. Habitual worries of all kinds should be as much as possible excluded, while actual excitement is in every respect highly dangerous. A fit of anger or other violent emotion may prove fatal, either by actually causing rupture of the sac or (as in a recent case of my own) from syncope.

The diet is a matter of importance. A very old treatment of aortic aneurism is that of Valsalva, in which repeated blood-lettings were practised, together with a gradual restriction of the food until the amount of this was brought within the lowest possible limits short of actual starvation. The fallacy of this proceeding has, however, been long ago demonstrated. Blood-letting has but little, or but a temporary, effect upon the blood pressure; and the withdrawal of food causes anæmia and weakness, with irritability of the heart and impaired nutrition of the arterial walls, which conditions indirectly aggravate the disorder. The result of experience shows that the formation of a coagulum, which is likely to be of service in the process, will proceed better if the patient be not too much reduced. Tufnell, of Dublin, is the only comparatively recent writer who has advocated the starvation plan. Conformably with his recommendation, the system has been extensively tried, but few are found who can report results calculated to lend support to its efficacy. As much nourishing food should be allowed as can be thoroughly digested, due allowance being made for the weakened digestive activity that results from the enforced rest in bed. If the patient be plethoric and show evidences of congestive tendencies, then our treatment may well be begun by the adoption of depletory measures for a time—a low diet with laxatives or saline purgatives.

As regards medicines, many have been tried, but few have proved useful. The most valuable drug is undoubtedly iodide of potassium. The good effects of the iodide were described by Dr. Chuckerbutty in 1862, and by Dr. Roberts in 1863, and they were emphasized and enlarged upon by Dr. George Balfour a few years later. Since that time it has been extensively employed, and has continued to grow in favor. The two former writers considered that it acted by inducing increased coagulability of the blood, but this view is not shared by Dr. Balfour. He considers that the iodide has "a peculiar action on the fibrous tissue, whereby the walls of the sac are thickened and contracted, while if coagulation should take place within the sac, it plays but a very secondary and unimportant part, depending for its occurrence solely on the remora of the blood, and is in no respect due to the iodide of potassium." This corresponds entirely with the results of my own observations, for in one case, in which the relief to pain and the general improvement had been very marked for a long time under this treatment, the autopsy subsequently showed that not a particle of fibrin had been deposited on the walls of the sac. Dr. Bramwell suggests that it acts by reducing the blood pressure and relieving the tension within the sac. The symptoms which specially indicate the use of the drug are pain and troublesome cough. The special pains of thoracic aneurism are generally very rapidly allayed, and are often for a great length of time held in abeyance by this agent; and the same may be stated with reference to the troublesome attacks of irritating cough which the tumor may excite from time to time. Independently, however, of its employment for the relief of these urgent symptoms, it is to be administered steadily for such a time as may be thought necessary to influence, as above, the disease itself. The dose usually given varies from gr. x. to gr. xxx. thrice daily. Balfour, who formerly inclined

to the larger dose, thinks now that fully as good effects can be obtained from smaller ones. His rule is to employ such a quantity as will lower the blood pressure without increasing the frequency of the cardiac contractions. Beginning with ten-grain doses, ascertain the pulse rate (the patient being recumbent), and increase to fifteen; if no increase in the pulse be observed, this is to be continued; but if the pulse gets quicker, then return to ten. It is rare that more than fifteen grains can be borne within the limits of this test. The treatment must be persevered in, at the least, for several months, and, to give it a fair trial, probably for a whole year, or even longer. If troublesome eruptions are produced by the potash, an intermission must be allowed till these are recovered from. It is also well to remember that some persons who are thoroughly intolerant of iodide of potassium can take iodide of sodium without any outward effects. Dr. Balfour speaks truly when he says the results (from iodide treatment) "are extremely encouraging; and when we reflect upon the entire absence of any risk to the patient from the treatment, and the almost certainty of relief to his sufferings and prolongation of his life being at least attained, I think I am warranted in saying that no treatment for internal aneurism hitherto devised holds out anything like an equal prospect of relief, if not of cure, with that by the iodide of potassium."

Tannic acid and acetate of lead have both been given with a view to promote coagulation within the sac and to favor contraction of its walls. No reasonable degree of success has followed in either case, even although the latter salt has repeatedly been pushed to the production of full toxic effects. I have tried it in one case of aneurism of the abdominal aorta, continuing its use until a deep blue line appeared on the gums, but without any noticeable change in the size of the tumor or the strength of the pulsations.

Ergotin, given internally (or by hypodermic injections), on theoretical grounds, to contract the vessel, has failed to produce any reliable results.

The hypodermic injection of a one-per-cent. solution of gelatin in normal saline solution has been strongly recommended by Lancereaux, with the view of causing coagulation in the sac. From 50 to 100 c.c. may be injected beneath the skin of the buttock, or thrown deeply into the muscles. There is sometimes considerable local pain and even general febrile reaction after this procedure. Although successful cases have been reported, the method is by no means free from danger. Serious and even fatal results have followed the injections, owing to the detachment of large emboli. The method is, therefore, not likely to come into very general use.

Mr. Christopher Heath and a few others have suggested and practised ligature of one or more of the great branches of the aortic arch, the object, of course, being to retard still further the blood current and thus promote coagulation. Some support is given to this procedure from the benefit that has been observed in certain cases of aortic aneurism in which the carotid and subclavian of the right side had been ligatured, under the impression that the disease was confined to the innominate artery. At most it would be applicable only to cases in which the tumor was sacculated and either involved the root or was situated close to the origin of some of the great vessels. Evidence of extensive atheromatous disease would preclude any prospect of advantage from this surgical procedure.

Attempts have also been made to produce rapid coagulation of the blood within the sac by the introduction therein of foreign bodies. Fine iron wire, watch-spring, and horsehair have been employed for this purpose. The results, however, have been more or less disastrous. The coagulum thus formed is soft or friable, and consequently very liable to the detachment of emboli, and moreover it is actually loose in the centre of the sac, instead of being regularly laminated upon its sides. Inflammation of the sac is liable to occur, and as there are no means of keeping this within the bounds of safety,

it may itself cause dangerous symptoms. With the use of strict aseptic precautions this risk is, however, reduced to a minimum. The principle seems faulty, and the absence of good results has caused the treatment to be abandoned.

There still remains to be mentioned a form of treatment which has seemed to be of service in a few cases of otherwise desperate character. That is *galvano-puncture*. The use of electricity in this way is permissible only after a fair trial, for a sufficient length of time, of complete rest and iodide of potassium. It is advised in sacculated aneurisms which are situated near the surface of the chest, have resisted treatment, are rapidly enlarging, and threaten soon to rupture. This method, in suitable cases, has met with a certain measure of success, but it has much more frequently failed of its object, in some instances even having caused dangerous inflammation of the sac, and in others having hastened the occurrence of rupture. For galvano-puncture it is necessary to employ a battery of considerable strength, the Leclanché or Stöher element being what is generally preferred. Experiments have been made with one needle only or with both introduced within the sac. From these it seems to be generally admitted that it is necessary to pass in only one or two needles connected with the positive pole, while the negative is attached to a flat metallic electrode on the surface of the abdomen. It is recommended either to continue the current for a short time only, say twenty or thirty minutes, by which time a small clot will have formed, and this will constitute a nucleus for further deposition; or else to allow the current to pass for a time sufficient to coagulate the entire contents of the aneurism, say for two or three hours. It may be necessary to repeat the operation after an interval of some days.

Another method of producing coagulation within the sac has been suggested by Macewen: A needle is introduced into the sac and the inner wall scratched with its point. The object is to produce an exudation of leucocytes with the formation of firm, white thrombi. The needle should never be left in for more than forty-eight hours and often for a shorter time. It is sometimes necessary to repeat the process several times. In the case of large aneurisms several needles may be introduced so as to irritate a large portion of the lining of the sac. This method has been employed in too small a number of instances to warrant us in drawing any trustworthy conclusions as to its value.

The method of all others which seems to hold out the greatest prospect of success, when it is decided to penetrate the sac, is that first suggested by Corradi. It consists in the introduction of coils of gold or silver wire into the sac through a hollow needle, combined with the passage of a strong galvanic current, the anode being connected with the wire. There can be no doubt that a firm coagulum forms about the wire, and in favorable cases pulsation of the tumor lessens or ceases. Four successful cases have been recorded in America, and with the improved technique suggested by Stewart, a greater degree of success may be looked for in the future. A full account of the technique will be found in Stewart's papers in the *American Journal of Medical Science*, 1892 and 1896.

Although the special treatment of thoracic aneurism in the majority of cases consists of prolonged rest and the administration of iodide of potassium, as above detailed, there are besides these certain therapeutic measures at our command for the relief of individual symptoms.

Excited cardiac action and palpitation are best relieved by the judicious use of tincture of digitalis and the employment of a bladder of ice over the front of the chest.

The pain, it has been already stated, is generally best treated by the iodide of potassium. If, however, it be very severe, it may be necessary to use hypodermic injections of morphine until the iodide shall have had time to act. Moreover, we do meet with rare cases in which the effect of the iodide ultimately becomes lost, and our only resort is the frequent use of morphine to make life bearable. One very marked case of this kind came under my

notice in the person of a hospital patient. His aneurism was as large as a cricket ball, and almost as solid. Neuralgic pains were complained of persistently, were relieved for a considerable time by the iodide treatment, but, for more than a year previous to his death, we were obliged to administer daily hypodermics of morphine in considerable quantity. Pain of well-defined neuralgic character (especially along the intercostal nerve) is decidedly benefited by the application of small blisters over the most tender parts.

Dyspnoea, if due to accompanying catarrh, must be treated with reference to the latter disorder. But if, as is most frequently the case, it is the result of mechanical pressure and irritation of nerves, recourse must be had to sedatives and narcotics, especially morphine and hydrocyanic acid. Alcohol in tolerably full doses is also of considerable assistance.

If a projecting tumor form, care must be taken to protect it from injury or friction by some arrangement of pads or a shield of some smooth metallic substance lined with cloth.

When rupture has actually taken place, we can probably do nothing; but, if any preliminary bleeding should occur, we may endeavor to prevent this going on to rapid hemorrhage by the use of ice externally and the administration of astringents with ergot, while the most perfect quietude is enjoined. *George Ross.*

RECENT LITERATURE.

Hershey: *Therapeutic Gazette*, September 15, 1896. (Introduction of gold wire into an aneurism of the innominate artery; application of galvanic current for a period of one hour and twenty minutes; partial solidification of contents of aneurism; patient remained well for nine and a half months after the operation.)

Stewart: *British Medical Journal*, August 14, 1897. (Report of post-mortem conditions found in a very large innominate aneurism after the introduction of a coil of gold wire.)

Langton: "Treatment," May 25, 1899. (Report of a case of aneurism of the abdominal aorta cured by the introduction of silver wire into the sac.)

Lancereaux et Paulesco: *Gazette des hôpitaux*, No. 71, 1897. (Injections, at intervals of from two to five days, of a solution of gelatin into the subcutaneous tissues, in a case of aortic aneurism; diminution in size and increased firmness of the aneurismal tumor; disappearance of the pain.)

Lancereaux: *Journal des praticiens*, November 19, 1898. (Further details in regard to the technique which he employs in the treatment of aneurism by the subcutaneous injection of solutions of gelatin.)

Stoicesco: *Journal de médecine interne*, July 21, 1899. (Reports of six cases of aneurism of the aorta and innominate artery treated by the gelatin method.)

ANGELICA.—*Angelica* L. (fam. *Umbellifera*) is a genus the limits and dimensions of which are greatly in dispute among botanists, the various sub-genera of one author being regarded as so many distinct genera by another. As recognized by Messrs. Engler and Prantl, whom we follow, it contains about twenty-five species, most of them natives of the cool temperate regions of the northern hemisphere. The plants abound in the aromatic principles of the family. A number of them have been employed in domestic practice, and two, under the names "European" and "American" angelica, have been very extensively used in medicine.

European Angelica is the rhizome and roots of *Angelica archangelica* L., a biennial, four to six feet high, with a stout, hollow, purple-green, fluted stem, large compound leaves with clasping petioles, and large umbels of white flowers. It is a native of far Northern Europe and Asia, and is very extensively cultivated, our commercial supplies coming mostly from cultivated plants of Germany and France.

It is one of the few vegetables whose use began in the extreme north of Europe and extended southward. It

was an article of food in Norway and Iceland many years ago, when its spicy taste made it a grateful addition to the monotonous diet of the North. Later, in the fifteenth and sixteenth centuries, it was generally cultivated throughout Central Europe. Since then, the use of angelica has been gradually diminishing, milder-flavored vegetables taking its place, and it is only grown at present to fill a very moderate demand in domestic and veterinary medicine, confectionery, and liqueurs.

It is important to note the extensive use of the "candied" stems (*Angelica glacé*) as a confection, since important cases of poisoning sometimes result from the ignorant use of certain toxic plants which bear a close resemblance to this.

The root consists of a large short rhizome, terminated above by a hollow stem, and often worm-eaten. Below, it divides into numerous thick, fleshy roots, 4 mm. (one-eighth of an inch) in thickness, and 20 or 30 cm. in length, of a blackish-brown color, much wrinkled longitudinally, and tuberculated. They are rather soft and pliable, brownish white within, and in the dried specimens lie in a parallel tress or bunch. The odor is rather pleasant; the taste at first sweetish, later bitter and musky. Radially arranged oil, etc., ducts are to be seen under the microscope on section, chiefly in the cortical portion.

The constituents of angelica are, first, an *essential oil*, of which it yields from eight-tenths to one per cent.; this has the odor of the plant and the usual carminative qualities of the oils of the order. Second, six to ten per cent. of resin. Third, *angelic acid*, one-third of one per cent., discovered by Buchner in 1843, and since found in a number of other plants, as well as made by synthesis; an odorless crystalline volatile acid. Fourth, a very small

amount of valerianic acid, together with the crystalline angelicin, an amaroïd, and a little each of starch, tannin, and sugar.

Its properties are aromatic, stimulant, carminative, and flavoring, as usual in the family. The dose is from 0.6 to 2 gm. (gr. viij.-xxx.).

Angelica oil from this source is an article of commerce.

American Angelica is the root of *Angelica atropurpurea* L., a plant of very similar habit to the last, growing in North-eastern North America. The roots grow in the same manner from a similar rhizome, but are marketed detached therefrom. They are somewhat larger than those of the European, and are of a light gray-brown color. The composition and properties are practically the same, though the root and the oil have a perceptibly different odor and taste.

H. H. Rusby.

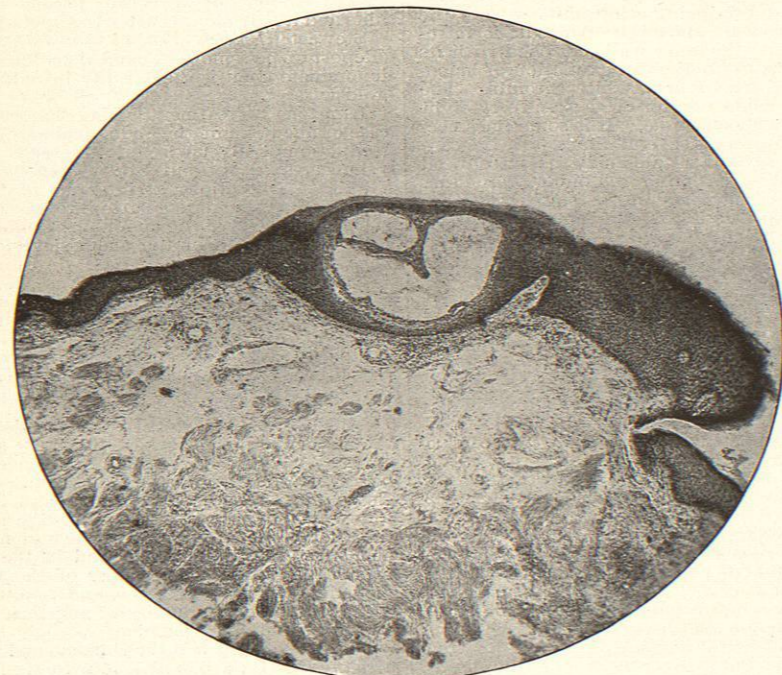


FIG. 201.—Section through Small Blood Cavity Completely Enclosed by Hypertrophied Rete. Thickened epithelium at right of section. Spencer, one inch; ocular, one and one-quarter inches.

ANGINA PECTORIS. See *Heart, Neuroses of the.*

ANGIOKERATOMA. (Synonyms: Kerato-angioma; Telangiectatic Wart.)

DEFINITION.—An unusual skin disease, chiefly met with on the hands and feet of those subject to chilblains. It consists of single and grouped papular and nodular lesions of a reddish or purplish color, made up of epidermic hypertrophy covering dilatation of the capillary vessels in the papillae.

HISTORY.—Mibelli gave the first anatomical description of the condition met with in the affection and proposed the name "angiokeratoma" for the disease. The lesions which formed the basis of his observations occurred on the dorsal surface of the fingers of a fourteen-year-old girl, and had existed for several years. They were preceded by chilblains.

Before Mibelli's careful investigations, cases of the same affection had been noted by other writers under various names; the true nature of the lesions had not, however, been determined.

We are indebted to Pringle for a most accurate and painstaking description of the clinical appearance and morbid anatomy of the affection, as well as for an analysis of most of the cases which had been met with up to the time of his publication.

Pringle reported two cases affecting girls with chilblains, and his histological findings agree in all essential points with those of Mibelli. Since the publication of these cases a number of others have been reported, among them Zeisler's, which presented, in addition to characteristic lesions on the hands and feet, naevus-like patches and pedunculated vascular tumors on the forearms, over the

patellae, the legs, thighs, and auricles.

In the case reported by myself, the skin of the scrotum was the seat of a number of small, spherical-shaped, dark purple tumors. They were arranged in a linear manner as if following the superficial vascular supply of the parts. The small growths, from the size of a pin's head to several times that size, were distinctly elevated above the surface of the scrotum, seeming to rest on it rather than to be embedded in the skin. Some of them were covered by a slightly thickened horny layer under which minute dark red points could be seen, giving the tumors a wart-

like appearance. In this patient the hands and feet were not involved, and the usual etiological factor, chilblains, could not, of course, be invoked to explain the development of the lesions.

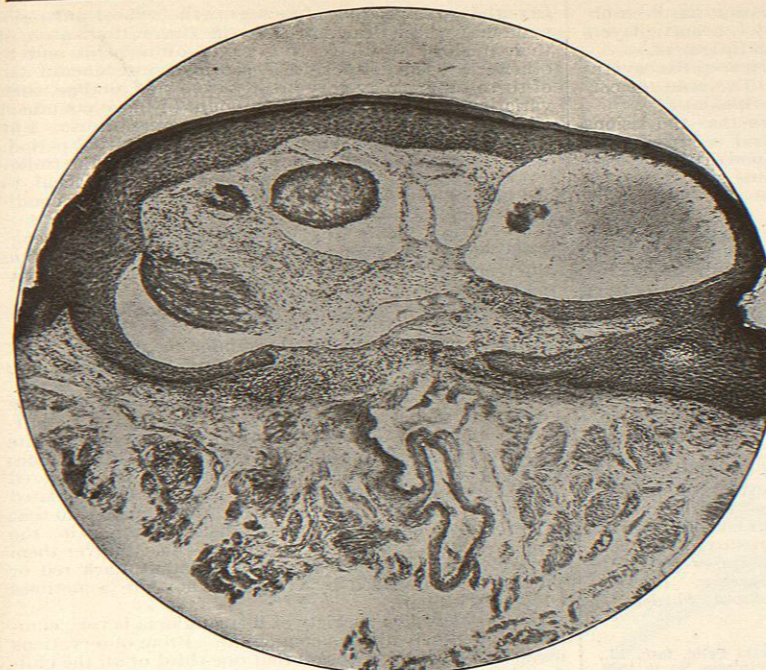


FIG. 202.—Large Tumor Showing Cavernous Spaces Divided by Fibrous Septa. Organized blood clots on the left of section. Spencer, one inch; ocular, one and one-quarter inches.

I have lately, through the kindness of Dr. Levisseur, seen a similar case in which the small tumors were seated on the vulva of a young girl. The diagnosis, in this case, was confirmed by the microscope.

Anderson has reported a case in which the eruption began over the knees at the age of eleven years, gradually spreading to the trunk and upper extremities, and finally involving almost the entire surface of the body with the exception of the hands and feet.

SYMPTOMATOLOGY.—A history of recurring attacks of chilblains precedes the development of the affection on the hands and feet. After a variable time minute telangiectases appear over the dorsal surfaces of the phalanges of the fingers and toes, which eventually cannot be made to disappear by pressure. The points of vascular dilatation become grouped, and over them the epidermis undergoes thickening, giving rise to hemispherical lesions from the size of a pin's head to that of a split pea, or larger, having a rough warty surface and a dark purple or lead color.

The minute vascular points beneath the thickened epithelium can be detected by making pressure on the growths.

In some cases lesions in all stages of development from minute pink points to the commingled warty growths can be detected. The

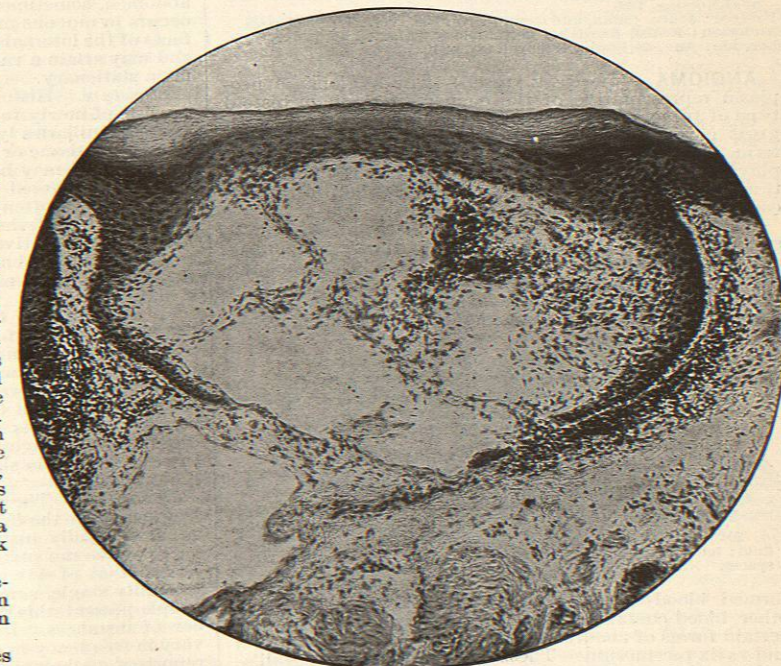


FIG. 203.—Cavernous Spaces Filled with Blood Corpuscles and Divided by Fibrous Septa. Hypertrophy of stratum corneum and rete Malpighii. Spencer, one-half inch; projection ocular, 2 Zeiss.

palms and soles may be involved. On parts of the body where the stratum corneum is thinner than on the hands and feet its hypertrophy is less marked than in the latter localities and may not be perceptibly thickened. It is usually bilateral, though not strictly symmetrical. The affection may persist indefinitely, become stationary, or disappear.

PATHOLOGY AND MORBID ANATOMY.—The primary change is undoubtedly in the capillary vessels of the papillae, which, subjected to repeated congestions, become permanently dilated, leading to the formation of cavernous spaces, and by pressure alter the normal conformation of the parts. On the hands and feet the stratum corneum covering the lesions is greatly thickened; this change is not so pronounced, however, when the affection is met with in other regions. The characteristic pathological changes are shown in the accompanying photomicrographs made from sections of tumors removed from the scrotum.

In Fig. 201, a small cavity filled with red and white blood corpuscles is shown completely surrounded by the hypertrophied rete layer.

On the right of Fig. 202, a large cavernous space is seen to be filled with blood corpuscles, which have by pressure caused a marked atrophy of the epidermis.

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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Leredde: *Ann. de Derm.*, 1898, vol. ix., p. 1095.

ANGIOMA.—(*ἀγγειον*, 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, angiomas are classified into—1. Hæmangiomas; 2. Lymphangiomas.

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

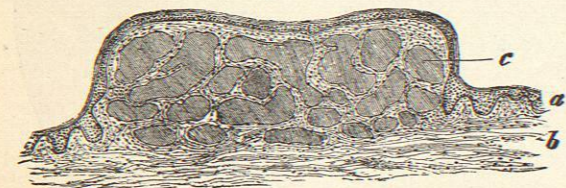


FIG. 204.—Angioma Cavernosum Cutaneum Congenitum. (Müller's fluid; hæmatoxylin.) a, Epidermis; b, corium; c, cavernous blood spaces. X 20 diameters. (After Ziegler.)

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 hæmangiomas 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 hæmangiomas 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 hæmangiomas 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

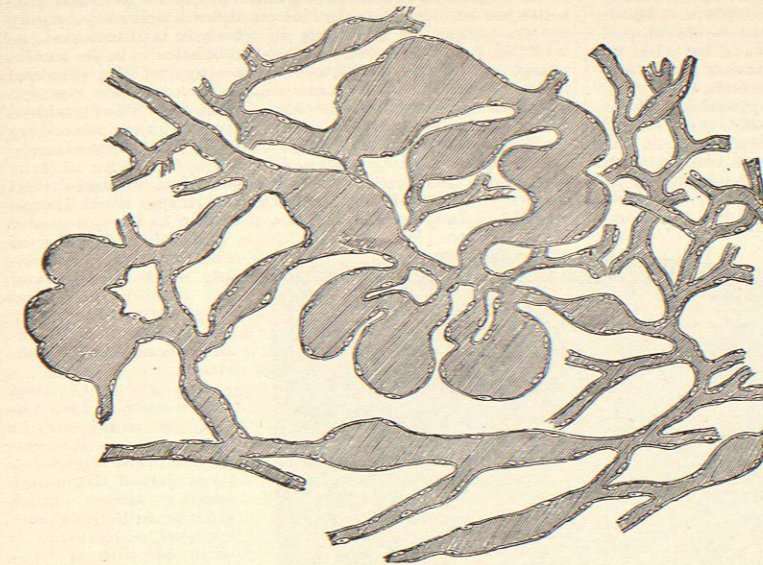


FIG. 205.—Dilated Capillaries from a Telangiectatic Tumor of the Brain, All the Attached Portions of Tumor Tissue having been Shaken Off in Water. X 200. (After Ziegler.)

is found in the *skin* less frequently than are the simple hæmangiomas. 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 trabeculae 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 local-

ized 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 hæmangiomas, 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 hæmangiomas 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

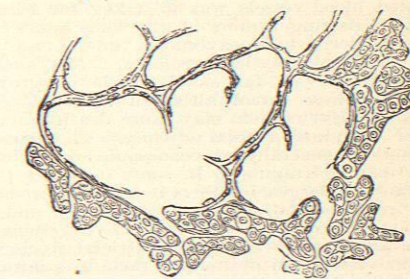


FIG. 206.—Section through the Margin of a Very Small Cavernous Angioma of the Liver at a Time When This Margin Was in Process of Active Growth. (Carmin preparation.) X 150 diameters. (After Ziegler.)

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