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Local Committee on Women’s Events), arranged by Mrs. Eunice Thomas Miner, New York Academy of Sciences, who will preside; 30 Dec. The address, by Edith H. Quincy, College of Physicians and Surgeons, Columbia University, will be on radiation hazards and what is being done about them.

American Geophysical Union. Symposium, cosponsored by Section D—Astronomy and the American Astronomical Society: “The Impact of Space Research on the Sciences,” arranged by the Planning Committee on Planetary Science of the AGU, Homer E. Newell, National Aeronautics and Space Administration, chairman, with Robert Jastrow, National Aeronautics and Space Administration, presiding; 26 Dec. Papers will be presented on the interaction between the earth sciences and planetary studies (Gordon J. F. MacDonald, University of California, Los Angeles); planetary environments and extraterrestrial life (Philip Abelson, Carnegie Institution of Washington); flying telescopes (Martin Schwarzschild, Princeton University).

Scientific Research Society of America. The Society will hold its annual convention on 29 Dec. On the same day there will be a joint luncheon of the Society of the Sigma Xi and the Scientific Research Society, and the annual address of the Scientific Research Society will be presented, with W. J. Coppec, Texaco, Beacon, N.Y., presiding. Coppec will award the William Procter Prize and Alan T. Waterman, National Science Foundation, will speak. The address is open to all who are interested.

Sigma Delta Epsilon. Cosponsor of the Third Conference on Women in Science. (For details, see the program of the American Council on Women in Science.)

There will be a National Council and Board of Directors meeting, with Ethaline Cortelyou, president of Sigma Delta Epsilon, presiding; 27 Dec.

On 28 Dec. there will be a luncheon for all women in science and an address, with Ethaline Cortelyou presiding. The address, “Petroleum—A Catalyst for Progress,” will be given by Dorothy Quiggle, Pennsylvania State University.

On 29 Dec. there will be a dinner and grand chapter meeting.

Attention is called to the luncheon and program of the AAAS Local Committee on Women’s Events, on 30 Dec. (For details, see the program of the American Council on Women in Science.)

Society of the Sigma Xi. There will be a joint luncheon with the Scientific Research Society of America, 29 Dec. (For details, see the program of the Scientific Research Society of America.)

The Society of the Sigma Xi will hold its 61st annual convention on 29 Dec. The joint address of the Society of the Sigma Xi and the United Chapters of Phi Beta Kappa will be given on the same day, with Mina S. Rees, member of the AAAS Board of Directors, presiding. The address, by Polykarp Kusch, Columbia University, will be on “Scientists and Laymen.”

Forthcoming Events

December

5–8. American Soc. of Agronomy, annual, Chicago, Ill. (L. G. Monthey, ASA, 2702 Monroe St., Madison 5, Wis.)

7–13. American Acad. of Optometry, San Francisco, Calif. (C. C. Koch, 1506–08 Foshay Tower, Minneapolis 2, Minn.)


11–14. Hot Laboratory and Equipment Conf., 8th, San Francisco, Calif. (J. R. Lilienthal, Los Alamos Scientific Laboratory, P.O. Box 1663, Los Alamos, N.M.)
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22-2. Panamerican Diabetic Congress, 1st, British Honduras. (B. R. Hearst, Director, Diabetic Inst. of America, 55 E. Washington St., Suite 1646, Chicago 2, Ill.)
26-30. Inter-American Cong. of Psychology, 7th, Havana, Cuba. (G. M. Gilbert, Psychology Dept., Long Island Univ., Brooklyn 1, N.Y.)
27-14. Bahamas Surgical Conf., Nassau, (B. L. Frank, P.O. Box 4037, Fort Lauderdale, Fla.)
27-29. Conference on Strong Interactions, Berkeley, Calif. (A. C. Helmholtz, Dept. of Physics, Univ. of California, Berkeley)
27-29. Northwest Scientific Assoc. and Idaho Acad. of Science, joint meeting, Moscow. (E. J. Harrison, Dept. of Biological Sciences, Univ. of Idaho, Moscow)
28. Association for Education in International Business, St. Louis, Mo. (J. N. Behrman, Univ. of Delaware, Newark, Delaware)
28-30. American Economic Assoc., St. Louis, Mo. (J. W. Bell, Northwestern Univ., Evanston, Ill.)
28-29. Linguistic Soc. of America, annual, Hartford, Conn. (A. A. Hill, Box 7790, University Station, Austin 12, Tex.)

January
3-9. Indian Science Cong., 48th session, Rookeer (Uttar Pradesh), India. (General Secretary, ISC Assoc., 64 Dilkhusha St., Calcutta 17, India)
3-12. Thermoelectric Energy Conversion, symp., Dallas, Tex. (P. H. Klein, General Electric Co., Electronics Lab., Blids 3, Room 221, Electronics Park, Syracuse, N.Y.)
8-14. Bahamas Conf. on Hypertension, Nassau. (I. M. Wechsler, P.O. Box 1454, Nassau)
16-19. Instrument Soc. of America, winter instrument-automation conf., St. Louis, Mo. (W. H. Kushnick, 313 Sixth Ave., Pittsburgh 22, Pa.)
22-28. Bahamas Serendipity Conf., 3rd, Nassau. (I. M. Wechsler, P.O. Box 1454, Nassau)
23-25. Institute of the Aeronautical Sciences, 29th annual, New York, N.Y. (Meetings Dept., IAS, 2 E. 64 St., New York 21)
24-27. Society of Plastics Engineers, 17th annual conf., Washington, D.C. (T. A. Bissell, SPE, 65 Prospect St., Stamford, Conn.)
25-27. Mathematical Assoc. of America, annual, Washington, D.C. (H. L. Alder, Dept. of Mathematics, Univ. of California, Davis)
27-28. Royal College of Physicians and Surgeons, annual, Ottawa, Ontario, Canada. (T. J. Gilles, 150 Metcalfe St., Ottawa)
28-30. Control of the Mind, symp., San Francisco, Calif. (Dept. of Continuing Education in Medicine, Univ. of California Medical Center, San Francisco 22)
30-3. Clinical Cong. of Abdominal Surgeons, Miami Beach, Fla. (B. F. Affes, 1663 Melrose St., Melrose 76, Mass.)

(See issue of 18 November for comprehensive list)

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Placebos for Relief of Pain

Beecher [Science 132, 91 (1960)] presented a thesis that placebos are more effective for relieving pathological pain than for relieving experimental pain. The approach is very interesting, the data presented are clear-cut and convincing; however, I think that in interpretation one important factor is left out.

The data on pathological pain are based on observations in average, unsophisticated clinical patients. The subjects for the investigation of experimental pain are mostly medical or graduate students. As far as observation and interpretation of sensory phenomena are concerned, these students are surely in a different category from the average clinical patient. If, in addition, selection is limited to those volunteering for pain experiments, this puts the subjects in a very special class.

This was pointed out in several previous publications [J. Appl. Physiol. 8, 630 (1956); Science 128, 303 (1958)]. Beecher actually quotes from the second of these references, but he leaves out the main theme—the one indicating that the placebo effect becomes less pronounced with the greater ability of the subject to evaluate pain objectively.

I fully agree with Beecher's conclusions that placebos work on the anxiety component of pain and on anxiety-induced reflexes. However, I think that his own evidence indicates that this is largely due to differences in the psychological characteristics of the subjects—differences in degree of scientific understanding and in the ability to make objective evaluation.

FRED B. BENJAMIN

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I am pleased, of course, that Benjamin found "the data presented . . . clear-cut and convincing" and that he "fully agree[s] with [my] conclusions that placebos work on the anxiety component of pain."

He is troubled, if I understand him, because the data on pathological pain are based upon the responses of "unsophisticated clinical patients," and those on experimental pain, on the responses of graduate students. He then makes a wholly unsupported statement; he says, "As far as observation and interpretation of sensory phenomena are concerned, these students are . . . in a different category from the average clinical patient."

But I am not at all sure that I know what Benjamin's real thesis is. He would not hold, presumably, that there are anatomical differences between the two groups, so he must believe that "conditioning" or "cultural" or economic differences make for different responses.

A great amount of effort has been devoted to demonstrating the presence or absence (according to the investigator's bias) of differences in pain threshold among Indians, Eskimos, Negroes, White subjects, North Europeans, South Europeans, men, women, the young, the aged, trained and untrained subjects, adapted and unadapted subjects, and so on. The enthusiast can "prove" about anything he wants to from this vast array of data [for references, see H. K. Beecher, Measurement of Subjective Responses: Quantitative Effects of Drugs (Oxford Univ. Press, 1959)]. It seems significant that no great differences have been uncovered and confirmed. Neither are the data as constant as others would like us to believe. Such differences as there are, are not great ones. In the study discussed in my report in Science, the difference between the two groups was tenfold. I am not at all certain how much familiarity Benjamin has with

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5. The programs of all 18 AAAS Sections (specialized symposia and contributed papers).
8. The four-session program of the Conference on Scientific Communication: The Sciences in Communist China, cosponsored by the AAAS, NSF, and ten societies.
10. The sessions of the AAAS Cooperative Committee on the Teaching of Science and Mathematics, and of the AAAS Committee on Science in the Promotion of Human Welfare.
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"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 that actually, if they spent 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 inability 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 vast majority of graduate students and 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 in 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 used 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. 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.

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