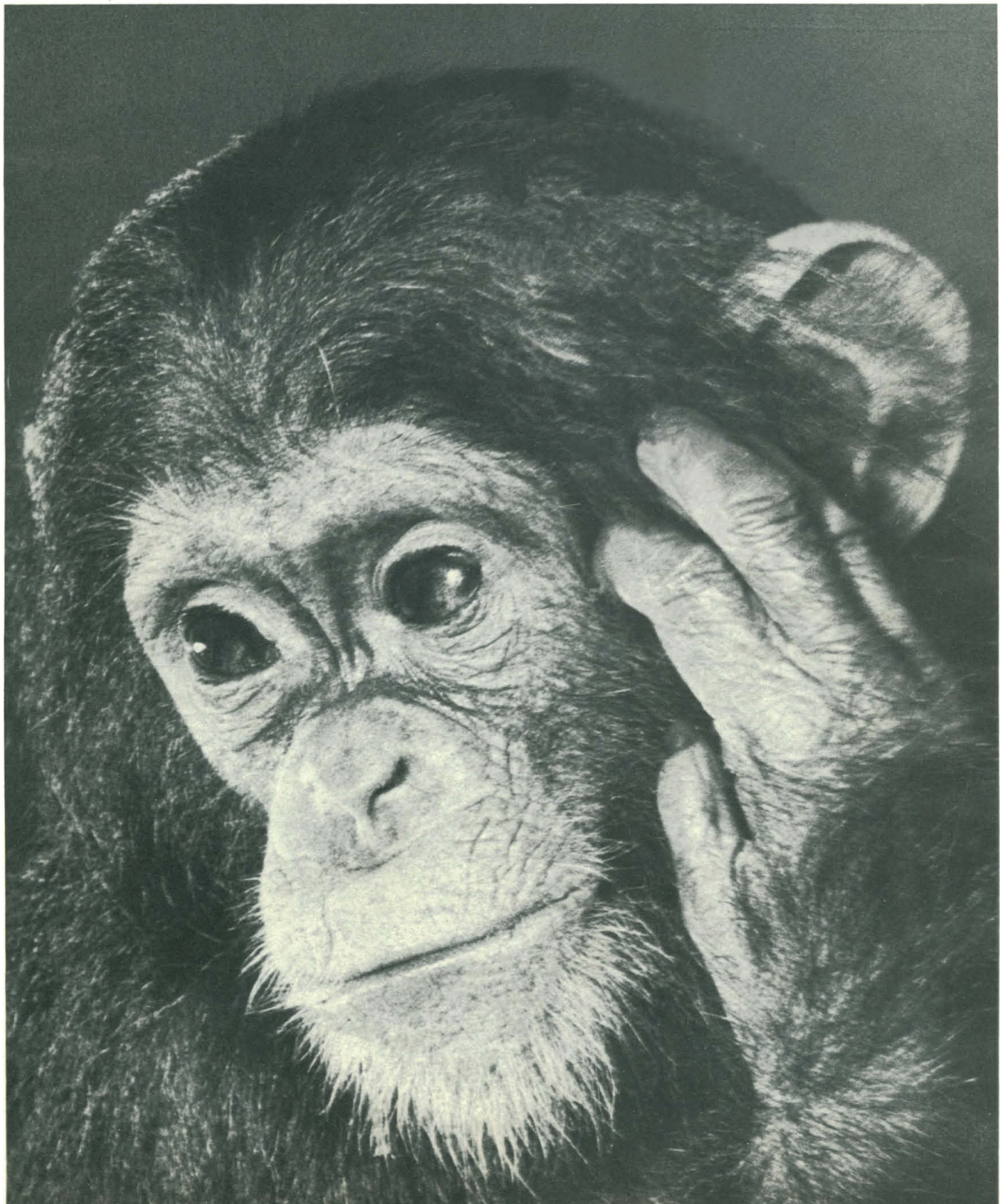


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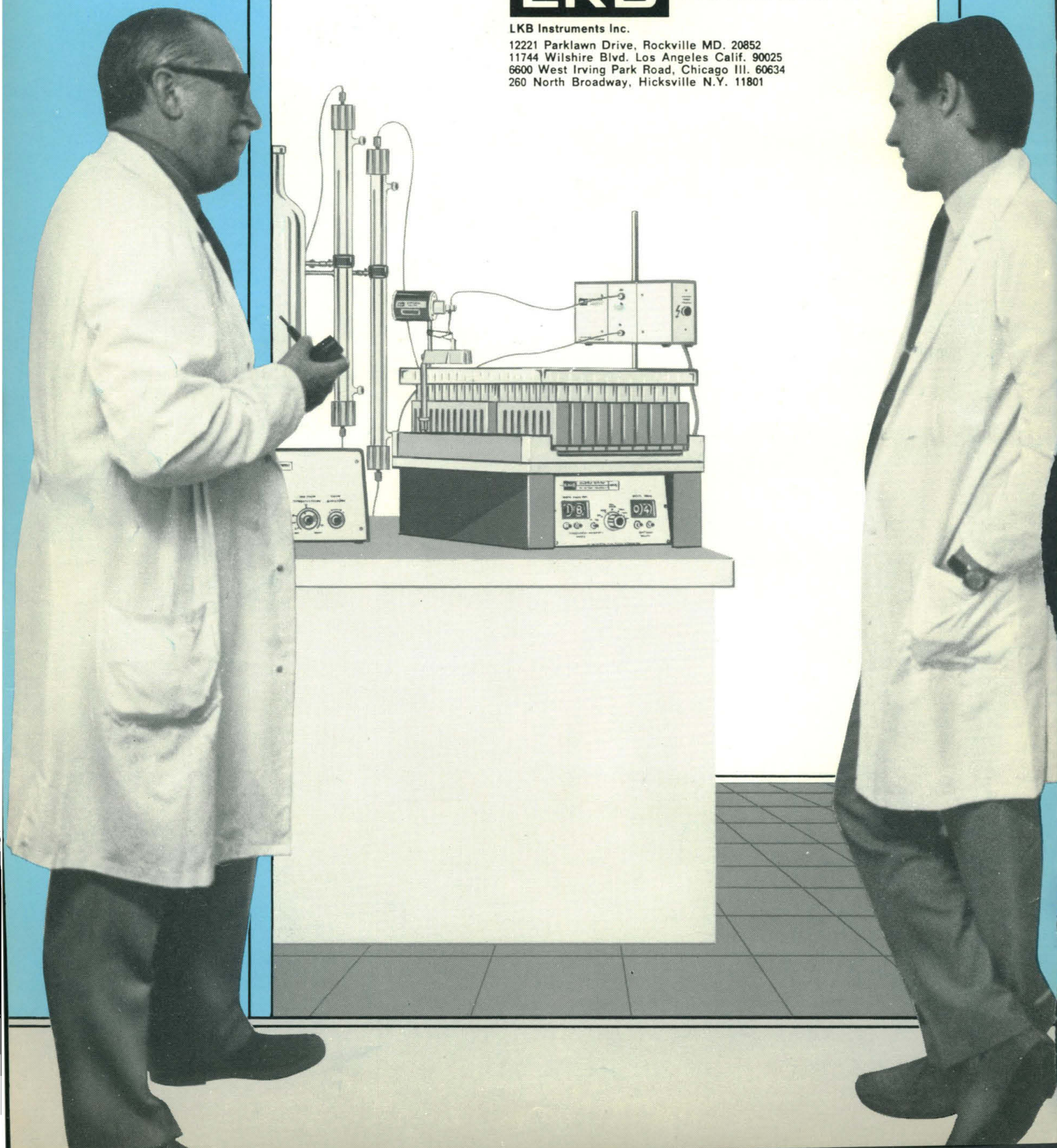
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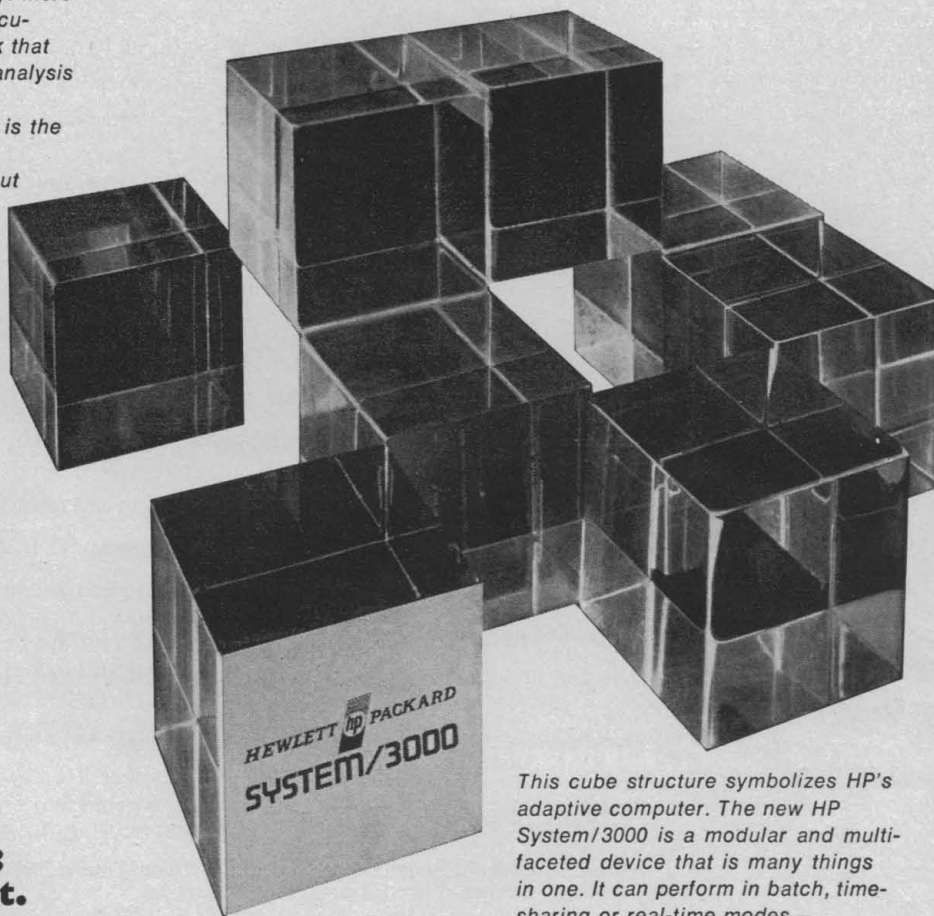
COVER

Chimpanzees given "typical" human doses of Δ^9 -THC, a component of marijuana, tend to overestimate passage of time just as do humans. See page 547. [Henry A. Shull, Darien, Connecticut]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

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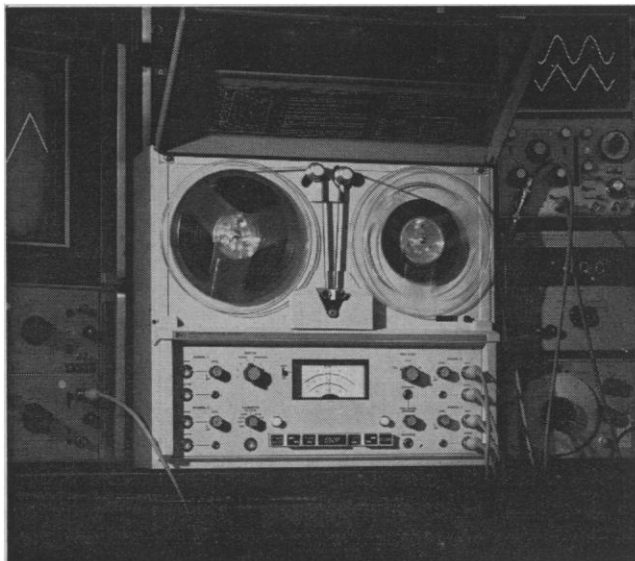
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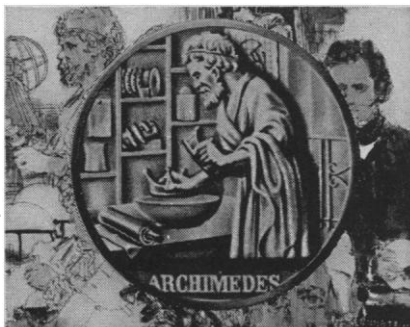
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The Future of Graduate Education, If Any

It is reasonable to assume that graduate education in the United States developed on undergraduate college campuses because its presence was somehow synergistic with respect to the higher education enterprise. The most important factor was probably the presence of a cadre of scholars engaged in the learning pursuit, both with neophytes and on their own. In addition, libraries, laboratories, and skilled artisans were available.

For half a century or more, the whole clearly exceeded the sum of the parts, whether considered from the viewpoint of quality, cost effectiveness, or a combination of both. Now, however, the proliferation of graduate programs on the individual campus, the increase in the number of campuses providing graduate education, the current oversupply of these graduates, and the seeming inflexibility of many people with advanced degrees calls into question the synergism argument in favor of graduate education on the country's campuses.

The rationale for expanding doctoral-degree programs in many disciplines was originally based on the need for more holders of Ph.D.'s and on the proposition that the programs were required to attract and hold better faculty.

The push for more holders of Ph.D.'s derived, in part, from an implicit belief that the economic well-being of a societal entity is at least a linear function of the number of advanced degrees in that entity. This is an extension of the level of literacy argument and probably is not valid. The idea that graduate programs would attract and hold better faculty never was valid, unless the reason for attracting and holding this faculty was to provide more adequate instruction for undergraduates also. That is, the basic reason for having the undergraduate-graduate combination must be to enhance the total enterprise, both academically and economically—and there must be evidence of such enhancement.

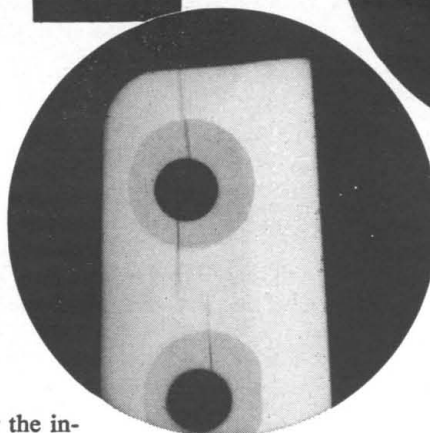
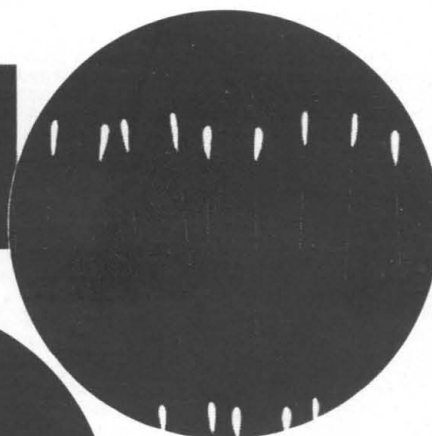
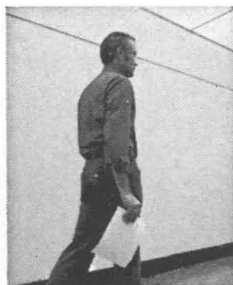
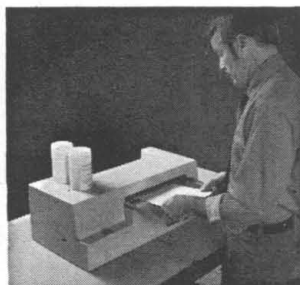
There has been no such evidence, at least until very recently, and this is not yet assessable. Moreover, although poor undergraduate instruction has been concomitant with some good creative work, it has also, unfortunately, been concomitant with much mediocre creative output. The latter derives not only from some faculty members' desire for sinecures, but also from the habit of minimizing the importance of mission-oriented problem solving. Thus, some individuals admirably suited to the latter perform only moderately well at the traditional academic tasks.

What is the solution? No single one stands out, but several possibilities present themselves. One is to continue seeking increased support for increased costs, as well as for expansion. Another is to (self-) limit proliferation on the individual campus by not acceding to the "attraction" argument. A third is to limit the number of universities offering a broad spectrum of courses. A fourth is to decide that the enhancement no longer obtains and, therefore, to separate graduate from undergraduate education. There are undoubtedly other possibilities, or at least variations and combinations of these four.

The fourth deserves a little elaboration. Proliferation of graduate activity has been riding on the back of expanding undergraduate installations and is, therefore, not readily controllable. The separated system is not unknown—for example, the freestanding postbaccalaureate professional schools. These are expensive, both on an absolute and on a per student basis, but for this very reason the number will be, in part, self-limited.

Nowhere in this is there any argument or any implication that is intended to diminish the continuing vitality of graduate education as an important national objective. The reason for raising the various possibilities is that the problem is serious and its solution should transcend personal preferences.—NORMAN HACKERMAN, *president, Rice University, Houston, Texas 77001*

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*Paper x-ray facilities at the bottom of every popular ski slope? Possibly. But don't count on it.



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