INTRATHYROID HAEMORRHAGE FOLLOWED BY ACUTE DYSPNOEA AND DEATH.

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As the following case is of rather an exceptional character, its narration may perhaps prove interesting.

The patient was a domestic servant, aged 24, who had been employed for the previous three weeks at the Lowther Road Hospital, Bournemouth, and who jumped off a tram travelling about eight miles an hour at 8 p.m. on Thursday, April 20th. She fell on the left side of the face, receiving two small cuts, one on the outer side of the left orbit, with a marked surrounding ecchymosis, the other on the under side of the chin; there was comparatively little bleeding from either of these cuts.

When helped up she was perfectly conscious, and acknowledged that the accident was due to her own carelessness. She remounted the tramcar with the assistance of the conductor, and was taken to a doctor's house twenty yards away. The doctor being busy with other patients at the time, the girl's injuries being apparently trivial, the hospital where she was engaged being only a few hundred yards off, her appearance not bad enough to excite alarm, and she herself professing to be quite well, she was allowed to return to the hospital about five hundred yards distant.

Soon after she commenced walking more urgent symptoms appear to have arisen, for, a quarter of an hour later, she was found on the doorstep of the hospital in a collapsed condition, breathing with great difficulty and clutching at her throat.

Her noisy inspirations were heard at some distance and attracted the attention of the sister in charge, who, with the nurse, came to her help. It was during the next few minutes that she related the history of the accident.

Within five minutes one of us was present, and realizing the urgency of the symptoms, telephoned for the other's assistance.

State on Examination.

We found the girl lying in a supine position, with head slightly raised on a pillow; she was unconscious. The noisy inspiratory dyspnoea was then the most pronounced symptom; each inspiration was accompanied by a throwing forward of the neck.

The thyroid gland was markedly enlarged, and we understood that she had previously suffered from a simple goitre, which had given her very little trouble; there was no localized area of fluctuation over the gland.

Her face was very pallid; the pulse was regular, rate 100, and small tension. The pupils were equal, somewhat contracted, and did not react to light. She had had incontinence of urine, but not of faeces. The skin was moist.

There was no exophthalmos, no marked flaccidity or rigidity of the limbs; there were no convulsive movements of any kind.

Treatment and Result.

We did everything that we thought suitable for relieving the profound shock present and the urgent dyspnoeic symptoms. Oxygen was freely given, but the heart-beats became steadily more rapid and more feeble, reacting for a short time only to the various remedies. There was no vomiting, no haemorrhage from the nose, mouth, or ear, and no escape of cerebro-spinal fluid. The pupils continuing equal, became slowly dilated and insensitive to light.

Finally she died at 9.30 p.m., an hour and a half after the accident, respirations having continued after the heart had stopped.

Necropsy.

At the necropsy held two days later the following condition was found: The body was well nourished. On one of the legs was the scar of an operation for varicose veins. On removal of the skull cap the cortical vessels of the brain were found to be much engorged, but there was no fracture or intracranial haemorrhage; both middle meningeal arteries were intact.

The examination of the chest revealed a healthy heart, with competent valves; there was no effusion of blood present. The abdomen was normal; the various organs were found to be healthy.

On the examination of the neck the thyroid gland was found to be much enlarged, the main bulk of the gland being formed by a haemorrhagic cyst with very definite walls, chiefly occupying the middle line, but also encroaching on the lateral lobes. Its approximate measurements after escape of its contents are 7.5 cm. by 4. This thyroid haemorrhagic cyst was situated low

down, between the upper portion of the manubrium sterni in front and the lower cervical and upper dorsal vertebrae behind. There was no extravasation of blood into the surrounding tissues.

The thyroid gland itself was much diminished in size after the escape of blood. It weighed 5½ oz., against the normal 1 to 2 oz. There was no obliteration or displacement of the trachea.

One or a combination of the following theories is suggested as a cause of death:

(a) Death from double shock—first the shock of the accident due to the violent impact of the head upon the ground, and, secondly, the shock of the sudden onset of dyspnoea.

(b) From the direct pressure on the trachea during life, this cause not being apparent *post mortem*.

(c) From thyroid poisoning due to the sudden tearing of the glandular substance, thus liberating an excessive quantity of thyroid secretion into the general vascular system.

(d) From pressure on the vagus nerve producing an inhibitory effect upon the heart.

(e) From pressure on the middle and inferior cervical sympathetic ganglia with a reflex effect upon the heart via the cardiac nerves to deep cardiac plexus.

The following cases are interesting with reference to the above, but in none of them is it related that the dyspnoea was preceded by a severe accident.

CASE I.—In the BRITISH MEDICAL JOURNAL for May 1st, 1909, there is a case of a Chinese male, aged 25, who had a sudden enlargement of the thyroid with dyspnoea. This man recovered without operation in about three days' time.

In the *Lancet*, November 16th, 1907, Berry narrates the following cases:

CASE II.—That of a boy of 17, who had chronic severe dyspnoea due to a thyroid. Postponed operation till it was too late. Very little blood was lost; but just after the thyroid tumour was removed, he collapsed and died.

CASE III.—Another in a woman, aged 68, who, after the operation of removal of the thyroid gland for the relief of dyspnoea, died from cardiac failure without any sign of respiratory distress.

CASE IV.—Still another one is mentioned of a girl of 14 who had a bilateral parenchymatous goitre, noticed only three weeks. On Berry's arrival the girl was deeply cyanosed and unconscious. Fortunately he had everything ready for operation. Thyroidectomy was performed; the patient recovered, not regaining consciousness, however, for one hour after the termination of the operation.

CASE V.—He relates, too, a case of a young woman with thyroid enlargement attending as an out-patient at one of the London hospitals who died on the doorstep of the hospital from sudden dyspnoea. *Post mortem* there was found to be present an extensive haemorrhage into an encapsulated tumour of the thyroid.

CASE VI.—Osler, in his book on *The Principles and Practice of Medicine*, fifth edition, mentions a fatal case from haemorrhage into the thyroid gland and cellular tissue.

The cases mentioned above nearly all occurred in young people. Monnier says that the prognosis is very bad in urgent operations for dyspnoea resulting from sudden enlargement of a thyroid gland.

THE DISCRIMINATION OF COLOUR.*

BY

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In a paper on the relation of light perception to colour perception,¹ and in previous writings,² I have stated that if a portion of the spectrum be isolated, it will appear monochromatic, the length of the monochromatic region varying with the intensity and wave-length of the light and the colour perception of the observer. Most normal-sighted persons make about eighteen such divisions in a bright spectrum.

In a paper in the *Proceedings of the Royal Society*,³ Lord Rayleigh, whilst agreeing that the facts were as I stated in the conditions described by me, expressed the opinion that he could distinguish between the wave-lengths included in a monochromatic division to the extent of discriminating between the colours of the two D lines. Lord Rayleigh kindly lent me the colour box with which he had made the experiments, and on repeating them in the manner described by him I arrived at similar results. I hope, however, to be able to show that the results obtained by Lord Rayleigh were due to the

* Read before the Royal Society.

admixture of small quantities of white and coloured light and to certain physiological influences which had not been taken into consideration, and which prevented him from arriving at a correct interpretation of the colours.

If a prism, even of the finest polish, be examined with a strong light against a dark background, numerous small particles and irregularities of the surface, which irregularly disperse the light, will be seen. The reflections from the sides of the prisms, lenses, and sides of the box have also to be taken into consideration. The amount of this irregularly dispersed light is small, but is a very important factor taken in conjunction with other facts. It is necessary, therefore, in order to get rid of the greater part of this irregularly dispersed light, to allow the light included in a monochromatic region to pass through a second aperture, such as that in my spectrometer. When this is done, I have found it impossible by any method which I have adopted to distinguish between the various waves included in the monochromatic region. I have magnified the image of this region with eyepieces of different power, making a corresponding increase in the light to make up for the loss of luminosity caused by the magnification. I have also obstructed the central portion of the monochromatic region with a screen, and the remaining portions have still appeared monochromatic. The most conclusive experiment, however, is the examination of the monochromatic region with an achromatic double image prism, the intensity of the source of light being increased as before. By this method two rectangular monochromatic fields are seen, and can be arranged so that they are side by side and just touch.

The portion belonging to the red side of the spectrum of one can be made to touch the portion belonging to the violet side of the spectrum of the other. This position is therefore most favourable for the detection of any difference, and yet I cannot detect any, neither can any other observer to whom I have shown the experiment. The experiment can be observed objectively in the following manner: An arc light being used for the illuminating source, a pure spectrum is obtained; a portion of this spectrum, forming a monochromatic region, is allowed to pass through an adjustable slit. Two images of this monochromatic region can be thrown with the aid of a double image prism upon a screen and made of any required size. The varying size of the monochromatic regions with different persons can by this means be demonstrated to a large number.

Another point which I found with Lord Rayleigh's apparatus is the difficulty of obtaining both fields of similar intensity. The slightest movement of the eye also causes an alteration in the number and kind of rays which enter the eye. When two fields are of unequal intensity the physiological effect of contrast is evoked, which causes an erroneous judgement of the colours under observation. In fact, weak orange light may, by contrast with bright red light, appear green. In making experiments on the discrimination of colour, the rays of light from the two regions to be compared should strike the eye at as nearly as possible the same angle; the fixation point of the eye should be in the centre between the two regions, so that one region may not be more influenced by the pigment of the yellow spot, or the blood in the retina, than the other; and equal amounts of light from each region should enter the eye.

The importance of the irregularly dispersed light in association with contrast in dealing with questions of colour has been overlooked by many physicists, as several instruments have been constructed for the investigation of colour and colour vision, which are defective on this ground. It was this irregularly dispersed light, as shown by Helmholtz,¹ which caused the apparent change in the colours of the spectrum observed by Brewster, and which led him to suppose—erroneously—that there were three kinds of solar light.

In conclusion, when special means are taken to have as pure a spectrum as possible, I can find no method which will enable me to distinguish as separate colours the wavelengths in a monochromatic region. I therefore regard the appearance of the monochromatic region as a fundamental physiological fact, as I stated over twenty years ago.

REFERENCES.

¹ *Proc. Roy. Soc.*, B. 1910, vol. lxxii, p. 458. ² *Colour Blindness and Colour Perception*, International Scientific Series. ³ December, 1910. ⁴ *Poggendorff's Annalen*, 1852, No. 8.

MENORRHAGIA IN VIRGINS: A MEDICINAL TREATMENT.

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IN the EPITOME for March 4th reference is made to a paper by Sireday and Lemaire on menorrhagia in young virgins. In this many factors are mentioned, but one of great importance is omitted.

The proximate cause of the menstrual flow is vascular distension of the uterine mucosa, in which there are at least three physiological factors: (1) The force of the heart; (2) the dilatation of the uterine arteries; and (3) the absence of arterial dilatation elsewhere—or, in other words, the maintenance in other areas of the average amount of vaso-constriction or vascular tone. The last factor, though, of course, fully recognised in physiology, is apt to be overlooked, or, at least, not allowed for, in practice. Hence vaso-constrictors rather than vaso-dilators are nearly always employed in seeking to arrest haemorrhage.

We may assume that the force of the heart remains unchanged during menstruation; at least, there is no reason to assume otherwise. It has also been shown in some cases of normal menstruation that the general blood pressure is unchanged.¹ It follows that in such there is a slight increase in the average vaso-constriction in the undilated areas (a slight general increase of vascular tone), though such increase would doubtless be far too small to admit of instrumental measurement.

Now, suppose an exaggeration of this normal slight increase of general vaso-constriction. Two results would follow: (1) An increase in the general blood pressure; and (2) a marked increase in the vascular distension of the internal genitalia. The former could be demonstrated by the manometer; the latter would cause symptoms. The increase of vascular distension in the ovaries and uterine adnexa would be indicated clinically by an increase in the ovarian and pelvic pain, which in some slight degree may be regarded as symptomatic of normal menstruation; the increase of vascular distension in the uterus would be indicated clinically by menorrhagia.

That marked menstrual exaggerations of general vaso-constriction are common is rendered probable by the well-known tendency to excessive vasomotor irritability which obtains in young females, and by the fact that hysterical girls who complain of pain, etc., during menstruation have a steady rise of 20 mm. during the flow.²

The conception that excessive menstrual losses may depend upon exaggerated vascular tone broadens the etiological basis of menorrhagia. While not forgetting the undoubted influence of local lesions and general diseases, we have to include amongst probable causes all the factors of exaggerated and impulsive (inadequately inhibited) vasomotor action—a series of factors too long to be here considered. Meanwhile we may work on proximate factors. From the fact that exaggerated general vaso-constriction increases the menstrual loss, it follows that a reduction thereof will diminish the loss; whereupon we at once think of the nitrites.

The effect on menstruation of an inhalation of amyl nitrite, the most rapidly acting of the class, is in strict accordance with, probably exceeds, anticipation. Synchronously with the flushing of the face, the clinical index of inhibition of the general vascular tone, the flow ceases; nor does this return until the next period, unless the inhalation has been administered during the first day or two of the process. In several cases a single administration of 3 minims on three or four successive menstrual periods has been sufficient to effect permanent relief from the tendency to excessive losses. In others the effect has been temporary only. In these latter it has been necessary, and usually sufficient, to give during the menstrual period a regular course of nitroglycerine, according to the practice recently advocated by Gowers in his article on Vagal and Vasovagal Attacks, in the *Lancet* of June 8th, 1907.

It is superfluous to add that the success of the nitrites in menorrhagia should never lead to the neglect of local conditions. But these, of course, are quite frequently not examinable.

REFERENCES.

¹ *Clinical Study of Blood Pressure*, Janeway, 1907, p. 127. ² *Ibid.*, p. 257.