tion in science. Such trends toward uniformity should even be considered in the otherwise valuable creation of strategically placed international institutes of advanced studies.

Summing up, then, I would say that neither barriers of any kind inside of Europe nor the organization of her universities is the primary factor that has caused European biology to lag behind, but rather the effects of the sad 20th-century history on this continent. As to the means for recovery, I am much more optimistic than Consolazio that with continuing economic improvement the deficiencies can be overcome by the reshaping of university organization that at the same time will keep the best of traditional forms.

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With respect to Perry's comments, my article limits itself to academic biology. I tried to make it clear that not everything was black. Even though I was generalizing, I nevertheless qualified my generalizations. In this instance, if I may quote from the article in discussion, I believe I can make my point clear: "There are pockets of scientific activity of very high quality in most of the other countries of Western Europe . . ."

With respect to Becker's points of issue, I have two comments to make. I am aware of plans not only in Germany but in other parts of Europe to right the existing situation, but more is needed than plans. In the second instance, I said nothing about language as a barrier to communication and to developments in science. I was talking about nationalism, and more specifically about citizenship as a qualification to hold appointments in the universities.

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Mushroom Structure

You have committed a mistake in the explanation of the picture on the cover of the 26 May issue [*Science* **133** (1961)]. Your statement reads ". . . crowded knife blade gills of white support the umbrella-shaped pileus and bear spores. . . ." The gills in *Lepiota* are free from the stipe and grow downward from the context of the pileus. The *pileus* is the supporting structure

and holds the gills in position for spore discharge. The gills, by virtue of hanging free from all parts of the carpophore save the pileus, are in no position to support anything.

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Thyroxin Analogs in Tadpoles

The report by Frieden and Westmark [*Science* **133**, 1487 (1961)] includes useful information on relative activity of thyroxin and its analogs in promoting certain metamorphic changes in tadpoles. The authors indicate that in the rat, according to oxygen uptake and goiter prevention tests, the various analogs used are from 0.1 to 10 times as effective as thyroxin. In the tadpole, when the hormones are administered by injection (insufficient detail given as to number and frequency of doses, and so forth), three of the analogs show 3 to 7 times the metamorphosis-promoting capacity of thyroxin, that is, within the same range of effect as for the rat, while the most active compound, 3,5,3′-triiodothyronine, is 17 times as active, that is, outside the range of activity shown in the rat, but of the same order of magnitude. In contrast, when these hormones are administered by keeping the tadpole immersed in their solutions, these same analogs show up to 20 to 300 times as much metamorphosing activity as thyroxin.

Frieden and Westmark ascribe the very different relative activities to the "unique" *route* of administration, that is, immersion, and suggest that in part the tadpole response is "probably strongly influenced by relative rate of penetration." Regrettably they fail to remark that most, if not all, of the tadpole tests utilize the relatively insensitive system of the tail, involving either the measurement of tail shortening or of tail height reduction. In contrast, when the most sensitive system, the leg of the tadpole, is used as a test object in hypophysectomized (and thus functionally thyroidless) tadpoles, far less difference in relative activities of the compounds is noted [Kollros, in *Comparative Endocrinology*, A. Gorbman, Ed. (Wiley, New York, 1959), and Kollros and Race, *Anat. Record* **136**, 224 (1960)]. Recent studies, using threshold doses of hormones to stimulate leg growth, have shown 3,5,3′-triiodothyropropionic acid to be be-