requiring attention and without giving rise to any sensation.

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STATUS LYMPHATICUS IN RELATION TO GENERAL ANAESTHESIA.*

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How often, in looking for the particular, is the general overlooked! Much as we know of the mechanism of death under anaesthesia and the action of narcotics on special organs, the influence of the general condition of the patient on the course of anaesthesia is still obscure. We need to take a broad view of our patient's constitution. On this occasion I wish to bring to your notice a definite pathological entity, known as the "status lymphaticus," or "status thymicus."

HISTORY.

According to Griffiths, Plater, in 1614, called attention to the fact that the thymus was enlarged in certain cases of sudden death. Later, in 1723, Bichat made the same observation, and Kopp, in 1829, associated enlarged thymus with laryngo spasm. Friedleben denied the then common assumption that an enlarged thymus could cause death by compression of the air passages. The merit of having directed into the right path the investigation of many hitherto inexplicable cases of sudden death is undoubtedly due to Paltauf. Graulitz of Greifswald had previously noted the occurrence of the enlargement of the thymus gland in two sudden deaths, and had emphasized the possibility of a connexion between such enlargement and sudden death.

Paltauf, in 1889 and 1890, was the first to collect a large number of cases of sudden death in adults, which, on *post-mortem* examination, gave, in an extreme degree, characteristically similar proofs of the correctness of his theory. There was found an enlargement of the tonsils, of the lymphatic gland system, of the follicles at the base of the tongue, of the spleen, and, lastly, an enlarged thymus gland, which varied in size in different subjects; in most cases also there was narrowing of the aorta. This combination of conditions the investigator called the "lymphatico-chlorotic constitution," and referred the sudden deaths of certain patients of this type to cardiac paralysis and acute heart dilatation, putting aside a theory advanced as to the possibility of mechanical interference by pressure of the enlarged thymus on the circulatory and respiratory organs. Paltauf's first case was that of a girl, aged 9, who sat up in bed and died suddenly. He speaks of sudden death during bathing, etc. Nordmann and Recklinghausen recorded similar cases of young people who died suddenly during or after a cold bath, and in whom, *post mortem*, status lymphaticus was found. According to Laqueur, Pott saw death occur in eight children who suffered from spasm of the glottis after introduction of a tongue spatula, and was convinced that they did not die from suffocation but from cardiac paralysis, for artificial respiration after the attack was useless. In other cases where autopsy took place a markedly enlarged thymus was observed. Kundrat next published in 1895 ten cases of death under or immediately after anaesthesia by chloroform, or a mixture containing it, collected from *post-mortem* records in Vienna, all on section presenting markedly the characteristics of the lymphatic diathesis; and also one case in which ether was the anaesthetic. He pointed out that in some of his cases danger symptoms began with the heart, respiration lasting some time after cessation of the pulse. Kundrat noted, too, the association of status lymphaticus with Basedow's disease in one of his cases, and he laid stress on the remarkable floccidity and recent dilatation of the ventricles of heart found *post mortem*. He instanced other

cases of death during anaesthesia in which many of the characteristics of status lymphaticus were found *post mortem*, but in which there was no mention of enlargement of the thymus gland.

To the writings of Paltauf and Kundrat little of importance can be added to-day. Ewing, Blake, and others in America have written on the subject, but there has been small mention of it in British medical literature. Since these observations of Paltauf and Kundrat many sudden deaths of children have been recorded apart from anaesthesia, in whom *post mortem* has been found the condition of status lymphaticus, and so constantly has the hypertrophy of the thymus gland been noted that the diathesis is often called the status thymicus. Lymphatism is a more modern name for the condition.

The subjects of the status are unusually subject to infectious diseases, to death from shock and fright, and to death during anaesthesia. Even comparatively slight lesions may in them end fatally. Perhaps some of those subjects who have been said to show idiosyncrasy to the action of chloroform have been lymphatic. (Hereafter in this paper status lymphaticus will be abbreviated to "S. L.")

Condition Found after Death.—According to Kundrat the results of autopsies in the subjects of S. L. are tolerably uniform and very remarkable. They are characterized by the presence of a thymus of greater or less size, by an enlarged spleen with varying degrees of prominence of its follicles, by tumescence and hypertrophy of lymphatic glands in various regions (especially of the mesenteric, retroperitoneal, and cervical), by noticeable prominence and multiplication of follicles at the base of the tongue and in the pharynx, by enlargement of the tonsils and swelling of solitary follicles and Peyer's patches in the intestine, by a dilated heart (especially is the right ventricle dilated) and extremely flaccid cardiac muscle. In addition, there is sometimes found a small heart, contraction of the aorta, and dark fluid blood in the heart cavities. To Kundrat's pathological complex may be added less constant features—namely, great pallor of the skin, enlargement of the tongue, enlargement of the thyroid gland, infantilism, oedema of the lungs and brain, fatty changes in the liver, and alterations in the bone marrow. As Kundrat remarks, similar more or less definitely characterized cases making the hypothesis of a lymphatic constitution probable are found scattered through the statistics of chloroform deaths.

Frequency.—According to Halstead, Kolisko, in a personal communication to Brickner, states that for many years he performed about six autopsies annually on persons dying from cardiac syncope under chloroform, in whom no previous lesion of the heart, lungs, or kidneys was known to exist, and always found the signs of S. L. In the children's clinic at Graz the records are said to show that during the last twenty years in every chloroform fatality there was present the lymphatic hyperplasia which is the principal feature of S. L. Hedinger states that the chloroform deaths in his clinic occur in patients of S. L. Blake recorded 3 anaesthetic and 2 non-anaesthetic cases of sudden death in hospital showing *post mortem* signs of S. L. in only a little longer than one year. Besides the number of deaths that have taken place, there must have been many cases of recovery from danger in patients of S. L. in whom the condition had not been recognized.

EFFECTS OF DIFFERENT ANAESTHETICS.

So frequently is death during chloroform anaesthesia associated with S. L. that the question has been asked, Does death under chloroform ever occur apart from the condition? It has been stated by Elser that when S. L. exists the administration of chloroform is nearly always fatal.

The first fatal case, so far as I know, in this country was recorded by Wolff in 1905, and was that of an infant, aged 11 months, whose eye had just been needed for cataract, when cyanosis appeared, and respiration and circulation quickly failed. The thymus weighed 1 oz., and the lymphatic glands were everywhere enlarged, but the spleen was quite normal.

The second case was that very typical one recorded by Mr. Harvey Hilliard at the last meeting of this society.

My fatal case occurred in 1903, but I have not hitherto published it.

In 30 cases of S. L. deaths during or after anaesthesia whose records I have examined, the anaesthetic used was

* Read before the Society of Anaesthetists, December 6th, 1907.

in 17 chloroform, in 6 ether, in 5 a mixture of chloroform and ether; 2 were doubtful cases, and the anaesthetic was nitrous oxide. In the first nitrous oxide case the patient was an anaemic girl, aged 18, who died at the end of a dental operation after five teeth had been extracted. She was supposed to suffer from S. L., having adenoids, etc. The second patient was a female cretin, aged 18, who appeared to be coming round from a dental operation and died suddenly. *Post mortem* a very large thymus was found but no trace of thyroid. She suffered from heart disease, which apparently was compensated, and she had taken gas well before.

MacTaggart has recorded the death of an infant, aged 1 year, who died after an injection of $\frac{1}{2}$ grain of morphine, and in whom *post mortem* was found the signs of S. L.

Under local anaesthesia two deaths have been recorded, the first by Horoszkiewicz. The patient was a woman, aged 30, who was operated upon for a small cyst in the neck. She was fearful, and convinced that she would not survive operation. Altogether 0.075 gram of tropacocaine was injected locally. At first the patient laughed at her fears, then suddenly became pallid and convulsed. The operation was stopped till the patient was better; then the neck was extended, and the operation begun again. Respiration then stopped, her pulse became small, and death quickly followed. *Post mortem* were found typical signs of S. L. The quantity of tropacocaine was not enough to produce poisoning in an ordinary patient, and it was thought that death was due to psychic insult or to lessened resistance to tropacocaine.

The second case was recorded by Nettel. His patient, a woman, aged 31, who suffered from Graves's disease, died fifteen minutes after the end of an operation for extirpation of the thyroid under Schleich's infiltration anaesthesia. Her breathing had previously stopped during operation. *Post mortem* was found a large and very thick thymus, associated with enormous hyperplasia of the whole lymphatic apparatus.

Age and Sex.—The average age in 35 cases which I have collected was 16; the youngest patients were respectively 6 months, 8 months, and 11 months; 7 of them were under 10 years of age, 14 were between the ages of 10 and 20, 8 from 20 to 30, 2 were 31 and 32 respectively, and the oldest was 55. Thus 24 of them were under the age of 20.* They were evenly distributed between the sexes.

I have notes of 22 cases of death during anaesthesia in the last ten years, excluding cases of death from vomiting in intestinal obstruction and also deaths during anaesthesia for tracheotomy. Of these, 19 occurred in hospital practice and 3 in my own. In 5 of these 22 cases there was found *post mortem* the symptom complex of S. L. I have had three fatalities in ten years' practice, one occurring in a man who had practically no left lung and a very bad heart, another in a child typical of S. L., and a third in a child of 5, who died during operation under chloroform administered after A.C.E. mixture for removal of adenoids and tonsils. Unfortunately no special examination was made for signs of S. L. in this last case.

Besides the above mentioned 5 cases I have brief notes of two interesting cases of death after operation under anaesthesia.

In 1899 I recorded a case of respiratory and cardiac failure during administration of chloroform to a patient probably of so-called lymphatic diathesis,† and gave some account of the condition.

CASE I.

The patient, a girl aged 8, suffered from double suppurative otitis media, and radical mastoid operation was performed by Mr. Frank Marsh, F.R.C.S., on March 21st, 1903.

History.—When 5 years the old patient had attacks of what was called "laryngismus stridulus," but as she never had fits or rickets or other illness than scarlet fever, which occurred two years ago, the laryngismus may have been of thymic origin. She had a sister who died three days after an attack of scarlet fever; both children had it very severely. No nephritis known of. There is a distinct family history of adenoids, and her father's mother had some affection of the throat, for which she wore a tracheotomy tube.

Anaesthetic about 9.45 a.m. The patient was pale and pasty-looking, fairly well nourished, and breathed stuffily and with open mouth, because of enlarged tonsils and

adenoid growths. The heart sounds were rather "flappy" and soft, but nothing noteworthy was found in the chest. Chloroform was administered from a drop bottle. The child went under very quietly, and a light anaesthesia was used throughout—(that is, the lid reflex was retained, except that it was abolished once for about half a minute). Respiration was very audible, lips were a good colour, pulse regular and of good quality, and the pupils contracted. No trouble occurred; indeed, I congratulated myself that I had been able to give chloroform throughout and not a mixture of chloroform and ether, to which I had intended to change early in the administration. Just before the wound was packed the pulse was good and regular, and everything as before. Mr. Marsh had told me that the child would need little more anaesthetic, and I had put away my drop bottle and was still holding on the mask, which had a little chloroform on it, when I noticed breathing to stop and the lips to become a little pale. The pupils began to enlarge, but never became widely dilated. I took away the mask and pulled the jaw forward, but there was no breathing; the lid reflex was very slightly present, and quickly disappeared altogether. The tongue was pulled out, the head lowered, and then the body inverted as soon as possible, and artificial respiration was started. No pulse was felt at the wrist, and the colour of the face became rather bluish, but improved a little with artificial respiration, soon becoming normal in the face, ears, and lips.

By the way, it is interesting to note that in this, as in several other cases of which I have record, artificial respiration brought about and kept up a deceptively normal colour of the face, ears, and lips after death. When the body was inverted during artificial respiration the colour was good, but when the body and head were raised the normal colour disappeared.

During artificial respiration air entered freely into the chest, the eyes became fixed and glassy, and no corneal reflex could be elicited. After about five minutes there were four or five spontaneous respirations (anoxaemic), but these quickly died away. The heart was vigorously compressed by one hand between the ribs and the other hand outside. I suggested laparotomy and direct compression of the heart, but Mr. Marsh said that he could do this quite as well from the outside. After about half an hour we gave up all attempts at resuscitation. The anaesthesia had lasted about an hour and the operation about fifty-five minutes; 10½ drachms of chloroform were used.

Autopsy.—The body was examined forty-eight hours after death. It was well-nourished, hair coarse, bridge of nose depressed, pupils moderately contracted, enlarged glands below the right mastoid process. Adenoid tissue considerably developed in the naso-pharynx; the tonsils much enlarged and excavated. Lungs: No pleural adhesions; lower lobes of lungs collapsed but have many patches of emphysema, which is also seen along lower part of upper lobes (probably the emphysema due to vigorous artificial respiration). No subpleural ecchymoses; lungs otherwise healthy. Heart: Muscle healthy, five and a half ounces; little fluid blood in right ventricle; left ventricle contained no blood, and cavity contracted; all blood fluid and of usual colour; no narrowing of aorta noticed. Larynx and bronchi contained nothing but a very little mucus. Tongue: Organ markedly enlarged; follicles at base were somewhat enlarged. Thyroid Gland: This was not enlarged. Thymus: This gland was persistent and much enlarged; *in situ* and when laid flat on table it was bilobed, both lobes being 12.3 cm. long, the right lobe being broader than the left, weight 22.5 grams; the greatest thickness was 1.1 cm. and the average thickness was from 0.9 to 1 cm.; the greatest width across both lobes was near the lower end and = 5.5 cm. There was no evidence of compression of any of the parts by the gland. Lymph Glands: The glands in posterior mediastinum and all about root of lung were not enlarged, but the mesenteric glands were generally and variably enlarged, some being very big and juicy on section. The axillary and inguinal glands were about the normal size. There were some slightly enlarged glands in front of the base of the epiglottis. Spleen: Weight 3½ oz.; much larger than usual. Slight adhesions around. On section the Malpighian corpuscles were very prominent, and the organ appeared congested, soft, and lymphatic. Liver, including gall bladder, weighed 2 lb. 3 oz.; rather large. Intestine: Peyer's patches and the solitary follicles were well marked. Kidneys: Appeared healthy, but a little congested. Suprarenals: Appeared healthy. Brain: Congested on vertex, healthy on section. Pituitary body not examined. Left middle-ear disease completely removed; the right mastoid cells and middle ear contained pus.

Microscope Results (examination made by Dr. Wynn, Pathologist to the General Hospital).—Thymus: Sections show moderate congestion. Blood vessels very prominent, standing out around lobules and also in their interior; some lobules are quite surrounded by a ring of congested vessels. The septa are composed of loose areolar tissue containing much fat, and are rather wider than normal, and in places show proliferation. The young connective tissue invades the follicles in places, making their outline less definite. In many of the lobules there are patches of cells undergoing colloid degeneration. These patches usually surround the concentric corpuscles of Hassall. The distinction between medulla and cortex is preserved. Thyroid: Shows marked hyperplasia of the epithelium, the alveoli are very irregular in size and shape,

* All of Blake's 7 cases (anaesthetic and non anaesthetic) were adults; this is interesting as the diathesis is usually one of early life.
† *Trans. Soc. Anaes.*, vol. iii, 1900.

a few being rather well formed, and consist of a single layer of cubical epithelium, and contained colloid substance; but by far the majority show proliferation of epithelium, which tends to grow inwards in irregular columns, filling up more or less the alveoli in places. The usual alveolar arrangement is almost lost; the tissue consists of irregular groups of cells surrounded by colloid material and young connective tissue. The blood vessels are well marked and somewhat congested; there is no infiltration of the connective tissue. *Spleen*: Shows nothing abnormal. *Lymphatic glands*: One taken from behind sternum is enlarged and congested, but its structure is of normal appearance. *Tongue*: Section through posterior part shows slight increase of lymphoid tissue.

CASE II.

Death under CHCl₃. Girl, aged 13. Operation for cleft palate. Child was known to have enlarged tonsils, adenoid growths, and an enlarged thyroid, otherwise nothing special was found on examination. There was no trouble in anaesthetizing patient, chloroform being given on an open mask. Operation started after there had been some difficulty in fixing the gag. On incision there was a good deal of bleeding, and the patient became rather blue and breathing difficult, but she had a brisk lid reflex and dilated pupil. Anaesthetic stopped, throat cleared out, head lowered, and patient went on breathing, and operation was about to be resumed, and a slight amount of chloroform had been given, when respiration stopped, the patient became pallid, and pupils dilated. Artificial respiration was started, head lowered, and in a very few minutes tracheotomy was performed. No cardiac impulse or pulse felt, but colour remained good, the alae nasi worked regularly, the vascular reflex was fairly active, and the pupils of moderate size for the whole one hour and a half that artificial respiration was continued. Encouraged by these signs, injection of adrenalin into the heart and direct subdiaphragmatic cardiac massage were delayed for about an hour, but all efforts failed.

Autopsy.—*Tonsils*: Moderately enlarged. *Adenoids* present in moderate amount. *Heart*: $5\frac{1}{2}$ oz. Muscle somewhat pale and bloodless. Right side distended. *Lungs*: Some old pleuritic adhesions at right base. *Trachea*: Contains a little blood and mucus. *Liver*: Dark, enlarged, and contains some excess of fibrous tissue. *Kidneys*: Both show marked pallor and swelling cortex in contrast to red medulla; some parenchymatous nephritis. *Spleen*: Firm, somewhat indurated, markedly enlarged Malpighian bodies. *Brain*: Nil. *Thyroid*: Markedly enlarged, weight $38\frac{1}{2}$ oz. *Thymus*: Persistent and large, 25.25 gram; extreme width $2\frac{3}{4}$ in., length $2\frac{3}{4}$ in., thicker than normal. *Glands*: Marked hypertrophy of lymphatic tissue in all places where usually found, the inguinal and mesenteric glands especially being much enlarged.

CASE III.

Girl aged 17. CHCl₃, April 24th, 1903. Large double-sided goitre. No dyspnoea except on exertion. Morphine $\frac{1}{4}$ gr. before CHCl₃. Died suddenly just after vomiting a little fluid. Severe operation. Lid reflexes not abolished throughout.

Autopsy.—*Heart*: Small. *Thymus*: 28 grams, 4 in. long by $2\frac{1}{2}$ in. wide. *Thyroid*: 11 oz. *Trachea*: Very narrow. *Tongue*: Follicles markedly enlarged. *Tonsils*: Enlarged. Adenoid growths present in naso-pharynx. *Glands*: Between bronchi much enlarged, as also at root of lung many cervical and mesenteric glands enlarged. Solitary follicles in places very large. Peyer's patches enlarged. *Spleen*: $3\frac{1}{4}$ oz., pale with considerably hypertrophied lymph tissue. *Brain*: Small. *Liver*: Large.

CASE IV.

Man aged 20. CHCl₃, October 12th, 1905. Malignant tumour of jaw. Sister died suddenly. Heart going well until first incision and reflexion of tissues, when pulse and respiration stopped suddenly.

Autopsy.—*Tongue*: Larger than usual, follicles also larger. *Tonsils*: Very much enlarged and lymphatic glands about pharynx also. *Thyroid*: Rather enlarged. *Thymus*: About normal size. *Glands*: Bronchial and mesenteric generally enlarged. *Spleen*: Enlarged, much enlarged lymphatic tissue. *Heart*: Not hypoplastic. *Liver*: Normal.

CASE V.

Girl, aged 6, chloroform, April 24th, 1903. Examination of abdomen and chest; about $\frac{1}{2}$ pint of fluid in each pleura. No struggling. Suddenly died when turned over to right side after anaesthetic stopped, and had moved an arm.

Autopsy.—*Tonsils*: Slightly enlarged; moderate adenoid growth; enlarged lymphoid tissue at base of tongue. *Thymus*: Persistent and much enlarged, weight 17 grams, extends half way down over front of pericardium. *Spleen*: Soft, with increase of lymphoid tissue. *Glands*: The posterior mediastinal, cervical, and glands in fork of trachea are enlarged but not caseous; solitary follicles of intestine prominent and rather swollen. Some free fluid both in pleuras and peritoneal cavity. *Liver*: Large and firm. *Kidneys*: Large, swollen; Malpighian bodies plainly seen (nephritis). *Thyroid*: Not enlarged, but microscopically shows degeneration.

In the first case recorded—my own—death was, I think, alone due to the administration of chloroform, for there

were no evidences of shock. In the remaining cases, besides the chloroform, other factors were present—for example, shock, haemorrhage, etc.—which, added to the influence of the chloroform, brought about death.

I have also notes of two deaths which occurred after anaesthesia.

CASE A.

Death five minutes after anaesthesia and operation. Boy, aged 8 months. Children's Hospital, Birmingham, April 18th, 1907. C₂E₂ administered for operation for phimosis. Some spasmodic cough toward end of administration. Five minutes after administration stopped became cyanosed, was coughing, and respiration stopped. Artificial respiration. Was thought to have recovered. Respiration stopped again. Artificial respiration for one hour, during which slight spasmodic attempts at respiration.

Autopsy.—Well-nourished child. Signs of rickets present. *Thyroid*, *Adenoids*, and *Tonsils*: Not specially examined, but not noticed to be enlarged. *Thymus*: Almost completely filled upper third of thorax and practically as large as a child's lung, weight $2\frac{1}{2}$ oz. *Glands*: Neither abdominal nor bronchial enlarged; others not noted. *Spleen*: Rather enlarged and congested. *Heart*: Healthy. *Liver*: Not fatty.

CASE B.

Death three days after anaesthesia and operation. Boy, aged 6 months February 21st, 1905. E₂C₁. Adenoids only; used to have "fits," becoming blue and "crowing." Had a fit, became very blue, recovered temporarily, made crowing noise, went black in the face, and died. Had had similar fits before.

Autopsy.—Rachitis present. *Thymus*: Markedly enlarged, about 2 in. long to 1 in. broad. *Thyroid*: Normal. *Tonsils*: Small. *Glands*: Mediastinal swollen, also axillary, cervical and inguinal. Mesenteric glands greatly swollen (ulceration of ileum). *Liver*: Fattily degenerated and enlarged.

In these two cases, owing to the small age of the patients, the full symptom complex of S. L. perhaps had not fully developed, the hypertrophy of the thymus being the prominent feature *post mortem*.

In the last case death apparently had nothing to do with the anaesthetic.

Many cases, particularly children, in practice, which I suspect to be of lymphatic diathesis, have, during anaesthesia, given trouble, especially during the administration of chloroform or mixtures containing chloroform; and so often have these troubles occurred that I am sure that some other factor than the chloroform *per se* has come into action—namely, S. L. All have been young, or fairly young, people or children. Most of them have been of the flabby type, generally having adenoids and enlarged tonsils, occasionally enlarged thyroid, very often an enlarged tongue and suspected enlarged thymus; sometimes their pupils have been larger than is usual, their pulses soft and comparatively slow, and their heart sounds have been weak and what I call "flappy" or "thin," giving the idea of thin-walled and rather dilated ventricles. Many of the cases have had the typical adenoid facies and the characteristic narrow high-arched palate, small mouth and throat. They seem to suffer more acutely than ordinary patients from shock, and the distance between ordinary deep anaesthesia and danger appears to be shorter in them than in the case of normal patients.

Under chloroform there is often a tendency to greyness of complexion, weak heart action, and shallow breathing, so that E₂C₁ or ether not uncommonly has to be substituted for it, and in most cases the dose of the drug needed to keep up anaesthesia is unusually small.

S. L. is not infrequently found in several members of one family. Hedinger states that Plater in 1614 recorded thymus hyperplasia in three children of one family who died suddenly. Hedinger himself reported the sudden death of five children in one family before they reached the age of 6, autopsy on one of them showing S. L. including an enlarged thymus. Hedinger also mentions another family in which all the 9 sons died between the ages of 3 and 9 after a few hours of slight depression with accession of sudden coma and death in less than an hour.

In most of the cases recorded there is little or no previous history noted, in fact in many of them it has been said that the patient was well and strong. Perhaps any infantile symptoms, for example, stridor or dyspnoea, may have been observed at the time and forgotten afterwards.

In small children, and especially in infants whose thymus is enlarged, there is very frequently stridor causing noisy and difficult respiration which is often called "thymic asthma." According to Hochsinger this stridor

is congenital or seen in the early months of life, and he calls the symptom "stridor congenitus infantum." It may appear suddenly and disappear suddenly, the infants are never cyanotic and never in the true sense dyspnoeic but remain well. Some cough is frequently present and is of the same noisy character as the stridor. (Warthin, however, says the cough is of a slight clear barking character.)

The stridor occurs during inspiration and is of a peculiar ringing, clanging, and hoarse character, audible afar off, and is most intense at the end of inspiration. The infants, later develop rattlings and wheeziness. These symptoms are generally mistaken for catarrhal bronchitis, but bronchitis causes wheeziness on expiration, and cyanosis. All these symptoms point to a narrowing of the upper air passages which is due to the tracheal and bronchial stenosis, caused by the enlarged thymus and bronchial glands. According to Warthin there is no modification of the voice and there are no laryngeal phenomena.

Hochsinger found in 26 young children, by percussion and by radiograph, enlargement of the thymus, and 20 of these gave the symptom picture of congenital stridor. Seven other children who had a moderately enlarged thymus, which was found radiographically, developed no symptoms. Hochsinger asserts, from his observations, that in children under 12 years of age stridor congenitus, of the type he describes, is always associated with an enlarged thymus gland demonstrable by radiograph; while children whose thymus was normal clinically or by radiograph never had the symptom of congenital stridor. This condition is a chronic one and differs from laryngismus stridulus, which is usually paroxysmal and associated with rickets.

If there be acute pressure by an enlarged thick thymus or by congestion of organs causing narrowing of the space between the vertebrae and manubrium, and especially if there be at the same time hyperflexion or hyperextension of the head on the neck, the child may have fits of dyspnoea or cyanosis. The dyspnoea, however, is supposed to be in many cases not obstructive but toxic in character. In older children there may be a history of epilepsy, infantile eclampsia, tetany, and spasm of the glottis, which neuroses, according to Ohlmacher, are associated with S. L. Fainting fits, due to sudden lowering of the already low blood pressure by the failure of a weak heart, are not uncommon in older children and young people.

DIAGNOSIS.

The most important thing to us as anaesthetists is the diagnosis of this condition. So far as I have read, not one of the cases of death under anaesthesia has been beforehand diagnosed as lymphatic.

Blumer quotes Escherich and other Vienna clinicians, who say they can recognize the status by the following: Pale thin skin, pasty complexion, a good deal of subcutaneous fat, frequently signs of rickets or scrofula, enlargement of the superficial glands, especially in the neck and axilla, enlarged tonsils, adenoid growths, and a palpable spleen. In addition to the above I would add that we may often observe enlargement of the thyroid, which is said to exist in more than 50 per cent. of the cases, and may get still more help from careful examination of the parts inside the upper air passages.

We know that the tongue is very richly supplied with lymphatics; so also is the soft palate and uvula. In the pharynx the mucous membrane is very rich in lymphoid tissue; especially is that lining the posterior surface of the larynx and the pharyngeal and laryngeal pouches. In some of the cases of S. L. recorded it has been noted that the lymphatic follicles in the pharynx, sinus pyriformis, and on the anterior surface of the epiglottis, as well as on the pharyngeal walls, have been much enlarged. In one case the follicles in the vault of the pharynx formed lobular soft rolls sprinkled with white dots formed by the numerous follicles. In many cases, probably, these enlarged follicles have been overlooked. In most cases also the tongue follicles have been enlarged. I regard enlargement of the tongue, which I believe has not hitherto been mentioned in the literature on the subject, as an important aid to diagnosis. Enlargement of the organ was noted by me *post mortem* in 2 of the 5 fatal cases I have recorded.

With regard to the presence of enlarged tonsils and adenoid growths, one or both of these conditions have been noticed in practically every case of death during anaesthesia

in patients of this diathesis. I do not look upon enlarged tonsils and adenoid growths as merely local manifestations, but as indicating a marked tendency to general lymphatic enlargement; and, more than this, I believe that if patients in whom these lesions were present could be examined *post mortem* there would be a very large proportion of them in whom much more evidence of lymphatism would be found. Adenoids and tonsils do not stand by themselves, but are associated with a lymphatic condition elsewhere. Hochsinger examined three children with adenoids radiographically and found in all of them an enlarged thymus.

Thus, in the inside of the throat alone we have many conditions which are often associated with generalized lymphatic hyperplasia.

With regard to the enlargement of the glands, these are not always palpable, because they are often buried in a bed of fatty connective tissue. Examination for enlarged mesenteric glands might occasionally be successful, as these seem to be most frequently hypertrophied.

Enlargement of the thyroid is a marked feature of a large proportion of cases. Wynn found the organ enlarged in all his cases.

Late development and congenital defects may be observable.

Other signs of low blood pressure may be associated. The pupils are comparatively large, the pulse being of low tension, the heart sounds "thin and flappy," and giving the idea of thin-walled and dilated cavities and of small muscular power. Many patients who suffer from goitre show the same signs.

Blood.—Paltz observed a lessening of the amount of haemoglobin in the blood. Ewing in one of his cases from lymphocytosis, the blood of a child who died under anaesthesia containing 76 per cent. of lymphocytes. Wynn states that "the blood *a priori* should show an increased lymphocytosis.... The blood taken *post mortem* in several of my cases showed marked lymphocytosis, and in 4 cases with every sign of the condition examined during life the blood showed respectively 52 per cent., 48 per cent., 43 per cent., and 34 per cent. of lymphocytes, in children of 5 to 10 years.... The blood in this condition needs further investigation, for if such lymphocytosis be constant, it will be an important diagnostic sign."

Rickets.—The presence of rickets may help in the diagnosis, since it is so often associated with S. L.

Thymus.—Occasionally it is said that the upper pole of the thymus, when much enlarged, may be seen above the sternum during expiration as a pulsating tumour, and it has been palpated also as a soft elastic swelling above the episternum. Percussion, which must be light, and is best done by direct finger percussion over the chest (Hochsinger), will sometimes show extension of thymus dullness beyond the manubrium. The apex of the thymus corresponds normally with the upper end of the manubrium, and its base lies behind the second intercostal space. The organ covers when enlarged a greater or smaller part of the heart. An enlarged organ shows dullness extending sideways beyond the edges of the sternum down to the level of the second rib. If this enlargement extends to either side, and especially to the left side, for about one or more centimetres, the thymus gland is distinctly enlarged. In children the dullness is continuous with the cardiac dullness.

Hochsinger examined 58 children in the first two years of life by radiograph, and in 26 by percussion found an enlarged thymus. In all of these the enlargement was to be seen radiographically.

Spleen.—The spleen has often been found so large *post mortem* that it could obviously have been palpated in many of the fatal cases.

Glands.—The mesenteric, popliteal, axillary, and inguinal glands have in some cases been felt to be enlarged.

Finally, both outside and inside the throat and neck may be found most of the evidences of lymphatic hyperplasia, the only important organs affected in other regions being the lymphatic glands and spleen.

Altogether the history and signs so numerous should enable us usually to diagnose the condition, the diagnosis of an enlarged thymus being the most difficult point.

ASSOCIATED CONDITIONS.

Several pathological conditions are often associated with S. L. Of these, perhaps the most important is exophthalmic goitre. It is well known that in Graves's disease enlargement of the thymus is common. Gierke found enlargement of the thymus in records of 42 cases of Graves's disease. He believed that most deaths after operations for this condition occurred in patients in whom the thymus was persistent, and noted the organ was persistent

in 18 out of 35 cases of Graves's disease ending fatally after operation.

Dernine observes that the heart in Graves's disease is peculiarly sensitive to the influence of fatigue, that its reserve energy is soon exhausted, and that it enlarges. If exophthalmic goitre be associated with S. L., there is a double reason for heart failure in operations on the thyroid. It is probable that, in a number of cases of exophthalmic goitre examined *post mortem*, though enlargement of the thymus was noted, S. L. was overlooked, and very likely the diathesis is accountable for more than it is credited with of sudden deaths in Graves's disease. Thus, both in cases of enlarged thymus and enlarged thyroid the essential factor in a fatal issue may be not the enlargement of thymus or thyroid, but the lymphatic hyperplasia.

Epilepsy.—Ohlmacher, who has had a large experience of epilepsy, has been much impressed by the frequent coincidence of idiopathic epilepsy and S. L. He believes that "idiopathic major epilepsy is a neurosis of the lymphatic constitution in the same relationship that lymphatic sudden death, infantile eclampsia, tetany, and spasm of the glottis are so considered."

According to Ewing nervous symptoms are frequently associated with the lymphatic constitution. The neuroses of Graves's disease and enlarged thyroid are also perhaps connected with it.

Rickets.—This is very frequently an associated condition, especially in the case of young children. In 37 children who showed signs of rickets Hochsinger found that 25 of them showed an enlarged thymus radioscopically.

Infantilism.—There are sometimes congenital defects, such as cleft palate, cleft kidneys. I have noted cleft palate and cleft kidneys in one of my cases. It is not uncommonly found that the heart is small and that the aorta is hypoplastic. The pelvis is occasionally ill developed, and menstruation may appear late.

DELAYED CHLOROFORM POISONING.

Two of the fatalities after operation under chloroform where S. L. has been noted as the cause of death have been due, I think, to delayed chloroform poisoning accelerated by the diathesis. In 15 cases of S. L., dying during anaesthesia, in which the state of the liver was mentioned, the organ was found to be fatty in 4, enlarged in 2, and abnormal in 3 other cases—that is, it was abnormal in 9 out of 15 cases. In 4 out of my 5 cases, where the condition of the liver was noted, it was found to be enlarged. In one or two of the recorded cases nephritis was associated with the S. L. Blake's second case and that of Gwyer seem to me to be rather due to delayed chloroform poisoning than to S. L., so as far as one can judge from the symptoms.

Blake's case was that of a child, aged 2½, to whom chloroform was administered for operation for phimosis. Afterwards restlessness, weak pulse, drowsiness, and coma gradually developed. The highest temperature was 101.4° F. Death occurred twenty-three hours after operation. *Post mortem*, the thymus was very much enlarged; the glands and follicles were generally enlarged; the spleen was excessively swollen, but the condition of the liver was not mentioned.

Gwyer's case was that of a boy, about 6 years old, to whom chloroform was administered for removal of a few axillary glands. He gradually developed a temperature of 105° F., rapid pulse, great restlessness, some delirium and coma, dying twenty-four hours after operation. No autopsy is reported, but Gwyer judged the case to be one of S. L.

Though in these two cases there is no mention of acetone or vomiting, the progressive symptoms ending in coma resemble those of delayed CHCl₃ poisoning. The gradual mode of death so long after anaesthesia may be contrasted with the sudden failure of circulation and respiration which characterize death in persons of S. L. If my supposition that these two fatalities were due to chloroform poisoning is correct, it would seem that having just possibly escaped sudden death during or immediately after anaesthesia by chloroform, they succumbed later with symptoms of delayed chloroform poisoning. I suggest that there is some association between S. L. and large liver, and that it would be interesting to have in future reports of deaths ascribed to delayed CHCl₃ poisoning or to S. L. a full microscopical examination of all the organs, and more particular notice of the state of the liver. Probably the S. L.

weakens the resistance of the body to the remote as well as to the immediate toxic action of CHCl₃.*

In each of these 3 cases the death occurred just about twenty-four hours after anaesthesia. Now the average period before death in 8 cases of delayed chloroform poisoning mentioned by Stiles and M'Donald is two and a half days, hence it would appear that the interval between anaesthesia and death in the lymphatic cases was greatly shortened, that is to say, the course of delayed CHCl₃ poisoning in lymphatic cases is much more acute than in ordinary cases, the resisting power to toxic influences being greatly weakened.

Many of the patients of lymphatic type are very fearsome and perhaps some of the cases in which sudden death occurred in these patients in days gone by have been due to fear which would have much more effect on them than on ordinary patients, for example, Mr. Harvey Hilliard's recent case and Horoszkiewicz's case under local anaesthesia.

Fatalities in subjects of S. L. have occurred during anaesthesia at the hands of skilled anaesthetists and at a period of anaesthesia which ordinarily would not be dangerous, so apparently some at least of the fatalities cannot be ascribed to want of skill.

MODE OF DEATH.

Death in the case of anaesthesia (as in many non-anaesthetic cases) is always sudden. In certain of them facial pallor and dilated pupils were first noticed and then it was found that cardiac action had stopped. In others respiration was observed to become superficial and intermittent and at the same time the pulse was impalpable; in yet others cyanosis first appeared together with dyspnoea, the circulation quickly failing afterwards. In another type of case there was sudden failure of circulation and respiration, apparently simultaneously.

The heart and especially the right ventricle is usually found to be dilated and very flaccid, in one case the flaccidity being so extreme that "the anterior wall of the right ventricle seemed to have sunk in." According to Kundrat the remarkable flaccidity and recent dilatation of the ventricles proved that along with the peculiar physical constitution the effect on the heart must generally be taken into account. Paltanf believed that the cause of death was the acute dilatation of the heart. Syncope is sometimes referred (Halg, Max Mader) to a sudden raising of the blood pressure which causes overburdening of the heart. Violent stimulation of sensory nerves especially during narcosis is supposed to lead to a sudden increase in the blood pressure. Therefore any transient awakening from narcosis during a painful operation is in the highest degree dangerous. It would appear well, then, to maintain an even level of anaesthesia.

It may be that, as in some of the non-anaesthetic cases, stenosis caused by the enlarged thymus may be a factor in the cause of death. The space in children between the vertebrae behind and the manubrium sterni in front has been found to be about 2 cm., and through that space pass the pneumogastric and recurrent laryngeal nerves, which are closely in relation to the thymus gland, while near the outer wall of the capsule run the phrenic nerves. Besides these, the trachea and most important vessels traverse the space. A large proportion of lymphatic patients suffer from rickets, and it has been pointed out by Benecke that this condition causes lordosis of the cervical vertebrae and narrows the small anterior mediastinal space, so that in a rickety lymphatic child the space between manubrium and vertebrae must be additionally narrowed by the lordosis. It has been noted that the pressure of enlarged thymus on these important structures may be the cause of sudden death. One would think, however, that if pressure alone were the cause death would generally be more gradual. The enlarged thymus only interferes with inspiration, the gland being said to act as a kind of valve, which is sucked in during inspiration. It is noteworthy that the stridor which it causes occurs chiefly during inspiration. Pressure may also be the cause of the constant dry cough which is a feature in certain cases. Pott of Halle says that the enlarged thymus causes reflex laryngo-spasm by pressing

*Since writing the above I have read that Stiles and M'Donald quote a case of Dörner's, namely, that of a child who died of delayed chloroform poisoning, and *post mortem* there was found an enlarged thymus along with hyperplasia of the lymphatic system. Stiles and M'Donald believed that the S. L. weakened the resistance of the organism to the toxic action of chloroform in this case.

on the recurrent laryngeal nerve. Any acute flexion of the head backwards would lessen the space between the vertebrae and manubrium, and might cause sudden symptoms.

In most of the cases of thymus enlargement the gland is broad and flat, but in some of them it is thick. Seydell quoted a fatality in which its thickness was 2 cm., and in Nettel's case, in which death occurred during local anaesthesia, the gland was from $1\frac{1}{2}$ to 2 fingerbreadths in thickness; and it is obvious that in such cases any acute congestion or throwing back of the neck would cause serious pressure on the neighbouring structures, and embarrass respiration and circulation. An extensive thin gland would cause no pressure symptoms, and most of the glands in fatal anaesthetic cases appear to have been thin. It has been denied that pressure has anything to do with the cause of death, but in not a few cases the trachea has been found to be compressed by an enlarged thymus.

PATHOLOGY.

Gallati, according to Ohlmacher, calls attention to a peculiarity of S. L. which is a factor of some importance in explaining some of the clinical phenomena—namely, the peculiar predisposition to oedema. This is shown by a pasty condition of the skin, by the tendency to eczema, and by oedema of the brain. Ohlmacher also believes that oedema of the lungs may occur. In several of the records of anaesthetic deaths I have found that oedema of lungs has been noted. Oedema of the lungs and brain has also been found in several of the non-anaesthetic cases.

Ohlmacher is "strongly disposed to the belief that a periodic increase of intracranial pressure on the exterior or interior of the brain or on both portions simultaneously, manifesting itself as a result of this tendency to oedema characteristic of S. L., is a direct provocative factor of such neuroses as spasm of the glottis, tetany, infantile eclampsia, epilepsy, and other various forms of sudden death incidental to the lymphatic state." This oedema, perhaps, is due to the anaemia.

There are two theories to account for sudden death. First, the pressure theory, and secondly, that which assumes death to be due to toxæmia. The first theory undoubtedly accounts for some of the deaths, and especially perhaps for some of the non-anaesthetic fatalities. Bronchoscopy has proved the existence of tracheal stenosis (Jackson). In the second theory lymphatism is regarded as the result of the action of lymphotoxins. Wynn points out that one of the most striking and constant changes he found in these cases occurred in connexion with the thyroid gland, and thyroid secretion is supposed to be competent to produce changes in lymphoid tissue. Wynn says that in all of his 20 cases:

The thyroid gland was found to be abnormal; in 10 it was markedly enlarged; in the remainder the gland was normal or only slightly enlarged, but in all microscopic examinations showed marked changes—namely, reduction or absence of the colloid substance with hyperplasia of the cells which grow into alveoli. On the contrary, microscopic examination of the thymus gland simply shows hyperplasia.

Occasionally the thymus gland is found to be fatty. Wiesel believes none of the theories advanced, but asserts that "the hypoplasia of the chromaffin system (that is, adrenal tissue) associated with status thymicus will explain, for chromaffin cells perform an important physiological function by a secretion which supports blood pressure and influences the tonicity of the vessel walls and cardiac muscles. When, therefore, a substance which influences the function of the heart and regulates blood pressure is absent or diminished in quantity, excessive fluctuations in the blood pressure mechanism may cause death from atony and dilatation of the heart and vessels, intestinal hyperaemia and cerebral anaemia, which have all been noted in all the cases of sudden death from S. L. in literature."

CHOICE OF ANAESTHETIC.

In view of the large proportion of cases in which death has occurred during or after the administration of chloroform, it is evident that, instead of chloroform, whenever possible ether should be chosen, even for the youngest patients, and especially for minor operations. If ether be inadvisable, a mixture of chloroform and ether should be administered. Because of the possibility of pressure caused by congestion of the thymus and neighbouring parts if ether be administered by the closed method, it

is better that the inhalation should be by the open method.

In exophthalmic goitre, if the operation be for removal of a goitre in Graves's disease, local anaesthesia is perhaps best, aided by a previous injection of $\frac{1}{2}$ grain of morphine combined with $\frac{1}{100}$ grain of hyoscine or atropine. If an inhalation anaesthetic be necessary, it should also be preceded by a similar injection half an hour beforehand, and ether should be given by the open method.

In any case in which chloroform is to be administered and I believe that S. L. is present I give an injection—if possible half an hour beforehand—of 5 minims of strychnine added to 1 minim of atropine, and repeat the dose if necessary during the operation.

TYPE OF ANAESTHESIA.

Little anaesthetic is usually needed to produce anaesthesia, and when once tolerance is established an ordinary dose comparatively quickly brings about deep anaesthesia. The pupils often are larger than usual, and tend to dilate quickly during shock or deep anaesthesia.

These patients do not seem to react to stimulation by ether as do normal patients, their respiration being comparatively slow; and if it be not much obstructed by the presence of adenoids and tonsils, it is, as a rule, much shallower than usual. The pulse is often comparatively slow (for example, the pulse of a child aged 5 was 70 per minute) and its tension is low, while the colour is paler than that of normal patients.

PROPHYLACTIC TREATMENT.

It is interesting to note that, according to Jackson, seven cases of thymic asthma have been cured by thymectomy.

Friedländer reports one case of S. L. with enlargement of the thymus gland that had yielded to treatment with the Roentgen ray after failure of other measures. Such curative treatment of the patient is obviously impossible for us, but it is to be hoped that surgeons will in future be on the look-out for evidence of S. L. in their patients, and as far as possible try to improve their general condition before operation. If operation be not urgent and enlarged tonsils and adenoid growths be found in the naso-pharynx these should be removed, in order that the obstruction to respiration and to the aëration of the blood be removed and that the heart be given a chance of gaining strength.

Drugs which tone up the heart should be administered for a week beforehand. The dominant feature in these cases being lack of tone in the circulatory system, cardiac and vascular tonics are strongly indicated.

If chloroform or a mixture must be administered, the inclined posture with the head low should be used.

It is important to avoid all struggling, because the heart is probably already dilated, and sudden changes of posture during the administration should be carefully refrained from. It is also advisable not to over-extend the patient's head in view of the possibility of compression of the vessels and nerves in the neck by an enlarged thymus gland.

Since several deaths have occurred during the sudden transition from light to deep anaesthesia, it is very important that the transition should be very gradual, especially if the anaesthetic be chloroform or a mixture containing it.

TREATMENT.

We have few or no records of cases of recovery from heart failure during anaesthesia in cases of S. L., because the condition has hitherto not been recognized beforehand so far as I know, save in the case of recovery in the patient whom I believed to be the subject of this condition.

Since death is due to cardiac failure, treatment must be most energetic and attention at once be given to the heart. Perhaps an injection of adrenalin into the organ should be made very early if the usual efforts fail. In children manual compression of the heart by one hand under the ribs and the other over it should at once be tried, and might possibly prove effective.

If the operation be an abdominal one and the abdomen be already opened when syncope occurs, direct massage of the heart by the subdiaphragmatic route, which is by far the most successful method, should at once be undertaken. If the abdomen be not opened, Sencert's advice, when speaking of cardiac massage, may be taken. He says if

there is that terrible "white syncope" at the onset, from which recovery rarely occurs, there should be no hesitation in performing direct cardiac massage. He goes on to say that if we have to deal with "blue syncope" artificial respiration and all the usual means of resuscitation should be tried, but if, after five or six minutes of useless efforts, not a single pulsating or respiratory movement occurs, subdiaphragmatic massage should be done without delay.

In patients of the type we are dealing with, however, it is advisable greatly to shorten the period of five or six minutes devoted to useless effort. In dealing with a case I regarded as typical, I should feel inclined to advise cardiac massage within one or two minutes of the onset of syncope.

For notes of one of the cases of death after anaesthesia I am indebted to Dr. Tangye, House-Physician to the Children's Hospital, Birmingham.

I wish to acknowledge the use of several abstracts which have appeared in the *Journal of the American Medical Association* during the last two years.

Appended is the bibliography I have used, which is by no means complete and is not altogether confined to the anaesthetic aspect of the subject.

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A FATAL CASE OF STATUS LYMPHATICUS.*

BY

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THE condition known as status lymphaticus being of great rarity, and one in which the administration of anaesthetics, or the performance of even trivial operations without them, is attended with grave risk to life, I venture to record a case which ended fatally during the administration of an anaesthetic by myself, and which at the time of its occurrence created more than usual interest in the lay press.

History.—The patient, L. H., was a young man, aged 21, 6 ft. 2 in. in height, obviously overgrown, and very thin, of a highly neurotic temperament. He suffered from a condition necessitating circumcision, and the fact of this had been on

his mind for some time. He had suffered from diphtheria two years previously, and had just returned from a prolonged stay in Egypt. He was a great smoker of cigarettes. I learned afterwards that he was rather subject to faintness. His dentist, after the occurrence, wrote expressing regret that he had not known the patient was to have an anaesthetic, as he would have told us that frequently he had to place the patient on the floor, and resort to restorative measures, to recover him from faintness which supervened whenever any painful manipulation had to be done upon his teeth.

Operation.—The operation was fixed for 12 o'clock, and the patient had taken an ordinary breakfast at 8 a.m. He had remained in bed, but had been smoking and inhaling the smoke from cigarettes all the morning. On examination before the administration of the anaesthetic I found a small, rapid pulse, poor chest expansion, and considerable enlargement of the thyroid gland. There was very marked diffuse epigastric pulsation of the heart, but I could detect no adventitious sounds. The patient's condition made me decide not to give nitrous oxide and ether, and I selected O_2 mixture, as being in my view the best anaesthetic in the circumstances. When I began the administration the patient became very agitated, asked for brandy, said he felt faint, and that he "could not stand it." I calmed and reassured him, and he then passed quietly and without a struggle under the influence of the anaesthetic. I noticed, however, that throughout the whole induction period the heart was beating very violently against the chest wall.

Result.—While the patient was still lightly under the anaesthetic the operation was begun. When the prepuce was stretched with forceps, he developed slight crowing inspiration and there was a tendency to draw up the legs. I therefore increased the percentage of the anaesthetic in the inspired air. At this moment the prepuce was severed, and simultaneously the patient turned an ashen colour, stopped breathing, and his pupils dilated. I immediately stopped the administration, asked the operator to compress the lower ribs and restore the respiration, and I performed rhythmic tongue traction and gave nitrate of amyl vapour meanwhile. This treatment quickly restored the patient, and I asked the surgeon to hurry through with the operation, saying that I did not wish to give any more of the anaesthetic, and I accordingly laid aside the inhaler. The parts were rapidly swabbed and a stitch was passed, when again the same symptoms of heart failure returned. All the usual restorative methods were resorted to, but unfortunately they all proved unavailing, and the patient was obviously dead. Artificial respiration was kept up for forty-five minutes, with skin frictions, mustard over the heart, acupuncture, hot-water bottles, amyl nitrate, and ammonia to the nostrils. I may add that when the patient "fainted" on the second occasion I adopted the advice of Dr. Leonard Hill, and for a moment sat the patient up and exerted pressure upwards in the epigastrium, with a view to relieving any engorgement of the right heart that might be present, by encouraging the patient to bleed into his splanchnic area.

Autopsy.—On post-mortem examination, made the next day, the following condition was discovered: The patient was tall, thin, and of sallow complexion, and dark hair. The head was dolichocephalic in form, the palate high-arched. The tonsils not much enlarged. The air passages were clear, the lungs normal, and giving on section no odour of anaesthetic. The thyroid gland was enlarged, and showed degenerative changes. The thymus gland was persistent, and weighed 24 grams; it extended downwards towards the pericardium. The heart was dilated, with thin, flabby walls, showing on microscopic examination considerable fatty degeneration of the muscle fibres. The spleen was greatly enlarged, and there was a supernumerary spleen; both showed on section very great overgrowth of the follicles and connective tissue. In the intestines the Peyer's patches and solitary follicles were excessively developed. The mesenteric glands were all enlarged.

REMARKS.

In reviewing this case I am unable to find any detail of the administration I should alter if I could have the opportunity of giving the patient an anaesthetic again; unhappily this is not possible, and I only hope to learn from the collective experience of the Society how in future I might improve on the methods I adopted. To err is human, and it is only by being told of our mistakes that we can expect to mend them, for we all do what we believe to be best at the time. I trust, therefore, the discussion will bring out points for treatment of these dangerous and unsuspected cases.

One or two points impress themselves upon me. First, with regard to the previous preparation of the patient, I think it is very important not to rush this type of patient into an operation; I believe it would be better to send him into a nursing home for two or three days beforehand so that he might benefit by the moral stimulus of the environment and settle down to the necessary discipline.

In my opinion it is dangerous to allow patients to smoke before taking anaesthetics; there is no doubt that tobacco

* A paper read before the Soc. of Anaesthetists on November 1st, 1907.