the ultimate triumph of good. He believed that social and political reforms were fully as important as scientific advances and fought for them with all his strength, uncompromisingly, antagonizing men of smaller stature, and yet all who knew him well knew his deep kindliness and human sympathy, respecting him as one who never deviated from a principle.

**DISCUSSION**

**Dr. Bailey:** I perceive Detroit is the proper place for the neurosurgeons to foregather. They seem to be rolling off the assembly lines like automobiles.

You perceive also how fortunate we are to have Dr. Sachs with us to deliver the Victor Horsley lecture. It is too bad that Dr. Sachs couldn’t take more time to tell us more stories about Sir Victor Horsley. I suggest that some of you corner him at lunch and get him to tell you about the time Horsley sent him to take the spinal cord out of a whale.

**Dr. Sachs:** Excuse me, walrus.

**Dr. Bailey:** Walrus? I think you missed a good opportunity to follow Mark Twain who said, you know, that one should not spoil a good story by telling the exact truth. As far as I am concerned, it was a whale. [Laughter]

Well, we shall proceed now with the regular series of presentations on this subject which has been so adequately introduced to us. The first speaker will be Dr. Wycis, who, as you know, began, together with Dr. Spiegel, these applications which Clarke always looked forward to confidently.

[Dr. Wycis presented a paper on “Pallidotomy and pallido-amygdalotomy in certain types of convulsive disorders,” by Drs. H. T. Wycis, H. W. Baird and E. A. Spiegel.]

**Dr. Bailey:** The next speaker will be Dr. Irving S. Cooper who will talk about chemopallidectomy.

## CHEMOPALLIDECTOMY AND CHEMOTHALAMECTOMY*

**IRVING S. COOPER, M.D., AND GONZALO BRAVO, M.D.**

*Department of Neurosurgery, St. Barnabas Hospital, and Division of Neuromuscular Disease of the New York University Post Graduate Medical School, New York, New York*

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In the development and evaluation of a neurosurgical technique the aim of which is to produce a lesion deep in the brain for the alleviation of hyperkinetic disorders there are six principal criteria by which a particular technique should be judged. These criteria are: (1) **Accuracy** of localization of the lesion. (2) **Standardization** of the technique so that with simple landmarks it is reproducible by many individual surgeons. (3) The ability of the technique to produce a lesion of sufficient size to alleviate the symptoms without necessarily inflicting undesirable sequelae. (4) **Safety**, so that the patient may undertake this particular type of therapy with a low risk of mortality or other complications. (5) **Ability to inflict the destructive lesion**

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gradually and in a controlled fashion, thereby enabling the surgeon to vary the size and degree of neural destruction in individual cases. (6) The ability of the technique to produce good results consistently in a large series of cases.

Chemopallidectomy, as presently performed on our service at St. Barnabas Hospital, fulfills each of the criteria enumerated above. It is the purpose of this report to describe the present technique of chemopallidectomy and to note its results not only in cases of tremor and rigidity of parkinsonism, but also in cases of disorders of involuntary movement in children such as dystonia musculorum deformans, choreo-athetosis, and hemiballismus.

In brief, we presently perform chemopallidectomy* via a convexity approach by the following steps:

1. A pneumoencephalogram, using 30 cc. of air, is performed prior to operation. By means reported previously in detail,2,3 a line (line C) is then drawn on the scalp which represents a plane 5 mm. behind the foramen of Monro. This line remains visible throughout the operation and serves as one of the two important external landmarks for orientation during the operation.

2. The patient is taken to the operating room and placed supine on the operating table. The procedure is performed under light Pentothal Sodium amnesia supplemented by local anesthesia at the site of operation.

3. A trephine opening is placed 5½ cm. from the midline directly on line C, which represents the desired plane for insertion of cannula 5 mm. behind the foramen of Monro.

4. The chemopallidectomy guide† is placed on the scalp and fixed by fixation of the scalp so that the cannula holder is poised above the trephine opening on line C, thus insuring the fact that the cannula will be introduced into the brain in a plane 5 mm. behind the foramen of Monro.

5. We then use the second external landmark, which is the inner canthus of the ipsilateral eye. The cannula is placed in the guide and the tip of the cannula is directed towards the inner canthus of the eye. The cannula is then pushed 2 cm. into the brain substance. At this point the external landmarks have served their purpose and it is necessary to switch to the internal pneumoencephalographic landmarks before proceeding further.

6. A lateral and an anteroposterior roentgenogram of the skull are made in the operating room. They are developed on polaroid film so that the pictures become available in 50 seconds. These films are checked to see whether the cannula, if it is pushed to its proper depth in the brain, will come to lie at the desired points, that is point X in the anteroposterior film and point 0 in the lateral film. These anatomic landmarks have been described in detail in earlier communications and will not be repeated here.2–5.

7. When it is observed that the cannula is aimed at the proper points, it may then be placed at its proper depth, which is at the level of the middle of the third ventricle. This is usually 6.5 cm. beneath the cortex. If it is not aimed at the proper point a correction in its position is made and it is rechecked roentgenographically until it has assumed the proper position.

* The technique described herein includes certain modifications made since this paper was presented in April 1957.
† Manufactured by Invengineering Inc., Belmar, New Jersey.