

anæsthesia, ether, chloroform, and nitrous oxide gas. The advantages of cocaine are that it renders the introduction of the instrument into the upper pharynx much easier and diminishes the pain and local spasm otherwise sure to occur. Its disadvantages are the length of time which it takes to produce its effect, the general toxic symptoms which it often causes, and its failure after all greatly to modify the actual pain of the operation.

Of the three general anæsthetics, nitrous oxide gas is suitable for short and rapid operations, but it is difficult of administration to a patient who is too young to follow the directions of the anæsthetist, and to those in whom the upper air passages are seriously obstructed. Chloroform is unquestionably dangerous, and, on the whole, not superior to ether. In the hands of a skilful anæsthetist and properly administered, ether will, as a rule, prove most satisfactory. Under deep anæsthesia the pharynx is completely relaxed and ample time is afforded for all the care and thoroughness necessary, the patient meanwhile being free from pain. The theoretical objections that ether is dangerous, that the children are apt to be injured by it, and that its action increases the amount of bleeding at the time of the operation, are not true. If more blood flows with anæsthesia than without, it is largely because under the former condition a much greater amount of tissue is removed.

Much caution should be employed in the after-care of the patient. He should not be at once dismissed, but should be put to bed, and kept there for at least twenty-four hours, and until all signs of disturbance or shock have subsided. Attention to this detail will be amply repaid, for it lessens the possibility of bleeding, prevents infection, guards the patient against taking cold, and greatly reduces the general depression due to the slight shock of the operation.

Meanwhile the administration of tonic doses of iron and quinine will materially hasten recovery. In other words, to this surgical condition the ordinary rules of surgical treatment should be applied.

It must not be considered that with the performance of the operation the case is completed and all possible help to the patient afforded. The general condition should be made as perfect as possible, to which end change of air is often of great benefit, and, most important of all, the patient should be carefully examined in order to determine whether or not the operation has resulted in a thorough and complete success. Should the contrary prove to be the case, further treatment may be called for, and although when properly performed at first, it will seldom be necessary to repeat it, there is no reason why this should not be done when required. Indeed, it is well, in difficult cases, to mention to the parents beforehand the existence of such a possibility.

The pharynx being freed from the offending tissue, such conditions as catarrhal inflammation, relaxation of the uvula, and the general tendency to local congestion can be greatly benefited by topical treatment, although in most instances special interference will be unnecessary.

The second variety of treatment relates to the cure of certain direct results of the naso-pharyngeal obstruction, namely, to mouth breathing, to errors of pronunciation, and to deformities of the chest walls and of the framework of the nose.

When free nasal respiration has been actually established every possible encouragement should be held out to the patient to close the mouth and breathe through the nose, both while awake and when asleep.

The operation for the removal of hypertrophied adenoids is not so simple and easy as many suppose it to be. On the contrary, its successful performance requires knowledge, experience, and skill.

III. TONSIL OF THE TONGUE.

[Glandular (or adenoid) tissue at the base of the tongue.]

This tissue, the existence of which has long been known, is analogous to the structure of the faucial tonsils and of the tissue at the vault of the pharynx. It com-

pletes the circle of glandular tissue which surrounds the pharynx.

Histologically, the principal difference between the faucial tonsil and the lingual lymphoid masses is, that while in the tonsils the lymphoid tissue is collected together into a circumscribed and well-defined mass, the lymphoid tissue at the base of the tongue is disseminated in small groups over a considerable surface. Strictly speaking, these groups are not glands, since they have no excretory duct nor outlet, but are enclosed bodies and belong in reality to the lymphatic system. They are usually three or four lines in diameter, and are loosely embedded in the submucous tissue. Their hilus is covered with a thin mucous membrane. Their sac contains a varying number of follicles, closely resembling those of Peyer's glands of the intestines. The existence of the lingual tonsil, so-called, is a normal condition. The collections of tissue are located between the circumvallate papillæ and the epiglottis. Normally they are not conspicuous, nor is their presence manifest excepting upon irritation, when it will be discovered that the region which they occupy is highly sensitive, and liable to marked reflex phenomena.

In examining the base of the tongue with the laryngoscope there is found, normally, a free interval between the base of the tongue and the epiglottis. When the lymphoid tissue is hypertrophied, this interval is more or less filled up, and the tip of the epiglottis may be seen impinging against the tongue or, apparently, buried in a mass of enlarged and prominent glands. The hypertrophy may extend laterally, and thus shut off the view of the pyriform sinus. It is often more markedly developed upon one side than upon the other. The glands may be seen projecting backward, each one more or less distinct and by itself, and the whole forming an aggregation which is clearly more prominent and conspicuous than is seen in the natural state of the parts. Dilatation of the blood-vessels of the neighborhood is generally present. As to what constitutes the normal condition of the base of the tongue, it may be said that in the vast majority of cases pathological symptoms will be caused only by abnormal enlargement of the lymphoid tissue so pronounced that, when sought for, it can hardly fail of being recognized.

The disease commonly met with in the lingual tonsil is a condition of general hypertrophy, in which the whole gland is increased to double the normal size or more, and its follicles themselves are considerably enlarged. This hyperplasia is very similar to the condition seen in chronic hypertrophy of the faucial tonsil. Associated with the hypertrophy there is often a dilatation of the blood-vessels. Sometimes but one or two vessels may be enlarged and sometimes many of them. It is not uncommon to see it in children.

The causes of the hypertrophy are, to a great degree, identical with those of chronic hypertrophy of the faucial tonsils. They may depend upon disturbances of the circulation due to renal or hepatic disorders, or upon cardiac disease. Among them acid indigestion plays a particularly important part.

The symptoms observed in these cases are many and, as a rule, well marked. They are more commonly observed in women than in men, and are in general such as commonly accompany hyperæsthesia of the parts. Thus, the patient complains of a sensation of pricking, or of the presence of a foreign body in the throat. The pain is usually localized, but sometimes radiates to other parts, these subjective phenomena being increased if the tongue be drawn backward. The explanation of the symptoms is simple. Normally, the margin of the epiglottis is free. When the lymphoid tissue of the tongue is so enlarged as to come in contact with it, then, two parts being in contact which usually do not touch each other, the subjective sensation of a foreign body results, accompanied or not by pain in proportion to the amount of irritation produced. Patients occasionally complain of pain shooting up to the ears, or refer their discomfort to the stomach, larynx, trachea, or

intrascapular region. Pain is also present when the glands are in a state of subacute inflammation.

The effect of hypertrophy of the lingual tonsil upon the voice is marked and disastrous, for fatigue in speaking and singing is a common symptom. When the trouble is not severe the only complaint may be that the patient has pain while talking, without being hoarse, the neighboring parts of the throat being normal. In some cases the vocal fatigue can be traced to deficient innervation. In cases in which the difficulty is more pronounced, the voice may be entirely lost. In some cases the voice is uncertain, being sometimes good and sometimes poor. Sometimes it is unreliable or difficult to control, breaking during the effort to sing. Again, there may be a marked tendency to sing out of tune, and the timbre of the voice may be seriously impaired. In other cases the normal range of the voice is interfered with, the patient not being able to produce two or even three of the highest notes of which his voice is capable.

Some patients suffer from cough, which is observed in two different forms. It is either violent, spasmodic, and almost incessant, or of a hacking character, appearing at shorter or longer intervals. The spasmodic form, as a rule, occurs when the hypertrophied glands encroach upon the epiglottis, and is less frequent than the hacking cough. The latter often gives rise to great anxiety, as the patient fears it to be a symptom of developing pulmonary phthisis. This form of cough is often present when there is merely contact between the glands and the epiglottis, and it is probably due to the friction of the tongue and epiglottis against each other during their movements.

It is a question whether the so-called "globus hystericus," as seen in nervous women, is not often less a matter of the imagination than has been commonly supposed. In patients afflicted with this complaint, hypertrophy of the lingual tonsil has frequently been observed, while in patients of nervous temperament other reflex symptoms of the condition are often severe. On the other hand, the globus hystericus has been seen in patients in whom the base of the tongue was practically normal.

Finally, attacks of dyspnea resembling asthma may occur in patients with enlarged lingual glands.

The prognosis is good, but the length of time required to effect a cure is not always easily determined.

Too radical measures for the relief of this condition are not indicated, and much harm has been done by the free use of surgical methods in cases in which simpler means would have answered the purpose. Thus, in cases depending upon hyperacidity of the stomach, correction of the indigestion will cure the tongue. When Bright's disease is present, or when there is disease of the liver or of the heart, the attempted removal of the enlargements or the obliteration of the dilated vessels can only result in harm.

In the congestive form of enlargement, especially when dependent upon indigestion, relief is often afforded by cleansing and astringent applications made to the base of the tongue by means of a good spray atomizer, attention being paid meanwhile to the constipation, or to the hyperacidity of the stomach, which may be present.

When the hypertrophic masses are permanent, requiring actual removal, surgical means are called for. Many special methods have been suggested for this purpose, from the use of various escharotics to actual ablation by means of cutting instruments. The latter are in general not to be preferred. On the whole, the most satisfactory means seems to be either the galvano-cautery applied by means of a flat electrode, the galvano-caustic snare, or the cold-wire snare. Under cocaine anæsthesia the operation is usually not very painful, and healing takes place in a few days.

Suppurative inflammation of the lingual tonsil is rare. When it is present it is necessary to determine the precise location of the lesion, and to remember that such attacks are sometimes accompanied by œdema of the larynx. Evacuation of the abscess during sleep may prove dangerous. Chronic abscess of this region and retention

cysts have been observed. This condition is sometimes so severe as to suggest Ludwig's angina.

D. Bryson Delavan.

TOPEKA MINERAL WELLS.—Shawnee County, Kansas.

Post-Office.—Topeka. Hotel.

These wells, two in number, are located on Harrison Street, in the city of Topeka. We are informed that a good hotel has been established at the wells for the accommodation of persons requiring treatment. Turkish, Russian, electric, and steam baths may be obtained. The following analysis of the water was made by Messrs. Barnes and Sim, chemists. The estimate was presumably made in grains per United States gallon.

One United States gallon contains (solids): Magnesium chloride, gr. 11.76; sodium sulphate, gr. 19.20; magnesium sulphate, gr. 14.86; sodium nitrate, gr. 1.94; sodium bicarbonate, gr. 35.61; calcium bicarbonate, gr. 22.48; iron bicarbonate, gr. 28.06; ammonium sulphate, gr. 1.50; alumina, gr. 0.40; silica, gr. 10.28; organic matter, gr. 1.76; phosphoric acid, a trace. Total, 147.35 grains.

The baths have been in operation since 1879. They are highly recommended for obstinate cases of rheumatism. The water is also used commercially. The analysis shows a fairly strong saline-purgative water, and it should be useful in cases to which such waters are applicable.

James K. Crook.

TORMENTIL. See "*Rosacea*," under the heading *Roses*.

TORONTO, CANADA.—This city, of about 250,000 inhabitants, the metropolis of the Province of Ontario, is situated in lat. 43° 39' N., and long. 79° 23' W., on the northwestern shore of Lake Ontario. Meteorological observations made here can be taken to illustrate the special climatic features of the northern shores of Lake Ontario, known as that of the "Lower Lake Region." For the following description of the topography of this region, as well as of the city, the writer is indebted to Dr. P. H. Bryce, Secretary of the Ontario Board of Health.

"Lake Ontario is 240 feet above the sea level and lies in a depression produced by glacial erosion, being surrounded by five well-marked lake beaches, extending from the Oak Ridges escarpment on the north, to the Catskills to the south. Northwesterly, these heights form a central plateau stretching to Lake Huron, with a general elevation of 1,000 to 1,300 feet, thereby protecting the Lake Ontario region from the severe storms which move from the northwest plains over the upper lakes, and spend their force on the northwest slopes of the plateau as rain and snow storms. The annual rainfall of Toronto averages 31 inches, with usually a light snowfall. The soil underlying the city and neighboring shores of the lake is a tenacious Post-glacial clay—the Erie clays, geologically—capped, however, in the upper portions of the city with sands and gravels. The combined system of sewerage has converted Toronto from what was "Muddy York" to a paved city, famed equally for its well-kept streets and lanes and for its wealth of residential streets lined with forest shade trees, and its splendid central and suburban parks, with magnificent deep ravines, whose precipitous sides form valleys eroded through the clays by the Humber and Don rivers. Lying in front of the city is an island, which, when the city was founded, was a peninsula formed from the weather-worn cliffs of Scarborough Heights in the east, reposed as a sandbar five miles in length, which bounds a bay some two miles in width in front of the city. This island now forms the summer home of thousands of city dwellers, and on it there is also a lakeside park, visited daily by many thousands. In the midst of the lake, a mile beyond the island, and fully protected against the sewage which is poured into the bay, is the intake of the city water pipe. The breezes blowing over

the deep waters, the temperature of which in even late summer seldom rises above 50° F., maintain a coolness which is typical of the whole northern shores of the lake, and which has caused these shores, from Hamilton to Kingston, to become yearly more and more the summer home of many thousands, especially from the Middle and the Southern States.

"The great depth of the lake keeps the waters open all winter, and gives to the climate of the surrounding region, during the winter and early spring, an unpleasant dampness and coldness similar to that which prevails in northern marine climates. The following table will enable the reader to compare the climatic conditions of Toronto with those of several other places where meteorological records have been kept."

MEAN TEMPERATURES AND HUMIDITY.

Place.	Latitude.	Height in feet.	FEBRUARY.				JULY.				RELATIVE HUMIDITY.	
			Mean max.	Mean min.	Extreme max.	Extreme min.	Mean max.	Mean min.	Extreme max.	Extreme min.	Feb-ruary.	July.
			Toronto	43° 39'	350	30.8°	18.2°	44.0°	1.0°	81.4°	63.5°	93.3°
New York	39° 57'	185	39.9	23.8	55.0	3.0	85.5	63.6	90.0	55.0	77	70
Boston	42° 21'	125	37.1	11.5	56.0	-4.0	77.4	60.1	89.0	51.0	71	68
Chicago	41° 52'	715	30.9	14.2	47.0	-18.0	80.7	64.6	94.0	56.0	76	68
Ottawa	45° 26'	330	26.1	8.5	40.0	-12.0	82.2	62.5	97.2	55.2	81	74
Winnipeg	49° 53'	760	13.3	11.4	41.0	-32.2	79.0	56.8	88.5	47.0	94	74
Calgary	51° 2'	3,989	24.9	7.0	40.3	9.7	72.4	46.0	86.3	39.0	73	61
Kamloops	50° 41'	1,193	35.5	22.0	44.6	11.5	78.9	54.8	98.0	46.0	79	67
Gravenhurst	44° 50'	770	25.0	8.8	40.0	-22.2	82.5	60.6	97.0	52.0	75	76

The table is interesting as showing that, while the relative humidity in winter is high, its mean minimum temperature in February is higher than it is either in Boston or in Chicago, though lower than in New York. On the other hand, its maximum mean is the same. Its two summer means are practically those of Chicago, although it is higher in both than it is in Boston.

The annexed chart, obtained through the kindness of Prof. R. F. Stupart, director of the Meteorological Service, Toronto, will show in detail the characteristic climatic condition of Toronto, and will also serve to illustrate the climate of the lower lake region. It will be observed that the winters are not excessively cold or the summers oppressively hot, this being due, as Professor Stupart remarks, to the tempering influence of the lakes. In May the mean temperature of the whole Ontario peninsula, says the same authority, is slightly higher than for the south of England. September and October are "generally delightful months." Much snow falls during the winter, but it seldom remains on the ground until March. The annual precipitation of the entire prov-

CLIMATE OF TORONTO. LATITUDE, 43° 39'; LONGITUDE, 79° 23'.—PERIOD OF OBSERVATION, FIFTY-SIX YEARS.
Prepared by Prof. R. F. Stupart, Director of the Meteorological Service, Toronto.

	January.	March.	May.	July.	September.	November.	December.	Year.
Temperature—(Degrees Fahr.)								
Average or normal	22.4°	28.7°	52.1°	67.6°	58.6°	36.1°	26.3°	44.2°
Mean of warmest	28.9	35.6	61.3	77.4	65.5	42.0	32.2	
Mean of coldest	14.9	21.4	42.9	57.9	47.9	29.9	19.6	
Mean daily range	14.0	14.2	18.4	19.5	17.6	12.1	12.6	16.1
Highest or maximum	57.5	70.3	93.4	98.0	93.6	67.0	61.0	99.2
Lowest or minimum	-26.5	-15.6	24.6	38.7	27.9	-5.0	-21.0	-26.5
Humidity—								
Average mean relative	83%	78%	70%	72%	77%	80%	82%	77%
Precipitation—								
Average in inches (rain)	1.16	1.44	3.05	2.99	3.27	2.67	1.60	27.35
Average in inches (snow)	17.4	12.3	.10	4.6	13.8	68.3
Wind—								
Prevailing direction	W.	N. W.	N. W.	N. W.	N. W.	W.	W.	W. N. W.
Average hourly velocity in miles	11.4	11.5	8.9	7.6	8.5	10.5	11.1	9.6
Weather—								
Number of days without rain or snow	19	17	12	13	12	18	20	178
Number of days completely clouded	13	6	3	0	2	8	13	64
Number of thunder storms	0	1	3	7	5	3	0	29
Number of fogs	2	2	3	2	3	0	0	33
Percentage of bright sunshine	29	43	48	60	56	28	22	44
Percentage of sky clouded	74	63	57	49	50	75	76	61

ince of Ontario is between 30 and 40 inches. At Toronto the annual percentage of bright sunshine is 44, and for July at the same place it is 60. This is much higher than in England, for instance, where it is about 36, according to Stupart. The relative humidity, 77 per cent. for the year, indicates a moderately damp atmosphere.

As the metropolis, for over a hundred years, of the province, Toronto is adorned with a fine House of Parliament, a splendid City Hall, and a Provincial University, with lands set apart for educational purposes, in the first years of the province, and throughout which are distributed some ten colleges, which cluster around University College, probably the finest type of gothic architecture in America. Some three thousand students are enrolled in those colleges. There are, in addition, three

medical colleges, which have a four years' curriculum of study, with a fifth year of clinical work before a license to practise is given.

Toronto is naturally the centre of the larger charities in the province; all hospitals, refuges, and reformatories are located here under governmental supervision. There are seven large hospitals, general and special, with provision for 6,000 patients annually, and twelve homes and refuges provided for 1,000 inmates. It is thus apparent that the 400 physicians of the city, as well as the students of the colleges, have ample opportunities for developing medical practice into a high state of efficiency.

"DEATHS FROM CONTAGIOUS DISEASES IN TORONTO IN 1901.

Smallpox, 1—rate per 1,000	0.005
Scarlatina, 37—rate per 1,000	.18
Diphtheria, 174—rate per 1,000	.83
Measles, 8—rate per 1,000	.04
Whooping-cough, 25—rate per 1,000	.12
Typhoid, 37—rate per 1,000	.18
Tuberculosis, 489—rate per 1,000	2.30

The City Health Department, acting under a health act common to the whole province, is well organized, and

the healthfulness of the city, with all the already mentioned charities centred in it, is illustrated by the fact that in 1901, the year of the last Canada census, the mortality was as follows: Toronto: Deaths per 1,000 population in 1901, 16.5; New York: Deaths per 1,000 population in 1900, 20.4."

One hundred and fifteen miles north of Toronto, near the town of Gravenhurst, is situated the Muskoka Cottage Sanatorium for the treatment of incipient cases of pulmonary tuberculosis. This institution is located in a beautifully wooded, sheltered park of some 80 acres, on the shores of Lake Muskoka. It has an altitude of about 800 feet, in the region known as the Highlands of Ontario.

The climate is a bracing one, and the air is dry and free from dust. The soil is dry, and of rocky formation, and the water very soft. The winters are cold, but there are no sudden changes of temperature. Snow remains on the ground from December to March. There is a very considerable amount of sunshine. The patients can remain out of doors from six to eight hours throughout the winter.

The buildings are constructed upon the cottage plan, with an administration building in the centre of the group. Each patient has a separate room, and the use of the sun parlors and piazzas. The accommodations at present allow for fifty patients, but the number of the cottages is to be increased.

Walking, sleighing, snowshoeing, and, in the summer, boating on the lake, are permitted for suitable cases. The cost to each patient is six dollars per week. The results so far have been satisfactory. This region also affords relief to those suffering from asthma and hay fever, and is much frequented as a summer resort by the people from the cities and towns farther south.

[For an excellent account of the climate of Canada as a whole the reader is referred to the paper of Professor Stupart, read at the meeting of the British Association, Toronto, 1897, and reprinted from the *Scottish Geographical Magazine* for February, 1888.] Edward O. Otis.

TORTICOLLIS.—(Synonym: Wry-neck.) Torticollis, as the name indicates, is a twisted neck, a distortion caused in most cases by active contraction or by actual shortening of one or more of the lateral muscles that control the head. Similar distortion may be present in Pott's disease, but in this instance the deformity is a symptom of a more important disease, while the term torticollis implies simple deformity.

Torticollis may be divided into two classes—the congenital and the acquired.

CONGENITAL TORTICOLLIS is a painless shortening of the tissues of one side of the neck of intra-uterine origin. Acquired torticollis is almost always accompanied at its onset by discomfort or pain. This afterward subsides, leaving the deformity; thus torticollis, from a therapeutic standpoint, may be divided into the acute and the chronic forms.

Whatever may have been the cause of the deformity, the sterno-mastoid muscle is most often affected, and typical torticollis implies contraction or shortening of this muscle. As an effect, therefore, the chin is slightly elevated and turned away from the contraction. The head is tilted toward the shortened muscle, and as a whole is displaced toward the opposite shoulder. There are also irregular forms of torticollis due to contraction of other muscular groups, to which attention will be called later.

Torticollis is a comparatively uncommon deformity, and the acquired form is far more common than the congenital variety. The sexes are about equally affected, and one side as often as the other.

CONGENITAL TORTICOLLIS.—In most instances the deformity is slight at birth, and it does not attract attention until the child is able to support the head, and in many cases not until a much later period. In exceptional instances, however, the deformity is well marked at birth and is accompanied by noticeable asymmetry of

the head and skull. In cases of this character the contraction often involves all the lateral tissues of the neck, indicating that its cause must have been a fixed or constrained position in utero, an explanation that may be applied to the great majority of the milder cases also.

It may be stated in this connection that it was at one time generally taught that so-called congenital torticollis

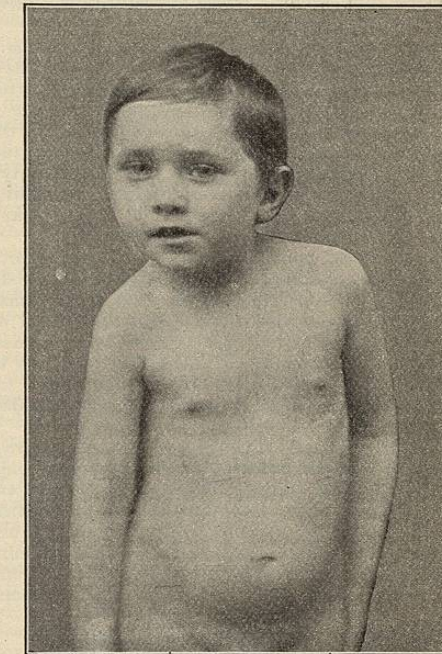


FIG. 4738.—Well-marked Congenital Torticollis of the Left Side, showing the Effect of the Contraction in Displacing the Head toward the Opposite Shoulder.

was due to injury at birth, the sequence of events being somewhat as follows: The sterno-mastoid muscle was ruptured; rupture was followed by hemorrhage into the substance of the muscle, which in turn set up inflammation; this was followed by scar contraction and by deformity. This theory has now few supporters, for the following reasons: In the majority of cases of true congenital torticollis discovered in early infancy, there is no evidence of hæmatoma. Hæmatoma is in but few instances followed by torticollis, nor is rupture of muscle in later life or in other situations followed by such shortening. It is apparent, of course, that a congenitally short muscle might be injured at birth with a resulting hæmatoma, also that injury at birth might induce irritation or discomfort, and that deformity might follow the habitual attitude assumed by the patient for the relief of this discomfort.

Pathology.—In the ordinary type of congenital torticollis, as demonstrated at operations on children, the substance of the affected muscle or muscles is simply lessened in amount, and there is a disproportionate area of tendinous substance, as contrasted with the contractile tissue. In other instances the muscle may be traversed by fibrous bands or patches of scar-like tissue. Such changes are far more common in acquired torticollis, and they indicate primary or secondary inflammation of the muscular substance. In cases of torticollis in infancy, or when the distortion is slight, there is but little general effect of the local contraction; but, if the deformity persists, secondary changes appear. The face on the affected side is flatter, the nose, the corner of the mouth, and the eyelids may be drawn down toward the contraction, and the skull even may be markedly deformed. There is in all cases of this character lateral distortion of

the cervical spine, the convexity being on the side opposite the contraction. Later, secondary curvature of the spine develops. Usually, there are also an increase of the dorsal convexity, "round shoulders," and a lateral compensatory curve in the direction opposed to the superior deformity.

If the deformity persists the neighboring muscles become eventually involved, together with the other tissues on the contracted side, the fascia presenting the greatest resistance to the correction.

Non-Operative Treatment of Congenital Torticollis.—If the deformity is discovered in early infancy it may be overcome, in many instances, by massage and stretching. In this manipulation one person holds the arm firmly, and another draws the head in the opposite direction, meanwhile vigorously massaging the contracted tissues. This treatment is carried out twice daily for about ten minutes each time. In holding the child and arranging the pillow during sleep, one should take advantage of postures that oppose the deformity.

Hæmatoma.—As has been stated, hæmatoma is not unusual after difficult labor. It forms a hard, resistant, ovoid swelling in the substance of the sterno-mastoid muscle. It is usually discovered about the second week after birth. Its absorption may be hastened by massage with some bland ointment. If there is a tendency toward contraction or toward a posture that might favor deformity, this should be prevented by manipulation and by posture.

Operative Treatment.—If the muscle or muscles are actually shortened, and if deformity cannot be overcome by manipulation in the manner described, operative treatment is indicated. This statement applies to practically all forms of torticollis, whether congenital or acquired, in which the deformity is persistent. The treatment of acute torticollis, and the prevention of deformity will be described later. The object of operative treatment is



Fig. 4739.—The Method of Applying the Plaster Bandage after Operation on the Left Side, to Hold the Head in the Attitude of Overcorrection. (From Whitman's "Orthopedic Surgery.")

to overcorrect the deformity and to hold the head in the overcorrected position until the parts are thoroughly adjusted to their new relations.

Forcible Correction.—The patient having been anesthetized the shoulders are elevated upon a hard pillow, the arm is then held firmly by an assistant, and the

operator begins a series of forcible movements, alternately stretching and relaxing the contracted parts and forcibly massaging them with the ulnar border of the hand. If the shortened muscles are very resistant, it is well to divide the tendinous insertions subcutaneously as a preliminary measure. In this operation the tendon being grasped between the thumb and finger, it may be divided without fear of injuring the deeper parts. One then proceeds with the forcible manipulation until all resistance has been overcome, and until the lateral curvature in the cervical region has entirely disappeared. The head is then fixed in the attitude of extreme overcorrection by means of a plaster bandage. This should include the upper part of the chest and shoulders, circular turns being made about the head. It should remain in position for at least three weeks, and for a much longer time if the appliance is comfortable, and if it is not considered objectionable. After removal of the supporting bandage the head should be turned forcibly from time to time into the attitude of overcorrection, for the purpose of preventing recurrence of deformity; and systematic exercises should be employed to strengthen the muscles and to re-establish the normal poise.

The Open Operation.—In many instances, and especially in cases of long standing in older subjects, the open operation is to be preferred to tenotomy and forcible stretching. An incision, parallel to the sterno-mastoid muscle and half-way between its two insertions, is made, running upward from the clavicle about an inch and a half. Through this incision all the resistant bands are divided as they appear under tension. When all resistance to overcorrection has been removed, forcible manipulation is carried out and the head is fixed in the manner already described. This fixation is not always necessary in the treatment of older subjects.

It should be stated that when the deformity is of long standing, it may be impracticable to fix the head at first in the overcorrected position, because of the impairment of the circulation or because of the discomfort that it causes.

ACQUIRED TORTICOLLIS.—As has been stated, acquired torticollis is far more common than the congenital form. At least eighty per cent. of the cases begin during the first ten years of life.

The deformity may be divided into two main groups, the common form or so-called acute torticollis and the irregular forms.

Acute torticollis is a painful contraction secondary to injury or disease of the muscles, or to irritation of the peripheral nerves. As a rule, the sterno-mastoid and trapezius muscles are involved, but occasionally other muscular groups are affected. A common form of torticollis is the so-called rheumatic or stiff neck, in which the muscles of the neck are stiff and sensitive to pressure; this form hardly requires consideration.

By far the most important form of acute torticollis is that which often follows irritation of the peripheral nerves in the naso-pharynx or its neighborhood; thus it is often a sequel of tonsillitis, measles, diphtheria, and the like. It may be preceded by toothache or earache, and it is often accompanied by enlarged or suppurating cervical glands. The onset of the affection is gradual, often preceded by fever, and the head gradually assumes the characteristic attitude of torticollis, and is fixed by the tonic contraction of the affected muscles. Attempts to overcome the deformity cause great pain, as do unguarded movements. It is particularly difficult to place the head in a comfortable position when the child lies down; thus "getting the child to bed" is a troublesome task.

The patients often become extremely nervous, and it would appear that the affection is more common among children of the nervous type. As has been stated, the deformity is usually typical, the muscles affected being the trapezius and the sterno-mastoid. In rare instances the contraction may affect both sterno-mastoid muscles, so that the head is drawn forward and downward between the shoulders; or the posterior muscles may be involved and the head is drawn backward, so-called

posterior torticollis. The muscles and other tissues become shortened. The pain and discomfort finally disappear and the case becomes one of chronic torticollis, although in the milder forms spontaneous recovery is possible.

Treatment.—The treatment is symptomatic and preventive. Support is always indicated. As an immediate application the neck

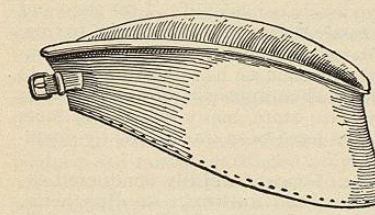


Fig. 4740.—The Thomas Collar. This apparatus is of service in the treatment of the milder cases of acute torticollis.

may be enveloped in a heavy muff-like collar of cotton; this should reach from the shoulders to the ears, and should be of such thickness as actually to support the head. It is held in position by circular bandages, and it may be stiffened by layers of adhesive plaster. This provides heat and fixation, and for the early cases it is often an efficacious remedy.

In most instances a more comprehensive support is indicated. Such a support is afforded by the plaster jacket and the jury mast; the elastic tension of the halter, if properly applied, will eventually overcome the spasm, and in great degree at least correct the deformity. This correction is further assisted by massage and by gentle manipulation of the head. When the spasm and deformity have been overcome, exercises to restore the ability of the weakened muscles may be employed. This treatment is particularly efficacious in those cases in which the muscular substance is involved by suppurating cervical glands. The duration of the treatment may be from several weeks to several months. If the deformity has persisted for more than six months operative treatment after the method described is, as a rule, indicated. It is evident, of course, that if acute torticollis is of secondary origin all sources of possible irritation should be looked for and treated if found; also that the general condition of the patient should receive attention.

IRREGULAR FORMS OF TORTICOLLIS.—**Spasmodic Torticollis.**—This is a form of convulsive spasm of the muscles of the neck resembling somewhat in its general characteristics writer's cramp. It is essentially an affection of adult life and is more common in individuals of a neurotic type. The onset is usually gradual, the first indications being sensations of stiffness and discomfort, drawing sensations, and twitchings of the head. When the affection is established there are at intervals spasmodic contractions of the affected muscles, which draw the head with a jerking motion into the attitude of extreme deformity. The spasm then relaxes, to recur at frequent intervals. These contractions may be painless, but in many instances the sensation is cramp-like. After a time deformity persists, the affected muscles becoming hypertrophied and structurally shortened.

Etiology.—Little is known of the etiology. Many of the patients present a neurotic family or personal history, and in certain instances constant or constrained attitudes in occupation, defective eyesight, and the like apparently induce the affection. There is little tendency toward spontaneous recovery.

Treatment.—The general condition of the patient should receive attention, and predisposing causes, such as occupation, should be avoided if possible. In mild cases massage, systematic exercise, and in some instances support in the form of a collar or light metallic brace may be of service. In confirmed cases resection of the nerves that supply the affected muscles seems to be the most effective remedy.

If the spasm is confined to the sterno-mastoid and trapezius muscles removal of a portion of the spinal accessory nerve may be sufficient. An incision is made along the anterior border of the sterno-mastoid muscle

from the mastoid process to a point about one inch beyond the angle of the jaw. One then exposes by blunt dissection the transverse process of the atlas, which lies directly below the mastoid process. This is a valuable landmark because the spinal accessory nerve usually passes directly over it, or slightly in front of its most prominent part. Traction on the muscle will usually make the nerve prominent. If it is not readily found its position may be ascertained by drawing the finger nail across the bottom of the wound, a sharp contraction following pressure on the nerve. This having been isolated, a section, at least an inch long, should be removed. If the sterno-mastoid muscle is actually shortened, it should be divided and a portion of the trapezius also, if this resists the correction of the deformity. Fixation of the head is, as a rule, not required after the operation. In many instances the muscular spasm involves the other muscles of the neck. In such cases resection of the posterior branches of the upper cervical nerves, in addition to the complete division of the contracted parts, may be required.

In the ordinary operation an incision, about three inches in length, is carried downward from the occiput, parallel to and about one inch from the spinous processes. It is continued through the trapezius and complexus muscles, exposing the posterior branches of the nerves. Those of the three upper nerves are then resected. As has been stated, complete division of the muscles that are shortened accompanies the operation.

OTHER FORMS OF IRREGULAR TORTICOLLIS.—**Paralytic Torticollis.**—One or more of the muscles of the neck may be paralyzed, most often the result of an extensive anterior poliomyelitis. Isolated paralysis of the muscles is uncommon.

Diphtheritic Torticollis.—Paralysis of muscles may be a sequel of diphtheria, the trapezii muscles being most often involved. This allows a forward droop of the head. The diagnosis is usually apparent.

Posterior Torticollis.—The most common form of posterior torticollis is the so-called cervical opisthotonos which is often a symptom of cerebro-spinal or basilar meningitis. A slight degree of the same deformity is not uncommon in ill-nourished infants.

Rachitic Torticollis.—In the progressive stage of rachitis, in which the characteristic kyphosis is present in the lower part of the spine, the head may be tilted backward in compensation. Occasionally the attitude may be increased by slight spasm of the posterior muscle.

Ocular Torticollis.—In rare instances the head may be carried habitually in an attitude of lateral distortion to accommodate defective vision. This is, however, rather an improper attitude than a symptom of torticollis. The treatment of these uncommon and as a rule unimportant varieties of deformity does not require especial consideration.

Royal Whitman.

TOUCH. See *Skin, Functions of.*

TOXINS, TOXALBUMINS.—Toxins are poisonous synthetical products of bacterial growth.

The exact composition of toxins has not as yet been discovered, but it is believed that they are of proteid character. At first all the toxins were supposed to be albumins, but recently some of the most important, such as those produced by the tetanus and diphtheria bacilli, have been shown to possess characteristics which separate them from that class. Toxins are formed during the growth of bacteria in media containing no proteid, but more abundantly when it is present. Toxins are divided into extracellular and intracellular poisons. Thus, the toxins produced by the diphtheria and tetanus bacilli during their growth in the tissues or culture media are largely given up to the culture fluid, but little remaining in the bacterial protoplasm, while the toxins elaborated by the typhoid, tubercle, glanders, and colon bacilli, and indeed by the majority of parasitic and saprophytic bacteria, are largely retained in the bodies of the bacteria until their death and destruction.