crushing action. When this posterior line of attachment has been reached the pressure of the thumb of the hand holding the guillotine should not be enough to force it home, owing to the bluntness of the guillotine; it is at this juncture that the other thumb should cease to press on the anterior pillar of the fauces, and the hand thus freed be used to force home the guillotine. The tonsil will always come away with the guillotine, owing to this crushing of the tissues. Since it is necessary to get a good view, it is advisable to pass immediately from the one tonsil to the other before blood obscures the view. Failure to see means that the furrow between the tonsil and the posterior pillar of the fauces may not be hit off, and that the anterior pillar of the fauces may be damaged. I often take away a thin edge of mucous membrane on the anterior pillar of the fauces. It is easily done without touching the musculature. After the enucleation of tonsils a definite smooth-walled cavity corresponding to the buried portion of the tonsil is felt with the finger. On examination of the tonsil the surface of the buried portion will similarly be seen to be smooth with the thin grey capsule of the tonsil covering it. The completeness of this capsule is the demonstration of complete enucleation.

Sometimes, especially in adults, the tonsils have to be

removed when there is no faucial prominence at all; there may be an excavation. In cases such as this the operation presents no increased difficulties, since the posterior pillar of the fauces is a guiding mark to the posterior border of the tonsil. Visibility is all-important to maintain the position of a guillotine whilst the tonsil is pressed into the guillotine. I have removed a tonsil which on examination afterwards was cup-shaped, consisting of an excavated buried portion of tonsil only.

The removal of adenoids calls for no other remarks beyond what has been said with regard to removing them with one sweep of the curette. It is always well to feel and steady the curette against the posterior border of the nasal septum where it touches the roof of the nasopharynx. This can quite well be done without any damage to what is a relatively fragile structure. One quick sweeping movement with maintenance of pressure backward on to the pharyngeal wall is then all that is necessary. At the end of operation the child can be turned sideways or face downwards to allow of the escape of blood; but is kept wrapped up, to avoid struggling, until such time as consciousness returns.

REFERENCE.

¹ On Enucleation of Tonsils with the Guillotine, by S. S. Whillis, M.D., and C. F. Pybus, M.S., F.R.C.S., *BRITISH MEDICAL JOURNAL*, November 25th, 1911, p. 1402.

A METHOD OF ENUCLEATING TONSILS WHICH LESSENS BLEEDING.

BY

PETER MACDONALD, M.A., M.D.,

HONORARY SURGEON, EAR, NOSE, AND THROAT DEPARTMENT,
YORK COUNTY HOSPITAL.

THE "reverse guillotine" method of enucleating tonsils, first described in this country by Whillis, is, I suppose, that most commonly now employed, and I personally use it almost exclusively, except that I use my thumb, and not my forefinger, to press the tonsil through the guillotine ring; and after trying various guillotines I came to the conclusion that the Howarth guillotine, with sharp and blunt blades, was much the most convenient of the instruments made for this purpose. I have come to use the blunt blade only in the vast majority of cases, keeping the sharp blade in reserve for cases where the fibrous attachments of the tonsil are so tough that they do not readily give way to the blunt blade—a condition found only in a small minority of cases operated on.

To obviate bleeding, and also to lessen the liability of the patients either swallowing blood or sucking blood into the larynx, I have recently somewhat modified my methods. It is much more convenient to engage the tonsil in the guillotine with the patient on the back than on the side, but to prevent blood from accumulating in the pharynx, with risk of its passing into the larynx or oesophagus, I like to have the patient on the side with the face turned somewhat down before performing any cutting, so that any blood runs down out of the mouth.

I adopted, accordingly, the following procedure: The patient is anaesthetized on the back and the operation field well illuminated with a head lamp or frontal mirror. Standing on his left side facing him, I first engage the left tonsil in the ring of the guillotine, shut down the blade by the handle lever and give this closed handle to an assistant (usually a nurse) to hold, and then engage the right tonsil with the second guillotine and close the blade and hold the handle myself.

On this being completed, the patient is turned on to the left side and the face turned somewhat down. Up to this time there is practically no blood in the mouth, and as the mouth is now turned down, any blood from the subsequent

operative procedure will run out of the mouth over the edge of the operating table. This manoeuvre almost completely obviates the swallowing of blood during the rest of the operation.

I now remove the tonsils, and I do so not by cutting out or tearing out; but, using the closed instrument in the same way as a pressure forceps is employed to perform torsion on a small artery, I twist the tonsil until the pedicle of fibrous tissue, engaged between the guillotine blade and the ring, containing the principal blood vessels of the tonsil, gives way.

In this way the bleeding from the tonsils is reduced to a minimum. The tonsil is removed in its capsule, and with rare exceptions the removal is complete. If necessary, adenoids are now removed with the face still turned somewhat down, so that blood from these also runs out of the mouth. On completion of the operation the patient is turned completely over on to the chest and face, with the

head hanging down over the edge of the table, and on removal to bed or recovery couch, care is taken that the patient is not allowed to lie on the back until there is a considerable degree of recovery from the anaesthetic.

The inconvenience of handing the closed handle of the guillotine to an assistant to hold, and the risk of slipping involved, soon made it evident that it was desirable to employ, for the first guillotine at least, one with a locking

attachment to lock the blade, such as the ratchet of the Elphick "haemostatic guillotine."

The Elphick guillotine, however, has the handle attached to the blade at right angles, and as the obtuse angle position of the handle in the Howarth guillotine has a great advantage, and also as the serrated edge of the crushing blade of the Elphick has no advantage which I can see, I got Messrs. Down to make me a guillotine which is really a modification of Howarth's.

The principal modification is the ratchet attachment to lock the blade in the closed position, but I had the guillotine made also with interchangeable ring and blades for different sizes of tonsils, and with the blunt blade very blunt. A small modification, but an important one, is that the end of the lever pushing the blade home is turned over to hold the sliding blade down to its bed, as I found in some of my Howarth's guillotines that firm pressure on the handle sometimes forced the sliding blade to ride up

over the end of the lever—a rather awkward *contretemps* in the middle of an operation.

The instrument can also be used as a haemostatic guillotine, and left *in situ* for five minutes, as advocated by La Forge.

I find by the method above described that while in the vast majority of the cases removal of the tonsil is complete, there is no greater amount of sloughing of the bed of the tonsil than when a sharp blade with cutting edge is used. The loss of blood is markedly lessened, as also the risk of serious haemorrhage. The amount of blood swallowed is reduced to a minimum.

The sister in charge of my recovery wards is quite clear that post-operative sickness is lessened, and in consequence, where patients have to go home the same day, as in hospital practice is often unfortunately necessary, they are sooner fit for removal.

RELATION BETWEEN THE GENERAL NERVOUS SYSTEM AND SYMPTOMS OF "D.A.H." IN NEURASTHENIC PATIENTS.

BY

H. W. DAVIES, M.B., B.S., CAPTAIN A.A.M.C.,

AND

J. G. PRIESTLEY, M.C., B.M.Oxon.

(From the Clinical Laboratory, Ashhurst War Hospital, Littlemore.)

An investigation¹ carried out by one of us in conjunction with J. S. Haldane and J. C. Meakins at No. 15 Canadian General Hospital, Taplow, during 1918, on patients suffering from symptoms of D.A.H.—chiefly in consequence of irritant gas poisoning—led to the recognition of the importance of the symptom of shallow breathing. This symptom appeared to be due to some abnormal upset of the Hering-Breuer reflex.

Hering and Breuer² described in 1863 the reflex control of the respiratory movements. Their experiments proved that inspiration and expiration are initiated in response to afferent impulses passing up the vagus, and that a state of deflation or inflation of the lungs provides the stimulus which originates the impulse leading to inspiration and expiration respectively. Hering and Breuer's work, however, did not throw any light on the question as to how the depth of breathing is normally regulated. The nature of this regulation was made clear by the work of Haldane and Mavrogordato,³ who showed that the degree of inflation or deflation of the lungs which is necessary to excite the Hering-Breuer reflex depends upon the CO₂ tension of the arterial blood.

Besides the abnormality of the Hering-Breuer reflex the patients also manifested many other functional and nervous symptoms, and consequently it seemed advisable to make some attempt to work out the relationship, if any, between their abnormal respiration and disturbance of other functions of the nervous system.

With this object in view the work was transferred to the Ashhurst War Hospital, and the present paper embodies the results of observations made there on neurasthenic patients. These patients were not selected, but were taken at random. All were admitted for "neurasthenia." The total number of patients on whom observations were made was 100.

The first point to which attention was directed was the prevalence and severity of D.A.H. symptoms among patients admitted for neurasthenia, and with this end in view the patients were all subjected to the following examination as far as possible:

1. Pulse rate at rest.
 2. Pulse rate after two minutes' work on a bicycle ergometer at 3,170 foot pounds per minute.
 3. Time taken for pulse to return to resting rate.
 4. Rate of respiration sitting quietly in chair.
 5. Rate of respiration sitting quietly and breathing through inspiratory and expiratory valves so that the volume could be measured.
 6. Volume per respiration and volume per minute.
 7. Vital capacity.
 8. Time during which the breath could be held (a) in inspiratory, (b) in expiratory position.
- In addition a note was made of any spontaneous complaint by patients of shortness of breath on exertion.

It may be well here to point out one difficulty which we experienced—namely, that the observations were made at very varying times after the onset of symptoms and after various kinds of treatment. Hence the patients had recovered to different degrees. In considering the results it was noticed that the patients exhibited a gradation of D.A.H. symptoms from none to moderate severity. They did not, however, except in a very few cases, show by any means such an extreme degree of severity of symptoms as was common among patients admitted directly in consequence of the effects of irritant gas.

An attempt was made to classify the cases observed under three heads: (1) Those with marked D.A.H. symptoms, (2) those with definite D.A.H. symptoms, and (3) those with no appreciable D.A.H.

Table I gives a selection of representative results of this classification.

TABLE I.

	Pulse at Rest.	Pulse after Work.	Time (min.) for Pulse to Return.	Complaint of Dyspnoea.	Respn. with-out Valves.	Respn. with Valves.	Respn. during Work.	Holds breath, Inspn. (secs.).	Holds breath Expn.	Vital Capacity, Litres.
Marked D.A.H....	88	136	2+	No	35	48	48	7	5	2.7
	80	176	7+	Yes	32	32	62	25	15	3.5
Definite D.A.H....	96	124	1	Yes	15	15	28	20	15	3.5
	84	100	4+	No	22	20	30	55	25	3.0
No appreciable D.A.H.	58	72	$\frac{1}{2}$	Yes	22	27	29	43	18	4.0
	60	88	2	No	13	26	22	54	33	3.2

On examining the figures for the whole series of cases it is evident that in the several degrees of D.A.H. the regulation of the pulse and respiration are both upset, but that in the milder cases the symptoms may be manifested chiefly with respect either to the pulse or respiration.

This is shown in Table II, where two cases of mild D.A.H. are compared.

TABLE II.

No. of Case.	Pulse at Rest.	Pulse after Work.	Time (min.) of Return of Pulse.	Complaint of Dyspnoea.	Respn. with-out Valves.	Respn. with Valves.	Respn. at Work.	Holds breath, Inspn. (secs.).	Holds breath Expn.	Vital Capacity, Litres.
97	72	116	3+	No	18	18	22	42	25	2.7
39	72	84	1	No	25	21	29	19	18	3.2

Table III gives a summary of the results, and in addition shows the relation of previous infection and gas poisoning to the frequency of D.A.H. symptoms.

TABLE III.

	No. of Cases.	Gas and/or Infection.	No Gas or Infection.
Definite symptoms of D.A.H. ...	13	12	1
Less marked symptoms ...	57	37	20
No appreciable D.A.H. ...	30	14	16

It appears from this table that of the 13 cases which showed well defined symptoms of D.A.H., 12, or 92.3 per cent., gave a history of gas poisoning or infection, either recent or from which the symptoms dated; of the 57 cases with ill defined symptoms, 37, or 64.9 per cent., and of the 30 cases free from D.A.H. symptoms, 14, or 46.6 per cent., gave this history.

These results accord well with the findings of Lewis and his co-workers.⁴ In considering them it should be borne in mind that several of the cases with no appreciable D.A.H. which are shown as having suffered from gas or infection gave a history of very slight gassing. Also in this connexion it should not be forgotten that the patients examined had been under treatment for very varying periods. Hence the figure of 46.6 per cent. may be taken as a maximum.