anastomotica magna artery (A. genu suprema) just before it pierces the adductor foramen. This artery divides into a superficial and a deep branch. The former runs on the vastus internus (M. vastus medialis) and aids in forming the plexus on the front of the knee. The deep branch penetrates the substance of the vastus internus and anas-

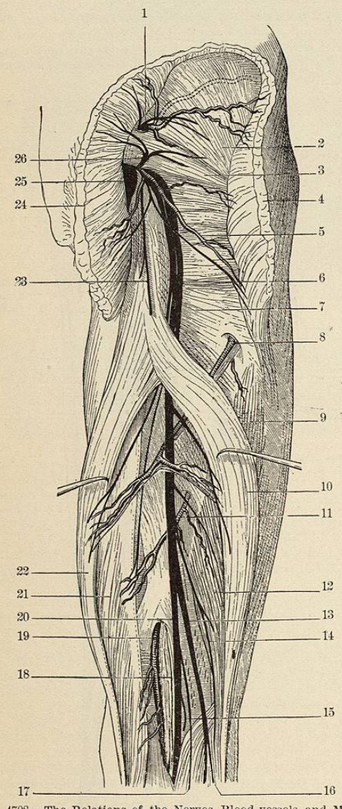

FIG. 4706.—The Relations of the Nerves, Blood-vessels, and Muscles of the Back of the Thigh. (Merkel-Henle.) 1, Superior gluteal artery and nerve; 2, M. gluteus medius; 3, M. pyriformis; 4, M. gluteus magnus; 5, inferior gluteal artery; 6, N. ischiadicus (sciatic nerve); 7, adductor muscles; 8, A. perforans I.; 9, M. biceps (short head); 10, M. biceps (long head); 11, A. perforans II.; 12, M. biceps; 13, N. peronæus communis (external popliteal); 14, superior articular branch from the external popliteal nerve; 15, inferior articular branch from the internal popliteal nerve; 16, N. cutaneus suræ lateralis; 17, N. cutaneus suræ medialis; 18, V. saphena parva (not well shown. It is represented by a part of the light area between the artery and nerve); 19, popliteal artery and vein; 20, N. tibialis (internal popliteal); 21, M. semimembranosus; 22, M. semitendinosus; 23, N. cutaneus femoris posticus (small sciatic nerve); 24, M. gluteus magnus; 25, pudic artery and nerve; 26, inferior gluteal nerve.

tomoses with the internal inferior articular branch of the popliteal (A. articularia genu superior lateralis) and supplies with them the knee-joint.

The *obturator artery* properly belongs to the pelvis, but it anastomoses with the internal circumflex artery (A. circumflexa medialis), and through the sciatic with the inferior gluteal. Through these connections it forms one of the most important channels of the circulation after ligation of the femoral.

Femoral Vein (V. femoralis).—The femoral vein lies to the inner (Fig. 4707) side of the artery and in the same sheath as it emerges from under Poupart's ligament (L. inguinale). As it passes through Scarpa's triangle (trigonum subinguinale) it passes spirally around the artery until at the apex it is directly posterior to it. In the lower part of the thigh it is below and somewhat to the lateral aspect of the artery. Two venæ comites are often present, and may be strongly developed.

Braun* has collected the following figures in regard to ligation of the vein: In 17 cases with the vein only ligated just under Poupart's ligament, 8 cases recovered and gangrene resulted in none. In 6 cases in which the ligation was concomitant with a removal of part of the vein, recovery resulted in 3 cases, gangrene in 2, and death in 1 case. In a series of 15 cases in which both the artery and the vein were ligated gangrene followed in 7.

Anterior Crural Nerve (N. femoralis).—The anterior crural passes below Poupart's ligament to the outside of the femoral artery (Fig. 4707). From this it is separated by the strong fascia iliaca. At a distance of from two to three centimetres under Poupart's ligament it divides into a number of branches to supply the skin and muscles of the anterior portion of the thigh (Figs. 4703 and 4707). The superficial branch runs under the sartorius, pierces and supplies that muscle, and pierces the fascia lata as the middle and internal cutaneous nerves. The deep branches supply the four portions of the quadriceps femoris muscle, and a small branch accompanies the internal circumflex artery to the pectineus. The anterior crural nerve also gives rise to the long saphenous nerve which accompanies the femoral artery through Hunter's canal.

Obturator nerve (N. obturatorius).—The obturator nerve reaches the inner side of the thigh by passing through the obturator foramen. It divides into a superficial and a deep branch. The superficial sends a small branch also to the pectineus, which thus obtains a nerve supply from two sources. It also supplies the adductor brevis and the abductor gracilis, and usually supplies the cutaneous branch to the skin over Hunter's canal and the lower part of the adductor longus muscle. The deep branches supply the obturator externus muscle and the adductor magnus. The obturator nerve thus supplies all of the muscles of this group except the part of the pectineus supplied by the anterior crural.

POSTERIOR SIDE OF THE THIGH.—The skin and fascia are sufficiently like those on the anterior side to need no special description. The small sciatic nerve (N. cutaneus femoris posterior) is found just under the fascia, and is distributed to the skin and fascia of the posterior aspect of the thigh, popliteal space, and leg.

The muscles found on the posterior side of the thigh have already been mentioned. They are the Mm. biceps, semitendinosus, and semimembranosus.

The *biceps* (M. biceps) springs from two heads. The long head takes origin in common with the semitendinosus from the tuber ischii. The short head has its origin in the middle third of the outer lip of the linea aspera. The two unite and are inserted into the head of the fibula. The long head is supplied by the internal popliteal nerve (N. tibialis), and the short head by the external popliteal (N. peronæus communis).

The *semitendinosus* (M. semitendinosus) has its origin on the tuber ischii and is inserted into the inner tuberosity of the tibia. It is supplied by the internal popliteal nerve (N. tibialis).

The *semimembranosus* (M. semimembranosus) arises by a long flat tendon from the tuber ischii, and is inserted into the inner tuberosity of the tibia beneath the semitendinosus. It is supplied by the internal popliteal nerve (N. tibialis).

The *great sciatic nerve* (N. ischiadicus).—This is the

*Braun: Archiv f. klin. Chirurgie, Bd. 37, Heft 3.

largest nerve in the body. It emerges under the gluteus maximus muscle and runs downward to the middle of the popliteal space (Fig. 4708). After emerging from under the gluteus maximus it is covered by the long head of the biceps. Between these flexor muscles it is buried in loose fatty connective tissue, which forms an easy path for burrowing pus from abscesses that have their origin usually in the pelvis. In this way the pus may reach the popliteal space. A line drawn from a point a little toward the median side of the centre of a line drawn from the great trochanter to the tuber ischii, to the middle of the popliteal space will lie over the nerve, and it is available as a guide in operations below the gluteofemoral crease. The nerve divides a little below the middle of the thigh into two branches, the internal (N. tibialis) and the external (N. peronæus) popliteal branches. The great sciatic nerve supplies the muscles of the back of the thigh, as has already been described. Its size and the number of its sensory fibres make it an important nerve in causing shock. Operative procedures involving this nerve may be made less serious by the use of cocaine locally, or by manipulations that reduce the mechanical irritation to a minimum.

Arteries and Veins.—The superior portion of the back of the thigh is supplied by the inferior gluteal artery (A. glutæa inferior) (Fig. 4708). It anastomoses with the internal and external circumflex arteries and the perforating arteries. The perforating arteries (Fig. 4708) are usually three in number and supply the muscles on the back of the thigh. The deep veins of the posterior side accompany the artery.

The Skeleton of the Thigh.—The shaft of the femur is bent in the form of a bow anteriorly. This outward and anterior curve gives the adductor muscles (the adductor magnus especially) a greater angle, and this arrangement of the muscle is the cause of the lower fragment often being pulled upon the inner one in fracture. In old age the spongy bone in the neck of the femur often undergoes fatty degeneration and disappears. This is the cause of the increased frequency of fracture at this part of the bone in old age. It occurs oftener in women than in men, owing to the fact that the angle is more obtuse in women than in men, and so the strain has a greater mechanical advantage. *Mervin T. Sudler.*

THILANIN.—This title is given to a compound of sulphur and lanolin, which is said to contain three per cent. of sulphur, but whether in combination with the cholesterin or with the fatty acids is undetermined. It was introduced by Dr. Edmund Saalfeld, at the third Congress of the German Dermatological Society, as being devoid of any irritating properties and useful in cutaneous affections. *Beaumont Small.*

THIOCOL, guaiacol-sulphonate of potassium, $C_6H_3.OH.OCH_3.SO_3K$, is a white, odorless crystalline powder with a faintly bitter taste. It is soluble in water or diluted alcohol, but not in strong alcohol, ether, or the fatty oils. Its aqueous solution is turned violet-blue by ferric chloride.

Thiocol, being a soluble compound of guaiacol, has the medicinal properties of this substance; but its taste is not disagreeable, it is unirritating to the stomach, and it does not "repeat" after ingestion. Being soluble it is easily administered and rapidly absorbed. Schwarz states that 15 gm. (℥ ss.) a day have been taken with no unfavorable symptoms. The results in tuberculous patients, as noted by Mendelssohn, Braun, Moir of Edinburgh, and many others, are increased appetite, lessened cough and sputum, disappearance of night sweats, moderation of the diarrhœa, and general improvement. The employment in whooping-cough and respiratory troubles other than tuberculosis has met with ardent advocates. In enteritis Schnirer studied its action in thirty-eight cases, and placed it among the valuable antidiarrhœic remedies. For children he recommends ℞ Thiocol, 0.5 c.c. (♏ viij.); syrup of orange peel, 10 c.c. (℥ iiss.); water to make 60 c.c. (℥ ij.). Sig.: A teaspoonful every two hours. For the adult, thiocol may be administered in capsule, cachet, tablet, or solution. The dose is 0.5 gm. (gr. viij.) three times a day, gradually increased.

A ten-per-cent. syrup of thiocol is marketed under the name of "*Sirolin.*" *W. A. Bastedo.*

THIOCYANATES. See *Sulphocyanides.*

THIOFORM is a basic bismuth di-thio-salicylate. It is a yellow, odorless powder containing seventy-two per cent. of bismuth oxide, and is used as a dusting powder or ten-per-cent. ointment in place of iodoform. There are good reports of its employment in eczema.
W. A. Bastedo.

THIOGENOL is a compound of sodium sulphonate containing ten per cent. of sulphur. It is readily soluble in water and alcohol and is used by Jaquet in two-per-cent. solution as an injection in gonorrhœa, and both pure and in twenty-per-cent. ointment for dermatitis and prurigo. It is an ichthyol substitute. *W. A. Bastedo.*

THIOL.—An artificial ichthyol, prepared by treating with sulphur the hydrocarbons having a specific gravity between 0.890 and 0.900, that are obtained from coal tar. The latter differs from ichthyol by the absence of much organic matter that supplies its objectionable qualities, their presence, it is claimed, being of no therapeutic value. After the thiol has been separated it is evaporated to an extract—*thiolum liquidum,* or to complete dryness—*thiolum siccum.*

Liquid thiol is a thin, brownish, neutral liquid, with a specific gravity of 1.080 to 1.082 at 60° F. It has a feeble bituminous odor, not disagreeable. It forms a clear solution with water, especially if glycerin be added. It is not very soluble in alcohol or ether. Aqueous solutions froth abundantly when shaken; they are not affected by the addition of strong alcohol, but soda, dilute acids, or metallic salts cause a precipitate. Dry thiol, which forms forty per cent. of the liquid form, is a dark brown or blackish mass, sometimes formed in scales, which, when heated, burns away entirely, leaving no residue. The advantages claimed for thiol over ichthyol are, that it is really a purified form of the latter, that it is devoid of the disagreeable odor, and does not stain the linen or clothing, is less irritating, and more definite in composition. The therapeutic use of thiol is the same as that of ichthyol.

Although the pure drug may be applied without causing any irritant action, a ten-per-cent. preparation is generally sufficient for all purposes. The powder may be combined with powdered starch; or aqueous or glycerin solutions may be prepared. For wounds a five- or ten-per-cent. solution in collodion is very serviceable. An ointment may be made with vaselin or lanolin.

For inflammatory diseases, and in gynecological practice, its action is increased by internal administration in addition to its local use. The dose is one grain and a half, which may be repeated up to five times a day. It is given in cachets, in pill form, or in solution in wine.
Beaumont Small.

THIOLINIC ACID, sulphurated linseed oil, thiolin, is a dark green semi-solid mass of peculiar mustard-like odor, containing about fifteen per cent. of sulphur. It is insoluble in water and soluble in alcohol, and is employed as a succedaneum for ichthyol. *W. A. Bastedo.*

THIOPHENE.—C_4H_4S. This is a sulphur-holding hydrocarbon, contained in coal-tar benzin. In the pure state it is a colorless, clear, volatile oil, boiling at 184° F., of slight odor, and will not mix with water. Thiophene itself is not employed as a therapeutic agent, but two preparations have been introduced—*sodium thiophensulphonate* and *thiophene di-iodide.*

Sodium thiophensulphonate, $C_4H_3SNaSO_3$, is a white crystalline powder, containing thirty-three per cent. of

sulphur, and having a slight but unpleasant odor. Used as a dusting powder, or applied as an ointment, ten per cent., with equal parts of lanolin and vaseline, it has proved of much service in all forms of prurigo. A lead salt has also been prepared and used with success in the same disorder.

Thiophene di-iodide, $C_4H_2I_2S$; contains seventy-five per cent. of iodine and 9.5 per cent. of sulphur. It forms in fine crystalline plates, insoluble in water. The di-iodide has been proposed as a substitute for iodoform, as it has a less unpleasant odor. *Beaumont Small.*

THIO-RESORCIN, $C_6H_4(SH)_2$, is a yellowish-gray insoluble powder made by fusing together resorcin and sulphur. It is a substitute for iodoform, and has been employed in skin and scalp diseases in ten-per-cent. ointment. *W. A. Bastedo.*

THIO-SALICYLIC ACID, $C_6H_4.SH.COOH$, is salicylic acid with an oxygen atom replaced by sulphur. It is used like salicylic acid as an antiseptic. *W. A. Bastedo.*

THIOSAPOL, a soda soap (hard soap) containing about ten per cent. of sulphur in combination, is used in the treatment of skin diseases. *Thiosavonal* is the corresponding potash soap (soft soap). *W. A. Bastedo.*

THIOSINAMINE (*Allyl-Sulpho-Carbamide*).—This long known chemical compound has been recently introduced as a drug possessing valuable therapeutic properties. It is obtained by the action of alcohol and ammonia upon the ethereal oil of mustard, which forms a basic compound with the following formula, $C_3H_5.NH.NH_2.CS$. It forms in colorless and odorless prismatic crystals, having a bitter taste, and is readily soluble in water, alcohol, and ether.

Thiosinamine has attracted attention on account of its reputed resolvent action upon scar tissue. When injected into tissue causing deformity and disability by contracture, it is said to produce a softening and relaxation which allow the part to become free and pliable. Numerous cases of fingers and limbs that were beyond the use of the knife are reported to have been almost perfectly restored. This effect was announced by Dr. H. von Hebra, Jr., of Vienna, in 1892, at the International Congress on Dermatology. He recommends that a fifteen-per-cent. alcoholic solution be prepared, and that two injections a week be used. It has been used with success for the purpose of relaxing the cicatricial tissue of urethral strictures. It has also been used in gynecological practice to relieve the symptoms arising from the effects of perimetritis and inflammatory troubles about the appendages. In addition to its action on cicatricial tissue, it causes a decided increase in diuresis and diaphoresis, and exerts a powerful tonic effect upon the system, in consequence of which it was thought to have a beneficial resolvent action upon local tuberculosis. Upon chronic enlargement of lymphatic glands its effect was very marked. In a number of cases of lupus it was noticed to exert a beneficial action. It has been reputed as acting favorably upon corneal opacities and deafness from thickening of the membranes. The injections are made in the interscapular or gluteal regions. No constitutional effect followed the injections, but a local reaction set in after a few hours, causing redness, tension, and swelling of the affected part. A ten-per-cent. solution in glycerin and water may be used. The dose is from one to three grains. *Beaumont Small.*

THIRD NERVE.—See *Cranial Nerves.*

THIRST.—1. Definition and Classification.—Gould defines thirst as "a state manifested by a desire for drink." The Century Dictionary defines thirst as "the uncomfortable sensation arising from the want of liquid nutriment; the uneasiness and suffering occasioned by want of drink; vehement desire for drink." From these definitions it becomes clear that thirst, as understood by the lexicographers, expresses first, *a condition of body;* second, *a sensation;* third, *a desire.* The condition is the need of water; the sensation is one of dryness of the mucous membranes, especially those of the mouth and fossæ. Following this sensation there is a natural desire for the needed water to allay the sensation.

In classifying thirst among the sensations, it is necessary to remember that all sensations may be divided into objective and subjective, the objective sensations being those which arise from stimuli caused by natural substances or forces acting upon sensory nerve ends; while subjective sensations are the re-experiencing of objective sensations without any physical basis. Subjective sensations are illusory and are experienced in dreams and in certain unusual conditions of the nervous system. Objective sensations may be subdivided into two classes: First, those caused by objects or forces outside of the body, as vision is caused by light entering the eye from without, or hearing, by sound waves entering the ear from without.

The second class of objective sensations may be called *indirect objective* or *auto-objective.* This class of sensations includes hunger, thirst, suffocation, pain, fatigue, etc. It will be noted that these auto-objective sensations all arise from different conditions that exist within the system, the first three named being manifestations of needs of the body for more matter, the last two, manifestations of overstimulation or overwork.

2. Physiological Considerations.—In order to get a clear idea of thirst, it is necessary for us to consider briefly the need of the system for water. The first need arises in the process of digestion within the alimentary tract and absorption from the alimentary tract. Nearly all of the digestive processes are hydrolytic cleavages which involve not only the incorporation of molecules of water into new combinations, but which combinations take place far more readily in the presence of abundant water. Absorption takes place slowly and with difficulty if the digested products are not thoroughly diluted with water. Once the food is absorbed and passes into the circulation, the proportion of water in the blood must remain fairly constant, otherwise the diffusion of blood and lymph plasma carrying nutrition to the tissues is interfered with. The metabolic processes in general involve either the incorporation or the liberation of water molecules, and these processes take place freely in the presence of an ample supply of water only. Secretion and excretion from glandular epithelia are scanty except for an abundance of water in the blood.

These various needs of the system for water are manifested, first and most apparently, by decreased water in secretion and excretion. This decrease of the water contents of secretion and excretion is most noticeable to the subject in the drying of the mucous membranes of the mouth and throat. This, in fact, is the sensation usually experienced in thirst and associated with that term. There is also, however, an increased specific gravity of the blood and lymph followed by what may be termed a tissue thirst, or a need of the active tissues of the body for water. This leads to a classification of thirst into *local* or *external thirst* as experienced in the mouth and throat on the one hand, and *general* or *internal thirst* experienced by the tissues of the body, and appealing to the consciousness in a rather vague feeling of lassitude difficult to describe, but quickly relieved by a copious draught of cool water.

The nervous mechanism of the sensation of thirst is obscure. Sherrington, in his chapter on sensation (Schaefer's "Textbook of Physiology," vol. ii., p. 992) refers to a thirst centre located in the medulla in association with the nuclei of the ninth and tenth nerves, the cerebral connections passing from this centre upward, the afferent impulses coming from the distribution of the glossopharyngeus and vagus nerves in the mouth, pharynx, œsophagus, and stomach. If we accept this theory, we are driven to the alternative of supposing that the thirst centre, wherever that may be located, is

influenced by the blood supplying the centre. This theory, while it might account for general tissue thirst, could not account for the local thirst arising from the dryness of mucous membranes.

Local thirst may be abated or allayed by local application of water to the mucous membranes affected. If the local thirst is, however, a local manifestation of the general condition, this method of allaying it will only be temporary and the sensation will recur a few moments after the application. General thirst may be allayed by intravenous injection of normal saline solution; by introduction of water into the stomach through a stomach tube, or by the introduction of water into the rectum. In all of these cases the water is rapidly absorbed and transported to the thirsty tissues and general thirst is thus assuaged, followed rapidly by an alleviation of local thirst. Had the water been taken in the usual way of drinking, the local thirst would have been temporarily allayed, incidentally upon the passage of the water over the mucous membranes, and this would have been followed presently by a moistening of these tissues from within by the more copious secretions. Variations of the above usual conditions may be noticed. Meteorological conditions, such as a high temperature or low humidity, will cause a profuse perspiration followed by a general increased demand for water. Muscular exercise will have a similar effect. Diet, if rich in salts or sugars, will lead to a demand for water to dilute the solutions to the normal specific gravity, while the free use of diuretic diets, as lemons or oranges, will lead to a depletion of the water of the system and be followed by thirst.

3. Pathological Considerations.—In its pathological relation thirst is called *polydipsia, dipsosis,* or *dipsesis.* It may be said, in passing, that *polydipsia ebrioria* (thirst for intoxicants) is not real thirst in any proper use of that term, though "thirst" is much used to express a desire for alcoholic drinks. Thirst proper is a desire for water.

Polydipsia is associated with many diseases as a symptom.

First, in such diseases as diarrhœa or cholera (in which diarrhœa is a prominent symptom) much water is carried off in watery stools. In diabetes insipidus water is lost in polyuria. In hemorrhage water is lost with the blood. In all of these cases there is extreme thirst as a secondary symptom or condition. This extreme thirst may be abated with frequent draughts of cool water and a free use of liquid diet.

Second, in diabetes mellitus the thirst is a secondary symptom caused by the increased sugar in the blood, which in turn leads to a demand on the part of the tissues for water to lower the specific gravity of the blood.

The polyuria of diabetes mellitus is secondary to the polydipsia, while the polydipsia of the diabetes insipidus is secondary to the polyuria.

Third, in another class of pathological conditions belongs hysterical polydipsia, which is as inexplicable as are other symptoms that may be manifested in hysteria.

4. Dietetic and Therapeutic Considerations.—The adult of average size requires about two litres of water each twenty-four hours to make good the loss by excretion and evaporation. About one-half of this requirement is supplied by the average diet, leaving one litre (about four glasses) to be taken as a beverage. Many adults take much less than this quantity. But many adults take too small an amount of water; few take too much. There is a growing belief in the medical profession that water is a most valuable agent for flushing out accumulating excretory material from the tissues.

The sense of thirst may readily become perverted and thus fail to fulfil nature's plan as an admonisher of a need for water. Such a condition results in malnutrition. *Winfield S. Hall.*

THIRY-VELLA FISTULA.—See *Succus Entericus.*

THIURET, $C_8H_7N_3S_2$, is a sulphur compound which is used as a substitute for iodoform. It is a light, odorless powder insoluble in water and soluble in alcohol and ether. In warm alkaline solution it sets free its sulphur. The compounds with hydrochloric, hydrobromic, salicylic, or sulpho-carbolic acids are somewhat soluble in water. *W. A. Bastedo.*

THOMASVILLE, GEORGIA.—This well-known and desirable winter resort is situated in the southwestern portion of the State, not far from the Florida line, and about one hundred and sixty miles from the Atlantic coast, and fifty-three miles from the Gulf of Mexico. It lies in the great southern pine belt, and, like Summerville, Aiken, and other resorts in this belt, is in a forest of pines, on sandy soil, and at a distance from any body of water. It has an elevation of 380 feet above sea-level, which is the highest ground in that part of the State.

The town is an attractive one, with a population of about seven thousand, with broad and shady streets, a park, churches of various creeds, an opera house, colleges, and many good schools. The place is well lighted, there is a system of sewerage, and there are water-works supplying the whole city from an artesian well nineteen hundred feet deep. The natural drainage of the town is also excellent.

The surrounding country is undulating, and besides corn and cotton, grapes are produced in abundance, and the famous "Le Conte" pear. Many other fruits are also grown here, such as peaches, plums, apples, strawberries, figs, and watermelons; and there is a profusion of flowers.

The accommodations are abundant and good, there being several first-class hotels, a large number of good private boarding-houses, and cottages and rooms to rent by the season or month for housekeeping purposes.

The tuberculous invalid, however, contemplating a temporary residence at Thomasville, must be warned of the difficulty of obtaining accommodations in the hotels or boarding-houses. As a rule such patients are not received, simply because invalids suffering from diseases other than tuberculosis, and tourists in general, will not frequent hotels or boarding-houses where consumptives are taken. The only alternative for the unfortunate tuberculous individual seems to be renting a cottage and establishing a temporary home.

The climate tempts to an almost constant out-of-door existence, and one of the chief attractions of the place is to be found in the beautiful drives through the pine forests. The roads radiate from the town in all directions, and are smooth and solid, being well adapted to cycling. A short distance from the city is the Country Club, with extensive grounds and a club-house. There are also golf links and a pack of fox hounds.

The resort is filled with visitors in the winter and early spring, and is also a stopping-place for those going to or coming from Florida. It is visited by those seeking merely change and recreation as well as by those seeking health. The hospitality of the people is particularly noted.

The climate, as will be seen from an inspection of the accompanying chart, is a comparatively dry one; its winters are warm without the enervating influences of the Florida coast resorts; "it is to a marked degree exempt from severe winds, and there is always a great preponderance of sunshine and of days which admit of out-of-door exercise on the part of the invalid."

The diseases for which such a climate is to be recommended are particularly the various catarrhal affections of the respiratory passages, and incipient or early pulmonary tuberculosis in individuals who have not the resisting power to undergo with advantage the cure in the high altitudes. Moreover, it is a favorable winter climate for very many conditions which require a mild, sunny climate, where outdoor life can be indulged in without great demands upon one's vitality. The feeble, young, or old, those temporarily weakened by sickness or hardship, can lead here a quiet, comfortable existence, and, when possible, regain their former maximum of health and strength.

Access from the north to Thomasville is easy and ex-

CLIMATE OF THOMASVILLE, GA. LATITUDE, 30° 50′; LONGITUDE, 84° 10′. PERIOD OF OBSERVATION, FIVE YEARS TEN MONTHS.

	January.	February.	March.	April.	July.	October.	November.	December.	Year.
Temperature—(Degrees Fahr.)									
Average monthly	52.15°	56.60°	61.55°	67.79°	82.35°	69.18°	58.56°	52.70°	
Mean of warmest	61.12	66.52	72.03	77.21	91.03	77.23	68.12	62.51	
Mean of coldest	43.19	49.08	54.0	61.97	79.14	63.32	51.72	45.18	
Average daily range	17.93	17.44	18.03	15.24	21.89	13.91	16.40	17.33	
Highest or maximum	78.0	82.0	88.0	91.0	101.5	94.5	84.5	79.5	
Lowest or minimum	14.0	28.0	32.0	36.0	66.0	37.0	26.0	10.0	
Humidity—									
Average mean relative	63.7%	62.8%	62.3%	62.3%	66.0%	68.2%	66.6%	64.7%	65.16%
Precipitation—									
Average in inches	3.41	3.36	3.92	5.28	4.69	5.19	2.69	3.85	51.56
Wind—	S. and N. W.	S. and N. W.	S.	S.	S.	S.	S. and S. W.	S. and N. W.	S. S. W., S. E., and N. W.
Prevailing direction									
Average hourly velocity in miles	5.0	5.0	9.0	8.0	3.0	7.0	8.0	7.0	5.8
Average number of fair and clear days	23.0	22.0	24.0	21.0	20.0	24.0	24.0	24.0	26.9

peditious, either all the way by rail or by steamers from Boston or New York to Savannah, and thence by rail.

Edward O. Otis.

THOMSEN'S DISEASE. See *Muscle, Pathology of.*

THORACIC DUCT.—The thoracic duct, the large lymph channel of the body, runs from the receptaculum chyli to the left side of the neck, where it terminates at the angle of junction of the left subclavian and internal jugular veins. The receptaculum chyli is located on the anterior surface of the body of the second lumbar vertebra, and is a dilatation of the lower end of the duct, into which empty a large number of lymphatics and lacteals, from the lumbar region and the organs of digestion. This pouch is not always present, its place being sometimes taken by a network of lymph vessels which unite to form the duct. This vessel has its course upward and to the right, on the anterior surface of the lumbar vertebræ, to the right of the aorta, in company with which it passes between the two crura of the diaphragm and enters the thorax. It now ascends on the dorsal vertebræ, lying between the thoracic aorta and the right vena azygos, and behind the posterior parietal pleura. At the fifth dorsal vertebra it curves to the left, and passing behind the transverse portion of the aorta, runs upward and to the left behind and slightly internal to the left subclavian artery. Passing into the neck, it now lies on the anterior surface of the scalenus anticus muscle, under the deep layer of fascia that lies over the muscle. The point to which it rises in the neck varies considerably. It may pass outward to the angle of junction of the subclavian and internal jugular veins, and empty by a single trunk into the veins as they unite to form the left innominate, never rising above the level of the upper border of the subclavian vein. This is the form which is least likely to be injured in surgical operations, as it is well protected by the deeper structures. It may ascend on the anterior surface of the scalenus anticus, as high as 6–6.5 cm. above the upper border of the first rib, or to the level of the middle of the thyroid gland. In these cases it curves downward and outward and frequently splits into a number of branches which may re-unite and form a single trunk, or may empty separately into the subclavian or internal jugular veins, or both; into the vertebral or the transversalis colli veins; or into any combination of these veins, depending upon the number of branches in the particular instance. After injecting and dissecting some fifty specimens, I am unable to state any fixed rule for the distribution of the cervical portion of the duct, or to formulate any systematic classification of the different variations of termination. It can, however, be said that, as a general rule, the higher the duct rises in the neck, the more likely it is to have terminal branches. When the duct is a single trunk, it generally lies low. The cervical portion is the only part that is of practical importance, from a surgical standpoint, as it is the only part that is exposed to surgical interference. The terminal portion of the duct, or the terminal divisions, if there are any, will always be found on the anterior surface of the scalenus anticus, or under the deep fascia covering the muscle, behind and internal to the last portion of the internal jugular vein. Where the duct rises high in the neck and presents many branches, it very frequently has a branch lying behind the clavicle, in the thorax, and emptying into the posterior portion of the subclavian vein. In case of injury to the cervical portion of the duct, this branch alone would suffice for furnishing collateral circulation.

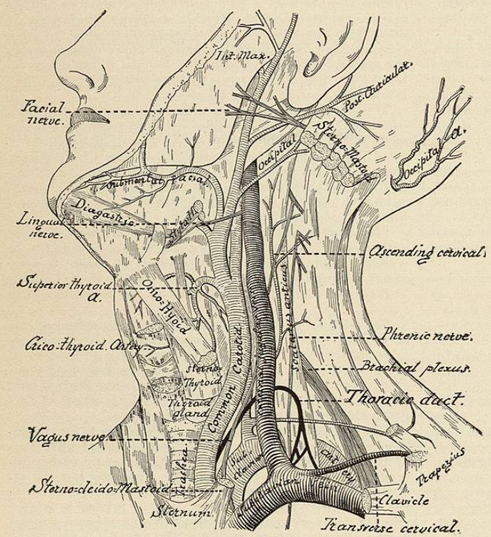

FIG. 4709.—Cervical Relations of the Duct in the Neck, showing a terminal arrangement frequently seen. The duct here divides into three terminal branches, emptying into the internal jugular (erroneously labeled 'external jugular' in the cut), the subclavian, and the transverse cervical veins, with a cross branch connecting the first and second branches. (From a drawing by G. R. Egeland, from a dissection from the dissecting room of the Northwestern University Medical School, Chicago.)

Anomalies.—Besides the multiple endings of the duct, which are so common as to be normal, the most frequent anomaly observed is that of the duct terminating in the right subclavian vein inside of the left. This has been frequently observed and is generally found associated with vascular irregularities, especially with absence of the innominate artery, with the right common carotid and subclavian arteries springing directly from the arch of the aorta. In such cases the thoracic duct takes the place of the right lymphatic duct, and the left duct has a corresponding course and relation usually found in the normal duct on the right side. Less frequently seen is a duct, double throughout, one portion going to the subclavian vein on each side, the two ducts being connected by numerous cross branches. Occasionally one finds a duct, single as far as the fourth or fifth dorsal vertebra, then dividing and sending a branch to the vein on each side. Cases of anomalous course or distribution have been reported by Thompson, Watson, Cruickshank, Krause, Paturban, Thomson, and Brinton. Thomson suggests that there are probably developmental reasons for these anomalies.

Physiology.—The function of the thoracic duct is to convey the chyle from the digestive system and the lymph from the lumbar glands to the blood of the right heart. It is not known what constitutes the force that pumps the lymph from the abdominal cavity to the termination in the left side of the neck. Weiss found that the pressure in the duct was equal to from 9 to 15 mm. of mercury. The flow of blood through the arch of the aorta, the action of expiration and inspiration, and the motion of the heart, as well as intrathoracic pressure, and the force of the flow of blood in the left innominate vein, are probably all factors in producing and maintaining the lymph flow. I have repeatedly found it impossible, in the cadaver, to inject the duct from the abdominal cavity until the heart and lungs were removed.

As to the composition of the fluid found in the duct of the human being, several analyses have been made. Rees, in 1843, analyzed the lymph taken from the duct of a recently executed criminal. Seyler took the contents of a pleuritic effusion caused by the rupture of a duct in the thorax. Hasebrook obtained and examined the fluid of a chylous pericardial effusion. Paton, in 1890, made three analyses of the fluid obtained from a chylous fistule following an operation for sarcoma of the neck. As it is impossible to say how greatly the chyle may be modified by absorption from a serous cavity, the results of the second and third observers are somewhat discredited. Rees and Paton, therefore, are best worthy of consideration. Their analyses gave the following results:

	Rees.	Paton.
Water	904.8	951.6
Solids	95.2	51.7
Organic	90.8	41.91
Proteids	70.8	12.55
Fats	9.2	26.06
Inorganic	4.4	6.49

In regard to the rate of flow, Paton found that it averaged from 1 to 3 cub. cm. per minute, or from 1,584 to 4,752 cub. cm. per twenty-four hours. The weight of the patient was 60 kgm. Therefore the flow was from 2.64 to 7.93 cub. cm. per 100 kgm. of body weight.

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THORACIC DUCT, PATHOLOGY OF.—Not many pathological conditions of the thoracic duct have been reported. This may be explained in part by the fact that anastomoses are frequently present, and consequently the symptoms which would have been caused are masked or absent. At other times the region in which the duct lies is examined at autopsy very superficially if at all, and consequently some pathological conditions are not seen.

Anomalies.—Anomalies of the thoracic duct are not uncommon. The duct may lie on the right side of the vertebral column; it may have two or three outlets into the subclavian vein, or it may be double throughout its entire course. In other cases the main trunk may divide to form a plexus of lymph vessels in the posterior mediastinum, the radicles uniting to form a single trunk which empties into the subclavian vein in the usual manner. Besides these more common varieties, other anomalies may occur, that reported by Svitzer[66] being one of the most peculiar. In his case the duct partially encircled the aorta and emptied into the left subclavian vein.

Hemorrhage.—Hemorrhage into the duct may result from trauma to the duct, or may be present in severe anæmias or leukæmias. In cases of congenital or acquired hæmophilia in which retroperitoneal hemorrhages occur, or in cases of injuries to the intestines, the contents of the duct may contain a variable amount of blood. In any case in which blood is present in the duct it may remain fluid, but if the quantity becomes very great, coagulation may result and a large clot form, which may cause obstruction.

Thrombosis.—According to Leydecker[1] thrombosis of the thoracic duct may follow lymphangitis, trauma, pressure from tumors, aneurisms, and exostoses of the vertebræ, or may accompany lesions of the heart valves.

Usually these thrombi are recent, as was the one seen by Turney.[2] The patient gave a history of chylothorax and chylous ascites, and at autopsy Turney found a thrombus at the mouth of the duct, extending downward a short distance and completely blocking the lumen. Below the obstruction the duct was greatly dilated, as were all its radicles. All the superficial lymphatics of the upper extremity were also dilated.

Oppolzer[46] reported a case in which no history nor signs of chylothorax nor chylous ascites were given. The patient had a valvular lesion, and at autopsy Oppolzer found that a clot obstructed the mouth and, for a short distance, the lumen of the duct.

Cayley reported a case in which a similar pathological condition was found. The patient was a young man, nineteen years old, whose chief symptoms were constipation and pain in the abdomen. He gave signs of chylous ascites, but none of chylothorax. Further examination showed the presence of a large retroperitoneal tumor which at autopsy proved to be a greatly dilated receptaculum chyli and its radicles. The thoracic duct was dilated, and at its mouth Cayley found a clot which closed the outlet of the duct.

In other cases the thrombi undergo partial or complete organization, so that the lumen may become partially or wholly occluded by a mass of connective tissue canalized by new blood and lymph vessels. Such a condition was seen by Heller.[3]

Retrograde Changes.—The only case of necrosis of the thoracic duct which has been reported as yet is the one quoted by Nochher,[4] and in the light of modern pathology his diagnosis and autopsy findings might be questioned. He diagnosed the case as "malignant epi-