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## New Test for the Brain

Psychologists and educators have long questioned the ability of IQ tests to gauge intellectual capacity and potential, asserting that the tests are both unreliable (an individual's scores have been known to differ by as much as twenty points on two ostensibly similar examinations) and culturally biased in favor of white, middle-class children whose native tongue is English. Last week, however, two Canadian researchers unveiled an instrument designed to eliminate cultural and emotional factors and measure directly what they call "the brain's physical ability to learn." The machine was invented by Dr. John Ertl, a psychologist at the University of Ottawa. What it does is monitor the speed at which the brain responds to the simple stimulus of a flashing light.

The idea of extracting information on intelligence from brain waves first came to the Hungarian-born, British-educated

Ertl in 1959, after he himself had scored a paltry 77 on a conventional IQ test. (He subsequently established, however, that his IQ is actually an impressive 140.) Built by a British electrical engineer, Dr. Bernard Elliot, the "neural-efficiency analyzer" consists of five basic parts: a pair of electrodes to pick up brain waves, a device to amplify the waves, an oscilloscope on which they can be viewed, a flashing light to stimulate the brain and a computer to analyze the brain's response to the light. The electrodes are mounted on a football helmet, which is shielded from interference by a copper coating on its outside and lined inside with a flexible layer of Styrofoam. The helmet is put on a subject in such a way that the electrodes rest lightly against the top of his head.

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**Involuntary:** To take the test, the subject looks at the light, which flashes about once a second for two minutes, and the computer calculates the average time the brain takes to respond to the flashes by analyzing the brain waves. Ertl insists that the response is completely involuntary and that the subject cannot consciously control its speed.

According to studies on some 6,500 subjects, the response speed measured by the machine correlates well, although not perfectly, with standard IQ scores. The exceptions, however, are important. In one study of 1,000 schoolchildren in Canada, for example, the neural-efficiency analyzer gave relatively high scores to seven children who had been assigned, on the basis of IQ tests, to classes for slow learners. After consultation with their teachers, these children were reassigned to regular classes, where they settled down quite successfully. Ertl's studies have also shown that scores from the machine are consistently reproducible; a child's score appears to stabilize at the age of 5 and remain constant for the rest of his life.

**Elusive:** One question about the neural-efficiency analyzer, which is being offered for lease by Associates International, Inc., concerns the exact quantity or quality that it really measures. Although Ertl and his colleagues cannot answer that, they agree that it is not intelligence per se. "Intelligence is a concept equivalent to truth and beauty," said Ertl last week. "I don't know what intelligence is, but I do know what it is not. It's not the score on an IQ test, and it is not what our equipment measures." Nevertheless, Ertl says, when it comes to evaluating the biological efficiency of a person's brain, "I feel that our measurement is more valid than the IQ tests. It is almost completely culture-free; it requires no language, and it requires no response of any kind." Besides advocating use of the machine as an extra tool for educational psychologists, Ertl recommends it also to predict the learning ability of children who cannot take conventional IQ tests—children who don't speak English, for instance, and toddlers under the age of 3.

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