

NOTES AND DISCUSSION

The Dilemma of Localizing Language: John Abercrombie's Unexploited Evidence

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John Abercrombie (1780–1844) was considered the most eminent Scottish physician of his time. In his *Pathological and Practical Researches on the Diseases of the Brain and Spinal Cord* (1836, Edinburgh: John Carfrae and Son, 3rd ed.) he described the cases of 140 patients with cerebral disorders, 48 of whom suffered from language disturbances. Despite the overwhelming clinical and neuropathological evidence of a close association between language disorder and right-sided hemiparesis or diseases of the left hemisphere, and in spite of his great interest in language disorders, he made no attempt to localize the aphasic syndrome to a specific brain area. © 1991 Academic Press, Inc.

INTRODUCTION

John Abercrombie, “First Physician to His Majesty in Scotland” and member of the Edinburgh School, gained international reputation for his medical and philosophical works, which were published in the United Kingdom and in the United States of America. Several of his books were translated into French and German. The first volume of his influential work *The Pathological and Practical Researches on the Diseases of the Brain and Spinal Cord* was published in 1818.

His passion for the psychological and philosophical aspects of neuropsychiatry is documented in his *Inquiries Concerning the Intellectual Powers and the Investigation of Truth* (1835). His authority was widely accepted and reached far beyond the medical profession.

In recent accounts of the history of neurology Abercrombie's work has received only little attention. His failure to draw the neuropsychiatry

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logical conclusions from his case studies may be one of the reasons for the lack of interest in one of the leading figures of 19th century neurology.

This note is an attempt to examine how Abercrombie came to overlook one of the seemingly most obvious conclusions from his collection of cases.

ABERCROMBIE'S REPORTS

In the third and enlarged edition of his *Pathological and Practical Researches on the Diseases of the Brain and the Spinal Chord* (1836) Abercrombie presented 159 case vignettes. In most instances he had attended the patients during their lifetime and performed postmortem studies. A large number of reports from other authors are discussed in the general sections and in the appendices.

One hundred forty of his patients suffered from brain disorders. The youngest patient was 5 months, the oldest 82 years. Eighty-six were male, 53 female. The sex of one child was not given. In 48 patients language disturbances were observed, in 45 a left- or right-sided hemiparesis. Postmortem studies were performed on 121 brains.

Case CXXVII (in the chapter "Of the Apoplectic Affections") provides a good example of Abercrombie's concise and objective style:

A gentleman, aged 56, in one of the last days of June 1826, while walking through the museum of the University of Edinburgh, was suddenly seized with a loss of speech. He walked with difficulty and some assistance to the house of a friend in the neighbourhood, where it was first observed that he had lost the use of his right side. After a short time he became nearly comatose, and continued so for some days. After repeated bleeding, purging, &c., he became gradually more sensible; but it was now found that he had lost almost entirely the memory of words, though he appeared to comprehend what was said to him. He gradually recovered the use of his leg, so as to be able to walk a little. But his arm made very little improvement, and both his speech and his memory of words continued very imperfect; his recollection of persons and events seemed to be tolerably good. He was improving very gradually in all respects, till about the end of October, when he began to be affected with a disease of the chest, of which he died in the end of November. The paralytic symptoms continued in a very considerable degree to the last, especially in the right arm, and in his speech, which continued very indistinct. I saw him a short time before his death, along with Dr. Alison, to whom I am indebted for the history of the previous attack.

INSPECTION.—In the substance of the left hemisphere, on the outer side of the ventricle, we found a cyst about an inch and a half long and one inch deep; it was quite empty, and lined by a yellowish membrane similar to that which has been described in the former case. (1836, pp. 259-260)

It is difficult to decide whether the neuropathological findings refer to a brain abscess or to a vascular lesion, which might exhibit similarities 6 months after the initial stroke. The case appeared under the subheading "The Cyst Empty—the Patient Dying of Another Disease" and served

TABLE I
APHASIA AND HEMIPARESIS

	Left-	Right-sided hemiparesis
Aphasia	5	23
No aphasia	11	6

X^2 -Test: $p < .02$.

as an illustration for the paralytic forms of apoplectic affections. However questionable the aetiology, the clinical history and syndrome were coined meticulously: acute loss of speech and right-sided hemiparesis, gradual recovery, persistent impairment for the memory of words, imperfect speech, but "sensible", apparently understanding what was said to him, recollecting persons and events. With some reservation, it seems reasonable to call such a disturbance an aphasia.

Table 1 shows the numbers of patients exhibiting hemiparesis with or without aphasia. A first look at the cells should arouse suspicion concerning the random nature of these relationships. Table 2 summarizes the frequencies of left- or right-hemisphere lesions with or without aphasia. The association of aphasia with right-sided hemiparesis and with left-hemisphere pathology proves statistically significant. The relationship of unilateral cerebral pathology and contralateral hemiparesis reaches even higher statistical significance (Table 3). Variances in the total numbers of patients among Tables 1, 2, and 3 are due to missing data.

ABERCROMBIE'S PRINCIPLES

The evidence for a laterality of language appears striking in view of these findings. Several of his principles may help to explain Abercrombie's dislike concerning apparently simple deductions.

First, Abercrombie tried to assume "no higher character than that of a truthful relater of facts" (1836, p. vi). "The foundation of all knowledge must be a careful and extensive acquisition of facts; and the first duty of an inquirer in any department of science is to bind himself down to such a patient accumulation, beware of all premature attempts to combine or generalize them" (1835, p. 409).

Second, "our next step is to arrange the facts according to the characters in which they agree; . . . by this, we mean . . . the symptoms which characterize particular diseases, and the morbid appearances in the cases which are fatal, as shall enable us to trace the relations between the symptoms and the nature and seat of disease" (1835, pp. 417-418). Accordingly he put an accent on the morbid anatomy, which, in his view,

TABLE 2
 APHASIA AND THE LATERALITY OF NEUROPATHOLOGICAL FINDINGS

	Left-	Right-sided neuropathology
Aphasia	17	7
No aphasia	6	13

χ^2 -Test: $p < .02$.

would link the symptoms and the nature of the diseases. Therefore the case reports in the "Pathological and Practical Researches . . ." were arranged in the three classes "inflammatory," "apoplectic," and "organic" with regard to their anatomical appearance and suspected nature (1836).

Third, "the rule [of deducing general principles] is opposed to the error of hasty generalizing, or of deducing a general statement from a limited number of facts. We can avoid this error, only by keeping steadily in view, that general principles derive their whole value from being universal facts,—or facts that are true without single exception . . ." (1835, pp. 441–442). "Attempts have been made . . . to establish a connexion between the seat of the disease and the particular organs which are affected; but these attempts do not seem to have been attended with much success" (1836, p. 265). In different places (1835; 1836) Abercrombie listed his own observations and numerous reports by colleagues and other authors to demonstrate the conflicting findings concerning the relationship of symptoms and underlying pathology. He was particularly impressed by the exceptional case of a young lady "in whom [the left] half of the brain was reduced to a mass of disease; but who retained her faculties to the last" (1835, p. 163). He quoted this case in his philosophical (1835) and in his medical work (1836, pp. 176–178).

Abercrombie admitted that his cases show "the mind holding intercourse with the external world through the medium of the brain and nervous system; and, by certain diseases of these organs, they show this intercourse impaired or suspended; but they show nothing more. In particular, they warrant nothing in any degree analogous to those partial deductions which form the basis of materialism. On the contrary, they show us the brain injured and diseased to an extraordinary extent, without the mental functions being affected in any sensible degree" (1835, p. 164)

Abercrombie did not explicitly attack phrenology as such, which was the most likely major target of his criticism. However, he states that "the zeal for hypothetical systems is considerably gone by; but this tendency to unsound generalizing must be viewed as one of the chief

TABLE 3
LATERALITY OF HEMIPARESIS AND NEUROPATHOLOGICAL FINDINGS

	Left-	Right-sided neuropathology
Left hemiparesis	1	9
Right hemiparesis	17	1

X^2 -Test: $p < .001$.

errors which at present retard the progress of medical science'' (1835, p. 443). Abercrombie himself was not aware that his own rigorous principles, which were in radical opposition to phrenology, prohibited potentially useful interpretations of his own data.

THE HISTORICAL BACKGROUND

Neuroscience in the early 19th century was characterized by a number of features, which might be considered flaws in the scientific method. Staining and microscopy were not widely used; neuroanatomical terminology was still ill-defined; the patient samples were rather heterogeneous, etc. Statistical methods has already been accepted in the social sciences, but were still considered inappropriate in medicine, where every case received individual attention. The authors were therefore easily overwhelmed by data and had no instruments for their reduction.

Morgagni (1761) had already described a number of patients with aphasic disturbances, right-sided hemiparesis and left-hemisphere disorders. Bianchi, Lassone, and Sulzerus had independently delineated the decussation of the pyramidal tract, but this issue was still under discussion at the turn of the 18th century (Giannitrapani, 1967).

The following decades were dominated by phrenology and by the question of whether language might be localized in the frontal lobes (Benton, 1964). Gall's and Spurzheim's observations in support of their theory were far from convincing (1809). They did, however, gain exceptional public. Phrenological societies were founded, one of them in Edinburgh, which pursued the phrenological concept with greater scientific sincerity than Gall and his immediate co-workers. The majority of scientists became engaged in a struggle for or against phrenology, which led to a wealth of clinical findings that were unfortunately only exploited with respect to phrenological issues. Bouillaud (1825) collected 29 cases in support of phrenology, i.e., of the relationship of frontal lobe pathology with aphasia. He neglected his evidence for the strong association of language disturbance with left-hemisphere pathology (8 of 11 cases) versus the considerably weaker association of aphasia with right-hemisphere disorders (4 of 14 cases).

Andral (1829–1833) collected 51 cases with the intent to falsify the phrenological idea. Twenty-one of 37 patients with frontal lobe lesions were aphasic, as were the 14 patients with postcentral affections, whom he mentioned. Apart from the fact that he did not show any interest in the side of the lesion, his interpretation of the data would appear quite questionable from a statistical point of view. Flourens (1824) chose the experimental approach of the physiologist to tackle the phrenological issues. He deduced from ablation studies in pigeons, that the cerebral hemispheres would act as a whole, and that specific functions could not be localized in specific areas.

The noisy argument about phrenology silenced the most diligent researchers. Marc Dax, a general practitioner in Montpellier, who had prepared a paper entitled “Lesions of The Left Half of the Brain Associated with the Loss of Signs of Thought” (1836), and who continued to investigate the neuropathology of aphasia throughout his life, never dared to publish a manuscript on more than 100 patients.

John Abercrombie did publish his unbiased research, but he and his audience abstained from any attempt to go one step further to interpret the observations. The turmoil of phrenology proved a stimulus and a major impediment to neurological progress.

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