

"clinical patients" in a large American medical center of today. Certainly they are unlike those of his native Germany and unlike those of Kashmir, India, where he practiced (dentistry). Since those days he has largely spent his time in physiological laboratories (according to the recent edition of *American Men of Science*). This is by no means to question his scientific status. This information is merely relevant to the question he raised. If Benjamin is trying to imply that the clinical patients are insensitive peasant types (if such exist), he is quite wrong. They are familiar with life's advantages and "sensitive" to them. While economic brackets are only one item in placing a man, I can point out that these television-owning, automobile-driving clinical patients are charged \$27.00 per day for their beds and they actually pay 70 percent of this, or \$18.90 per day. It is impossible for me to believe that the *tenfold* difference I showed could be explained by any such nebulous possibility as suggested by Benjamin.

There is an extraordinary constancy in the average response to morphine and to placebos, for example, if one deals with rather large groups of patients, notwithstanding diverse backgrounds. Houde and Wallenstein, studying chronic pain in cancer patients, found in 67 patients that 10 milligrams of morphine satisfactorily relieved ("relief" was carefully defined) 65 percent. Lasagna and Beecher found in groups of postoperative patients of a similar size in different years that 65.8 and 69.3 percent, respectively, were relieved ("relief" was carefully defined here also) by 10 milligrams of morphine. Houde and Wallenstein found that a placebo satisfactory relieved 42 percent of their patients; Lasagna and Beecher's figure was 39 percent. Here are remarkably similar results in groups whose past experience, present situation, and future are highly different. If the response to "observation and interpretation of sensory phenomenon" are as labile as Benjamin believes, one would have expected the lability to show up in a comparison of these two disparate groups. It did not.

The "active" drugs aspect of my report is pertinent to the present discussion. The universal effect of morphine in relieving more or less completely the pain of a wound, in graduate students as well as in all others (sophisticated or unsophisticated, it makes no difference), has been demonstrated. But some 15 groups of investigators have now utterly failed to demonstrate any dependable effectiveness of morphine on the experimentally produced pain threshold in (usually) sophisticated subjects. Here we find effectiveness in one instance

and lack of it in the other, in groups of graduate students, depending on whether or not the pain was of pathological origin or was experimentally contrived. Benjamin's thesis breaks down here, for the effectiveness of the morphine was not determined by "differences in the psychological characteristics of the subjects—differences in degree of scientific understanding and in the ability to make objective evaluation."

To turn to another aspect of the problem, Javert and Hardy found that pain thresholds in clinical patients were normal, in comparison with thresholds in volunteers in their experimental studies, for a group of women before labor, during labor, and *post partum*. Many other data could be cited to indicate that the difference postulated by Benjamin has no support.

Benjamin speaks of the "ability of the subject to evaluate pain objectively." Pain is a subjective experience, subjectively evaluated. He refers again to "the ability to make objective evaluation," in his last sentence. I do not know what he means by these statements and therefore cannot discuss them.

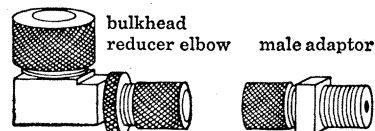
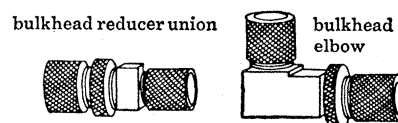
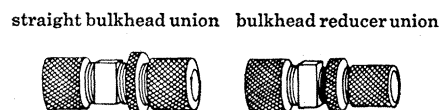
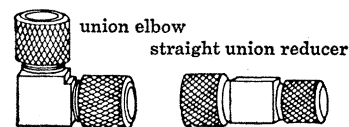
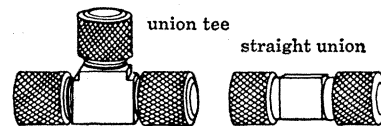
One can erect a thousand straw men in this field, but if the tenfold difference I showed in a very large number of individuals is to be explained on any such vague basis as "psychological characteristics of the subjects—differences in degree of scientific understanding and in the ability to make objective evaluation" (whatever that last phrase means), there must be more evidence than Benjamin has yet produced to show, first, that these characteristics exist as determinants and, second, that they are relevant to the present study. I have indicated above several kinds of data to indicate that they are not of much importance, if any, in the present connection.

HENRY K. BEECHER
*Harvard Medical School,
Massachusetts General Hospital,
Boston, Massachusetts*

Sterilization of Interplanetary Vehicles

The article by Phillips and Hoffman [*Science* 132, 991 (1960)] about the sterilization of interplanetary vehicles poses some interesting and difficult problems as regards one "component" that will be engaged in space travel—namely, man himself. Perhaps it is time that thought and investigation be given to the production of germ-free human beings.

JACK DE MENT
*De Ment Laboratories,
Portland, Oregon*



simplify tubing connections with Vari-Grip® Teflon Fittings

No need to labor over glass ball joints or other intricate fittings or connectors with the new Beckman Vari-Grip® Teflon Tube Fittings. Simply insert glass or metal tubing into fitting and tighten nut for a perfect compression seal. Fitting design permits considerable variation in tube size. Since Teflon is more inert than glass it is unaffected by most liquids and gases. A complete listing of time-saving Beckman Vari-Grip Fittings by size, type, and price is available from authorized Beckman laboratory apparatus dealers. Or write for Data File 38-48-09

Beckman

Scientific and Process Instruments Division
Beckman Instruments, Inc.
2500 Fullerton Road,
Fullerton, California

*TRADEMARK, BII

25
YEARS
1935-1960