When a severely disabling seizure disorder has not responded satisfactorily
to extensive medical management, a surgical solution is often sought.

This may be possible by resection of a cortical focus. Or an attempt
may be made to limit spread of seizure activity by the interruption of
fiber tracts radiating from the focus. Among cerebral fiber tracts, the
corpus callosum is the largest and most widely connected.

When Van Wagenen (R) introduced section of the corpus callosum as a
surgical treatment for epilepsy, he referred to his observation of
seizure amelioration following injury to the corpus callosum. At about
the same time, Erickson's animal studies (R) provided experimental
support for this approach. We do not intend to review here the extensive
clinical literature on section of various fiber tracts, nor the even more
extensive experimental literature on the effects of callosotomy on
seizure development and spread. But we do wish to point out that
experimental work since Erickson has included a number of studies
showing the importance of the anterior commissure for seizure propagation,
especially with temporal lobe foci (R, R).

It is unfortunate that no published long-term followup is available on
Van Wagenen's patients. Even personal investigation has failed to provide
us with the data. However, a review of the many papers by Akelaitis
and co-workers (R, R, R, R, R) provide some information, at least in the
short term. Appraisal of these results is complicated by the hetero-
geneity of the population, both as regards the nature of disease as well
as the considerable variation in extent of callosal section. If we
restrict our consideration to those patients described as having a division
of the corpus callosum either complete or nearly complete (described as containing "a few fibers of the splenium"). We can accumulate a total of twelve patients in the Van Wagenen-Akalsitis series, of whom these, six are described as having a cessation or marked diminution in generalized convulsions. Therefore, if we suppose that patients who are not described to be failures, it appears that of those patients with a complete or nearly complete callostomy, but not including the anterior commissure, approximately one-half obtained a distinct improvement.

In 1960, one of us (J.E.B.) became physician to a man whose severe convulsions had not been helped an a number of medicines, had been worsened by Dilantin, but was slightly helped by Phenobarbital and to some extent by Mysoline, Diamox and Zarabin. On the latter four medicines in large doses he continued to have generalized convulsions at least one or two times per week and status epilepticus about every three months. There were, in addition, numerous less severe spells, some of which included various forms of automatic behavior.

There was EEG evidence for involvement of both temporal lobes and also the left temporal parietal language zone, as well as neurological evidence of a right frontoparietal lesion. The patient and his family were desperate for relief. No surgical treatment then in use seemed applicable. After lengthy correspondence with the National Institute of Health at Bethesda, he was admitted there for six weeks of study and discharged with an apparently hopeless prognosis. On his return in Spring of 1961, extensive discussions lead to the proposal by J.E.B. that he have an experimental operation to which he readily assented.
To insure a minimum of surgical risk P.J.V. and J.E.B. entered into a program of study including cadaver dissection. We were particularly concerned that the operation include all of the corpus callosum and also the anterior commissure, because of our view that even a small remnant of fibers might vitiate the effect of the operation. To insure a maximum of scientific data, as desired by the patient and his wife as it was by us, R.W.S. agreed to make available the facilities of his laboratory. We were joined in the Fall of 1961 by M. S. Gazzaniga, who devoted a major portion of his time for the succeeding five years to the study of this and subsequent patients. Preoperative testing continued through the remainder of 1961, during which time the patient continued to have seizures of the same frequency and severity as previously (See Figure 1). Following operation on February 6, 1962, the patient had a difficult post-operative course but during the year was able to enter into a social life impossible before the operation.

It is difficult to describe the sense of satisfaction and delight with which we listened to his excited description of his first attendance at a baseball game in over six years (the Dodgers won). In the first two months after surgery there were two episodes involving unresponsiveness together with some motor activity. There were also numerous brief episodes of stiffening of the left arm or inability to talk. (See Figure 2). But since that operation six years ago he has not had a generalized convolution.

A year and a-half after the operation on W. J., M. G. entered the White Memorial Hospital in status epilepticus. Medical treatment had been unavailing for the preceding eight years. A left temporal EEG focus had been demonstrated some years before, but by 1963 the EEG
abnormalities were generalized in a diffuse. There was in addition a right central calcification associated with an occasional pre-convulsive aura of left-sided numbness. This patient was operated on September 5th, 1963. Following her discharge from the hospital nearly five years ago she has not had a generalized convulsion nor any other type of spell involving unconsciousness. She manages her household, does the sewing, travels, does housework, and in general leads a moderately normal existence.

The gratifying results in our first two patients has encouraged us to offer the procedure to subsequent patients. The operation has been performed fifteen times to date and has included three deaths. Of the other twelve patients, only one has not obtained a definite improvement in seizure status. In each case, our scientific interest was discussed with the patient before operation and they have without exception been most helpful in cooperating in the psychological studies.

This leads into a discussion of the neuro-psychological deficits.