

## BOOK REVIEWS

*The Purposive Brain*. By Ragnar Granit. Cambridge, Mass.: MIT Press, 1980.  
Pp. x+244. \$5.95 (paper).

We don't see starlight during the day — a fact linked to a thousand others by a general principle which fits them all tolerably well, considering that its terms are restricted to trigger-springing physical events at the body surface and their out-comes in the mind. Gustav Theodor Fechner boldly expressed this principle mathematically in 1850: sensation varies in degree as the logarithm of stimulus intensity. As Ragnar Granit remarks, Fechner is less respected today than he deserves. As a matter of fact, the stature of that learned, depression-prone man has always varied strangely. He was called the founder of experimental psychology by Wundt, himself the official recipient of that title. William James, on the other hand, in 1890 in one of his frequent moods of Jovian insouciance, which inclined him to take cheap shots at any thinker in range, spoke of Fechner in a famous passage as "that dear old man" who started a "new department of literature", which it would be impossible to match for its thoroughness and subtlety, but of which the proper psychological outcome is just nothing." But James expressed a different view, regrettably seldom referred to, some years later in his Hibbert Lectures at Oxford when he said of the mind of Fechner that it was "one of those multitudinously organized crossroads of truth which are occupied only at rare intervals by the children of men, and from which nothing is either too far or too near to be seen in due perspective."

The retinal circuitry of frogs and rabbits is complicated enough to respond in very distinctly different ways to objects moving in different directions. The retinas of cats and monkeys cannot do this. That kind of sophistication is shifted to the visual cortex in the more complicated vertebrates — not her fact linked to a thousand others by a general principle — encephalization.

A group of discharging spinal motor neurons, or of amacrine cells in the retina, will suppress the action of their neighbors according to a universal scheme materialized in a limitless number of ways in all synaptic nervous systems — the scheme of interacting excitation and inhibition.

The psychophysics of Fechner, encephalization, or to be still more general, centralization, and excitation and inhibition — these are old themes in the time scale of neurobiology, and they are bound up with one that is much older, that of purpose in biology. The last has been a guiding principle in the work of Granit, as it was for his teacher, Charles Sherrington. The title of Granit's book, *The Purposive Brain*, is more forthright about this than Sherrington's

Silliman Lectures of 1904, "The Integrative Action of the Nervous System." But the two are equivalent, for by integration Sherrington meant coordination and interaction of nervous pathways for definite purposes. As David Hull points out in his brief but very illuminating book, *Philosophy of Biology*, the distance between the ideological and mechanistic points of view is not the unbridgeable chasm it once was when both were young. They are now often expressed in ways that make their differences matters of quibbling. Most teleological why questions turn out to be answerable to everyone's satisfaction by causal how answers. This is so unless one quibbles about the difference in meaning between the words "effect" and "purpose," a difference which, for most problems that biologists involve themselves with, was reduced to insignificance by Darwin. It seems almost as if the only why questions left are the ones reducible to ontological what questions such as "What is gravitational force?" and to a few such very ultimate why's as "Why is there something rather than nothing?" I am not sure that either David Hull or Ragnar Granit would wholly agree with these offhand remarks, but their drift is in keeping with the general trend in both authors. Despite this, an ill-humored conflict continues to thrive between the enlightened descendants of the old vitalists and mechanists. Why this is so must be because the...