DEFINITIVE treatment of cerebral tumors has been standardized by accurate quick histological diagnoses. Though a majority of cerebral tumors can be diagnosed by their gross appearance, it is of considerable importance to the surgeon to know the tumor type prior to removal of the neoplasm. The pathologist is forever trying to improve upon the accuracy of the diagnosis and at the same time enable methods to remain within a practical reach and understanding of the surgeon. In order that a method may fulfill the latter purpose it must be rapid, provide good staining differential qualities, be adaptable to handling tiny bits of tissue, and stain all of the constituents of the tissue. It is of course desirable that any rapid method be comparable to the standard preparations commonly used.

It is the purpose of this paper to describe a simple method of rapid diagnosis of cerebral tumors which can be used in the operating room. The tissue can be ready for the surgeon to examine within 30–40 seconds following his own preparation of the smears made at the operating table between two sterile glass slides.

The technique of using smears of bits of tissue for the diagnosis of various lesions is not new. It has been described for the diagnosis of brain tumors by Badt, Russell, Deery, and Dudgeon and Patrick. It has probably been used in every pathological laboratory. The stain described here is superior to any one I have ever used for quick histological diagnosis, and was developed by Dr. William Reid, and used at the Montreal Neurological Institute.

TECHNIQUE

As soon as the tissue is removed, a tiny fragment is placed at one end of an ordinary glass slide, and a drop of normal saline solution is added. A second glass slide with its long axis perpendicular to the first slide is then inverted over the fragment. Gentle pressure on both slides is then applied with the thumb and index finger of the same hand, mashing the tissue between the two slides. After little experience the proper pressure necessary to obtain a satisfactory preparation will be acquired. With a firm hold on the uppermost slide, this slide is quickly drawn down the long axis of the lowermost slide, thus making a smear of the fragment, just as one would in preparing a smear of gastric juice, exudate, or blood. It is recommended that several slides be prepared from the same fragment and from different fragments of the same specimen. The slides are then allowed to dry in air or over a hot plate.
The staining method is as follows:

1. Place in eosin solution for 5 to 10 seconds. This solution is prepared in the following manner:
   - Eosin (water soluble) .................................... 1 gm.
   - Potassium bichromate .................................... 1 gm.
   - Distilled water .......................................... 100 cc.
   2. Wash carefully in tap water.
   3. Dehydrate with acetone-alcohol from dropper bottle.
   Use:
   - Absolute alcohol ...................................... 1 part
   - Acetone .............................................. 5 parts
   4. Wash carefully in tap water.
   5. Stain in methylene blue solution for 10 to 30 seconds. Tumor tissue requires a shorter time, usually about 10 seconds. The preparation of this solution is often difficult, and the success of having a good concentrated stain depends on carrying out the directions carefully:
   - Prepare a solution of
     - Methylene blue ........................................ 1 gm.
     - Potassium carbonate ................................... 1 gm.
     - Distilled water ........................................ 300 cc.
   - Boil the solution for 10–15 minutes. Add 3 cc. of glacial acetic acid, drop by drop with a pipette, shaking the solution rather vigorously. Continue to shake until the precipitate dissolves. Finally boil the solution until a concentrated solution of 100 cc. remains.
   - Allow to cool slowly. This stain is stable for at least a year, if not longer.
   6. Wash carefully in tap water.
   7. Dehydrate with acetone-alcohol solution from dropper bottle, using 1 part absolute alcohol and 5 parts acetone.
   8. Dehydrate with chloroform from dropper bottle.
 10. Mount in Canada Balsam.
 11. Cover with large cover glass.

The preparation is then ready to be studied under the microscope. The actual preparation of the smear can be made in less than 1 minute in a large number of instances.

The results of the staining reveal blue nuclei, slight grey to pink cytoplasm, brilliant pink collagen, pink glial fibers, blue intracellular phagocytosed particles. In one instance a metastatic brain tumor from a melanoma of the eye revealed blue intracytoplasmic granules. The stain gives an excellent differentiation between the various structures listed. On several occasions I have been able to observe the intracytoplasmic fibrils in a piloid astrocyte. In another case, “gitter” cells could be easily differentiated from the tumor cells of the same size, because of the mesh-like cytoplasm in the “gitter” cells. These results were checked with fat stains on homologous smears. The smears may also be used for the routine frozen and chromatic techniques. Mucicarmine and glycogen stains have been particularly successful.

Certain alterations in the staining times will result in distinctive preparations. For example, if perineurial fibroblastomas are left longer (25 to 30 seconds) in the eosin solution, and if meningeal fibroblastomas are left exactly 8 seconds in the eosin solution and 12 seconds in the methylene blue