LETTERS

Two Disciplines

Gerald M. Edelman touches on important issues in his editorial "Scientific quests and governmental principles" (9 Apr., p. 99). He makes some good points, but also some not-so-good ones. What moves me to overt disagreement is the following argument as I understand it. The politico-legal and the scientific disciplines are distinct, different, and "rarely intersect." This leads them (and presumably their followers) to extreme and antagonistic ideological positions that are "dangerous as well as erroneous." These cannot be fully understood or resolved until we understand "how the brain itself produces thought and language."

My unpremeditated reaction is that we risk first experiencing a cold day in Hell if we must await that achievement. I am not pessimistic about the capabilities of the neurosciences, although the task Edelman sets is no mean one. I am more influenced by the dire social conflicts that are already upon us and that are now consigning many lives daily to whichever postulated ultimate fate. The travail of the Irish and the Lebanese, for example, is almost purely within the politico-legal "discipline," if that includes the religious. With "politico-legal" conflict everywhere rising and value-driven fire storms threatening, we can hardly wait to "know better how the brain works."

Actually, cognitive and normative knowledge processing each have a constructive tradition and a long history of interaction. The practitioners of one far from always disagree with practitioners of the other. Edelman wisely urges a greater mixing of the two. It is only through a combination of the best in both traditions that real progress can be made. In fact, we need more effective incorporation of knowledge from all constructive traditions into decision-making; existing mechanisms at the social level are failing to provide it. Whatever the relation of agreed-upon facts and not-agreed-upon values in the mechanisms of the brain, there will remain the *social* problem of accommodating many behavioral streams into a not too disharmonious ensemble. Despite the advantages and attractiveness of greater knowledge of mechanisms in the brain, we can't wait nor can we give all our energies to contemplation of even a neuro-navel.

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Of course, scientific and normative approaches to human knowledge have a long history of interaction. But in modern times, there are peculiar difficulties of understanding that have become particularly crucial with the increasingly rapid societal adoption of scientific technology. Grobstein and I apparently do not mean the same thing by "interaction." I mean acts or decisions based upon a *mutual* understanding of the limits of both scientific and legal disciplines. It is this understanding that I feel should be encouraged among practioners of science and of government.

Much of Grobstein's letter is inspired by his mistaking my suggestions for fuller resolution of ideological conflicts that arise from a failure of this understanding. I did not propose or imply by these suggestions a moratorium on practical or pressing goals. Although I still recommend deepening our knowledge of brains and language, I am astonished at his inference that this reflects an unconcern for our present historical agonies.

It is always tempting to impute a lack of common sense or of moral concern to those who suggest long-range approaches to important social matters. While sharing Grobstein's moral concern, I do not feel that looking for the physical bases of thought and language will distract us from our moral duties, nor do I suggest giving *all* our energies to the task. In any case, I am not as sure as Grobstein that one can predict how long a fundamental answer to this key problem of neurobiology will take. Although knowing how the brain works will not solve our moral dilemmas, it will, I think, prevent us from adopting egregiously stupid ideologies. And possibly, it may suggest some epistemological limits to apply to both cognitive *and* normative matters.

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Ice-Age Vegetation

In the otherwise excellent CLIMAP (*1*) survey "The surface of the ice-age earth" (19 Mar., p. 1131) an ambivalent description of land surface properties is shown in figure 1. Vegetational equivalents of albedo estimates in places seem to contradict geological data established by pollen analysis and dated by radiocarbon.

This is especially true for category E, described in the figure legend as having an albedo below 20 percent and com-