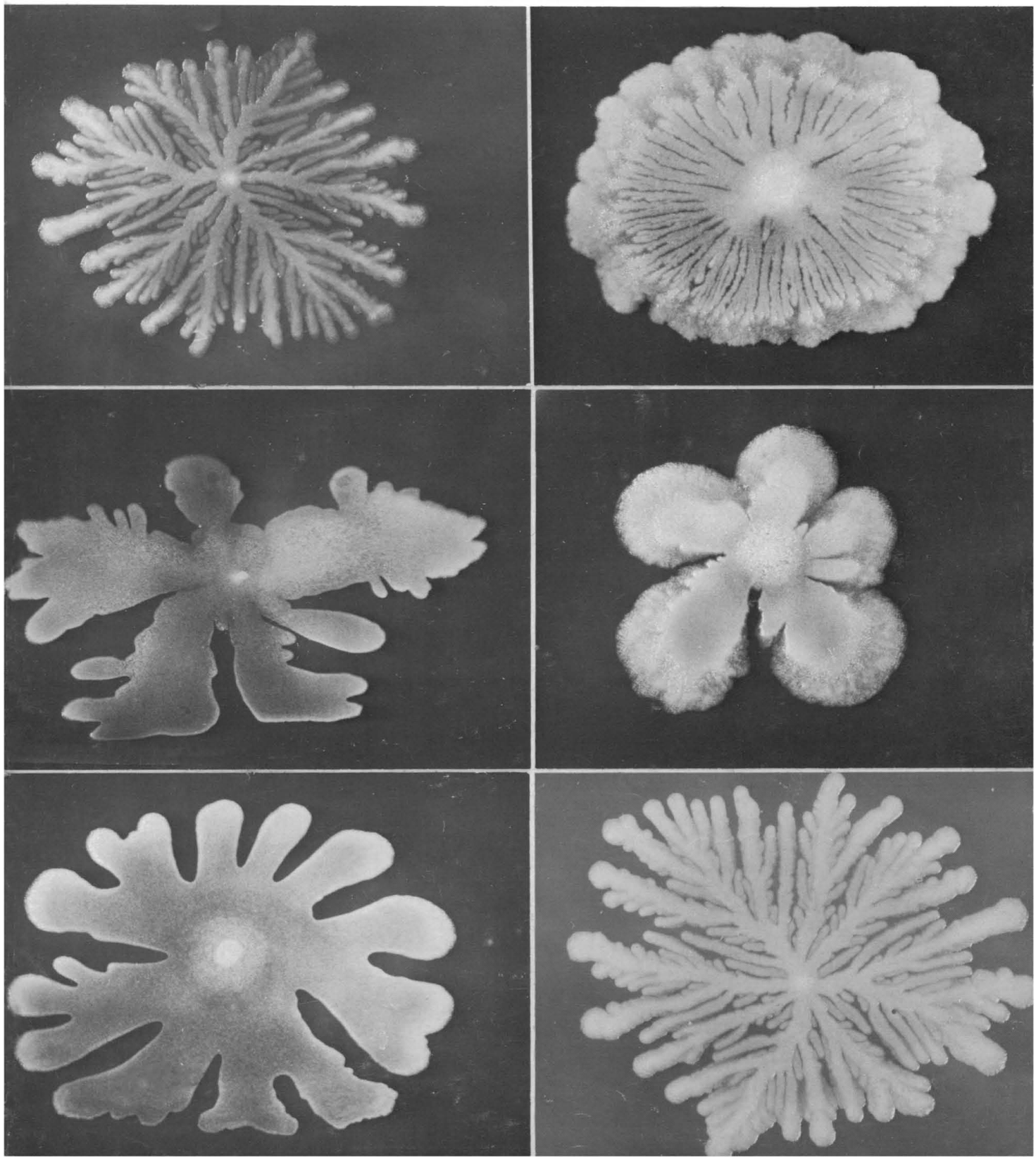
SCIENCE

20 December 1968

Vol. 162, No. 3860

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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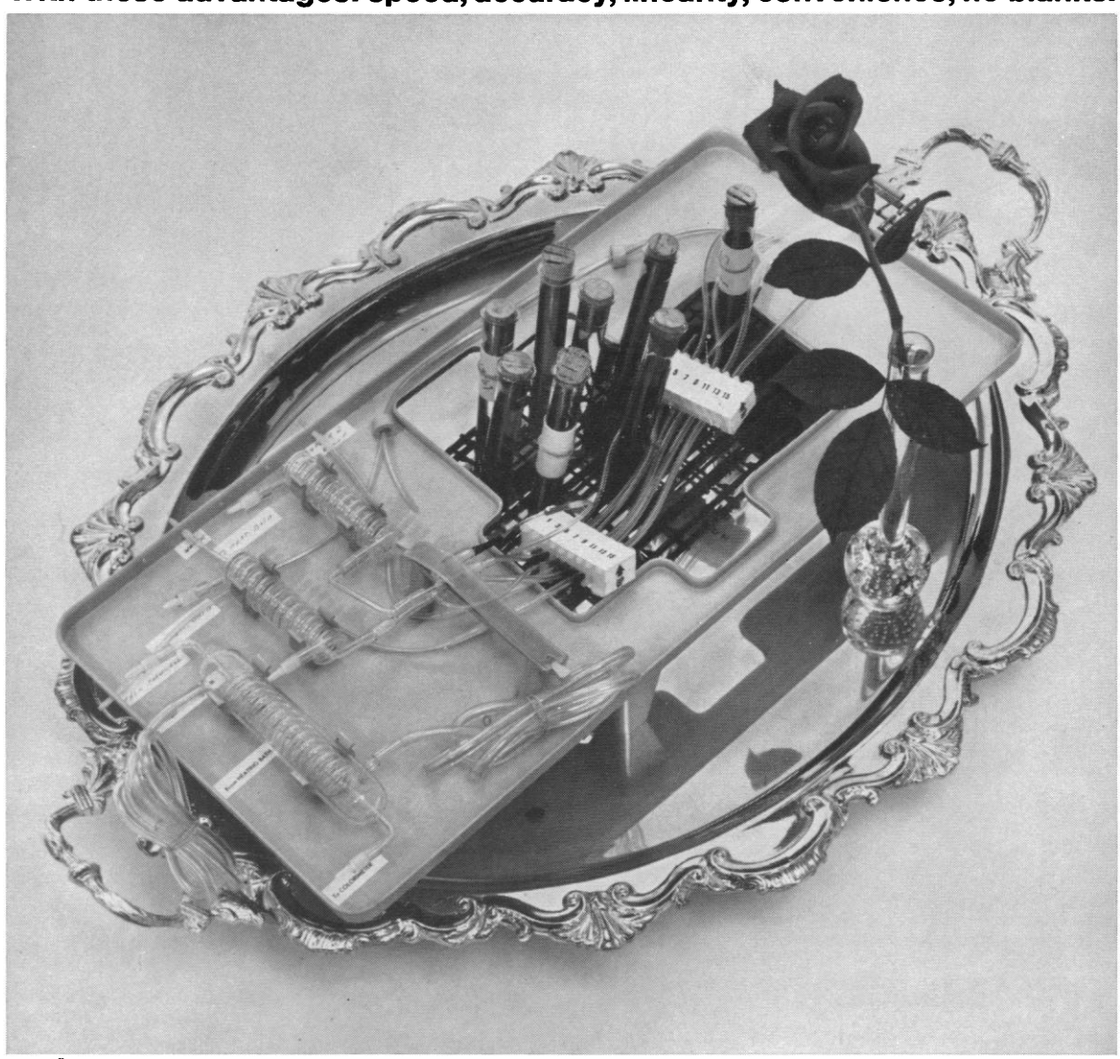

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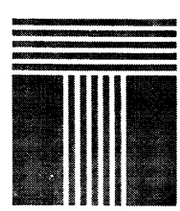

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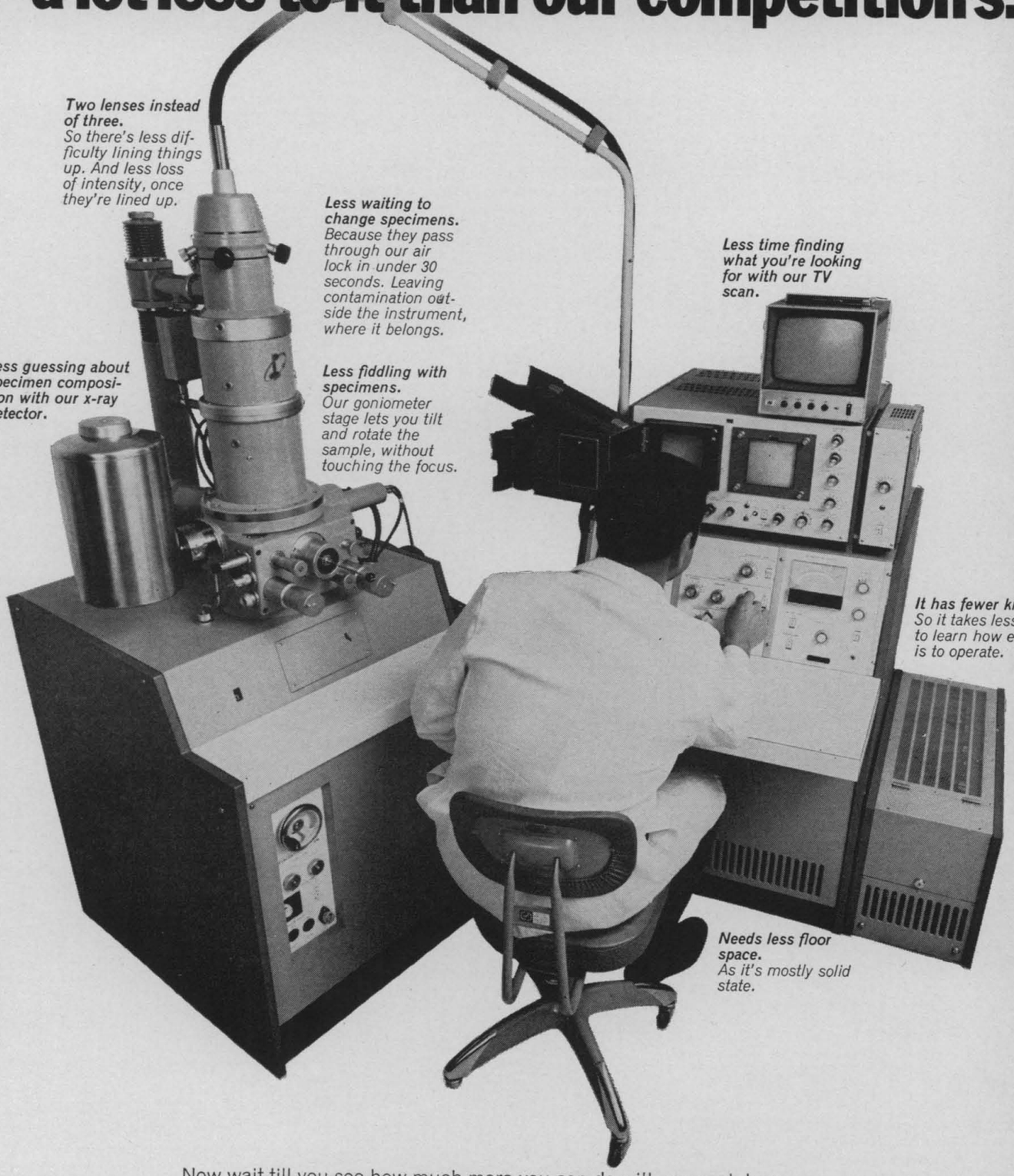

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20 December 1968
Vol. 162, No. 3860

SCIENCE

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COVER

Aberrant surface colonies of *Bacillus subtilis*. The experimentally induced variations of colony morphology are reflected both in the vertical and horizontal planes. When the intricate configurations of each colony are considered, there is a remarkable degree of symmetry (about × 3). [Mary E. Mann and Lloyd D. Witter, Department of Food Science, University of Illinois, Urbana]

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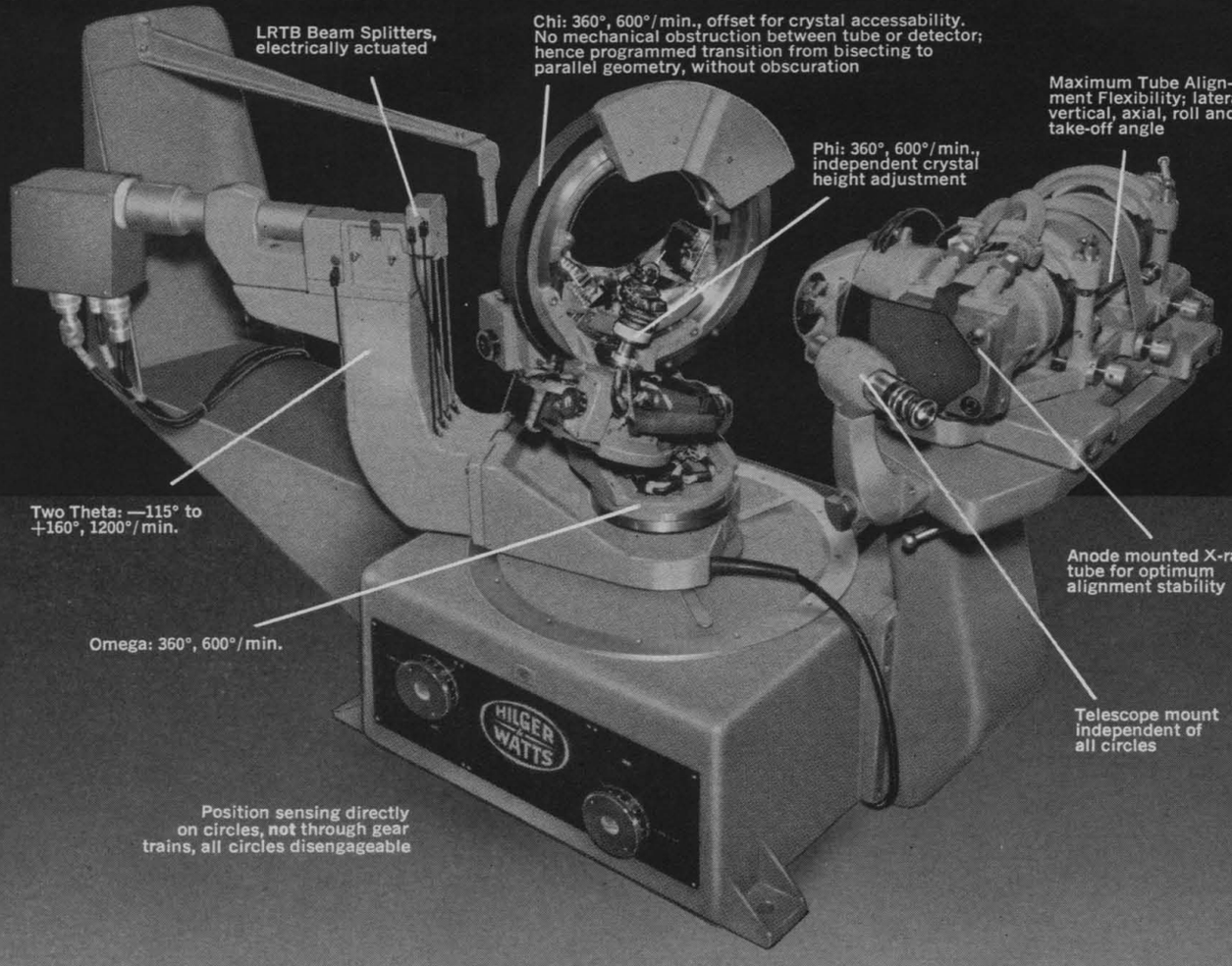

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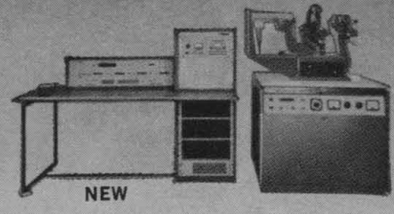

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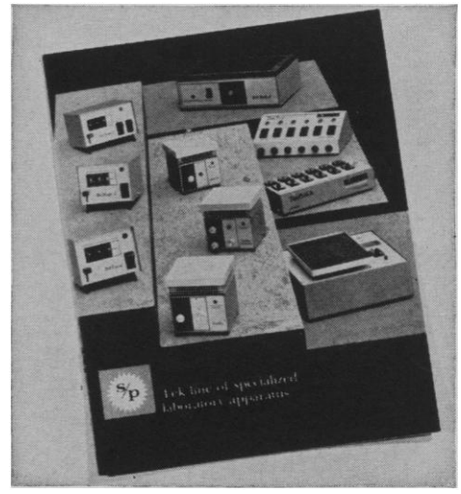

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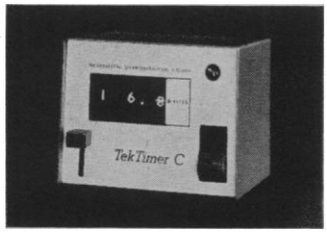

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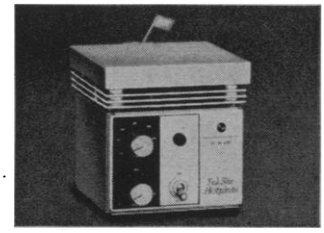

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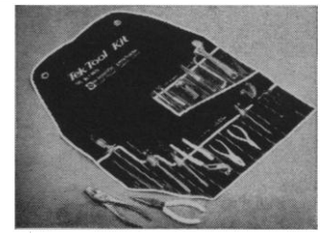

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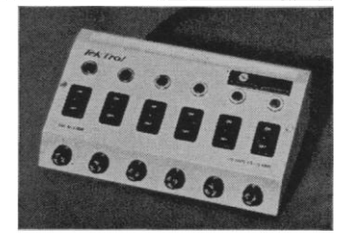

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Racial Proposal

The proposals of the Association of Black Psychologists to the Council of the American Psychological Association (11 Oct., p. 243) were thought-provoking but in a highly negative sense. It is extremely unfortunate that these psychologists, supposedly experts in human behavior, cannot see any further than the color of their skin. No one denies that there has been and there is much injustice and racism in our country, but to substitute positive discrimination for negative is no solution. Only when we assess individuals on the basis of relevant characteristics, rather than skin color, will we begin to solve our racial problems. To demand proportional representation of Blacks in the APA or graduate schools is as ludicrous as if Italians, Norwegians, Holy Rollers, people with strabismus, or any other "minority" were to demand proportional representation.

GEORGE DOMINO
Department of Psychology, Fordham University, Bronx, New York 10458

Stringent Drug Regulations

The discovery by Lowinger (Letters, 16 Aug.) that only 10 of 26 reports on new drug studies which he submitted to 19 drug houses had subsequently been received by the Food and Drug Administration would indeed be cause for alarm if taken at face value. It should be noted, however, that the present stringent regulations concerning investigational drugs first became effective in May 1963. Prior to that time, there was no requirement that manufacturers even *notify* the FDA when investigations of new drugs were initiated in man, and the data or "toxicity reports" from such investigations were submitted to the FDA only when and if New Drug Applications (NDA's) were filed. While Lowinger is correct in stating that the 1938 law required filing of all safety data by the manufacturer ". . . before the drug can be marketed," thousands of compounds were investigated before 1963 and abandoned for a variety of reasons without NDA's being filed. There never was any requirement that toxicity data on such drugs be submitted to the FDA.

Furthermore, prior to 1963, there

was no requirement that *every* new report on an already marketed drug be submitted to the FDA. Once the NDA became effective, additional data on the drug were not filed unless they represented unexpected and serious new hazards. Since Lowinger's survey covered the period 1954 to 1966, a number of his reports may have failed to reach the FDA because of the above considerations. Without further information, it is impossible to ascertain whether all, some, or none of the cited failures to report were really delinquencies. This, in turn, vitiates the final recommendation that investigators be required to assume the additional burden of sending reports directly to the FDA.

BURTON W. ROCKLIFF
Box 567, Blue Jay, California 92317

Statistical Uncertainties

Most of us in the business of statistical consulting would gladly display bumper stickers proclaiming "WIPE OUT $A \pm B$." Eisenhart's article ("Expression of the uncertainties of final results," 14 June, p. 1201) is a much-needed contribution to this campaign. However, his nearly all-inclusive use of the term *uncertainty*, even with the modifying words, gives the reporting scientist what amounts to a cop-out phrase. Wouldn't it be better to use such established statistical concepts as *estimated standard deviation, confidence limits, sample size, degrees of freedom,* and *tolerance limits*?

GARY L. TIETJEN
ROGER H. MOORE
Los Alamos Scientific Laboratory,
Post Office Box 1663,
Los Alamos, New Mexico 87544

Eisenhart leaves very little uncertainty as to proper statement of a physical quantity. I only wish that someone would equally clarify some matters of biometrics. For example, the statement, "The average height above ground of an ear of American corn is 1.5 ± .5 meters," certainly does not mean that we are unable to measure corn within a meter. It could mean that one half the corn will ear at between 1 and 2 meters, or it could refer to the standard deviation.

The statement, "Hybrid corn type X ears at 1.5 ± .1 meter," could mean

that one half of this superior hybrid ears out at between 1.4 and 1.6 meters. Again, this is distinctly a statement of a property of the corn, not of my precision. A second name and number is needed to describe the uncertainty of determination of an inherent dispersion about a mean. For instance, I could come forth with the true but idiot statement that the average weekly wage is 1.986 ± .02 dollars per hour, where the .02 represents not variance in wage but a disagreement among the findings of several pollsters in the same area.

A. A. FOSTER

Gorman-Rupp Industries, Inc.
Bellville, Ohio 44813

I welcome Tietjen's and Moore's support in my campaign to wipe out or at least curb "$a \pm b$." They complain, however, that my "nearly all-inclusive use of the term *uncertainty* . . . gives the reporting scientist what amounts to a cop-out phrase." The aim of "my" recommendations was, of course, not to aid "copping out"; but rather to foster separate, adequate, and lucid reporting of the random and systematic components of uncertainty, as a first step in the direction of clear and adequate reporting of details needed for later critical evaluation.

Some scientists do elect to take the easy way out. They state only their personal estimate of the overall uncertainty, without details of the various components thereof and how they were combined. The consequence is "loss of information through over-simplification" (*1*). Such brevity may expedite a paper's publication, but at the risk of its joining the useless literature explosion (*2*). My colleagues in the National Bureau of Standards Office of Standard Reference Data find that an appalling fraction of the literature in any specific field contains data not worthy of critical evaluation. Estimates of the faulty fraction range from 50 to over 90 percent (*3*). The three principal reasons for failure appear to be: the experimental work was done incorrectly; the sources of uncertainty were not analyzed; or the work was not reported in sufficient detail to permit evaluation.

With regard to the five "established statistical concepts" cited by Tietjen and Moore, three of these are mentioned explicitly, and nothing in our recommendations precludes the use of *confidence limits* or *tolerance limits*, when appropriate. They were not in-

troduced because careful discussion of the operational difference in their meanings, and of their unsatisfactoriness when based entirely on small samples, would have diverted attention from the general theme.

The situation in biometrics pointed out by Foster certainly calls for avoidance of "$a \pm b$" without qualification. As a former biometrician, my feeling is that the needs of biometrics will usually be met by the recommendations given for the case of "systematic error negligible, imprecision not negligible" provided that any "standard deviation" reported is clearly identified as relating either to the *standard deviation of the population* of animals, plants, and so forth, or to the *standard error of the (reported) mean*; and in the latter case it is made clear whether it connotes sampling variation, measurement error, or a combination of both.

CHURCHILL EISENHART
National Bureau of Standards, Washington, D.C. 20234

References

1. H. H. Ku, *Meas. Data* **2**, 72 (July–August 1968).
2. L. M. Branscomb, *Sci. Res.* **3**, 49 (1968).
3. *Status Report–National Standard Reference System, April 1968*, Technical Note 448 (National Bureau of Standards, Washington, D.C., 1968), p. 1.

Can Intelligence Be Measured?

Frank A. Meier (Letters, 27 Sept.) says "Whether or not there are racial differences in intelligence is a legitimate subject for scientific investigation; no one is disputing that fact."

Some *are* disputing that fact. Intelligence has yet to be defined in demonstrable, verifiable, scientific terms which are susceptible to public agreement. In fact, all the so-called research concerning "intelligence" seems to be manipulating a reciprocal measure of accumulated ignorance more than any measure of inherent capability. At least, a child who fails to recognize a noun in a sentence and therefore later does not capitalize personal pronouns, the experts deem "low in intelligence" . . . The word "intelligence" has been a verbal booby trap for centuries. Better forget it.

BERT DECKER
Office for Continuing Education, State University of New York at Buffalo, Buffalo 14214

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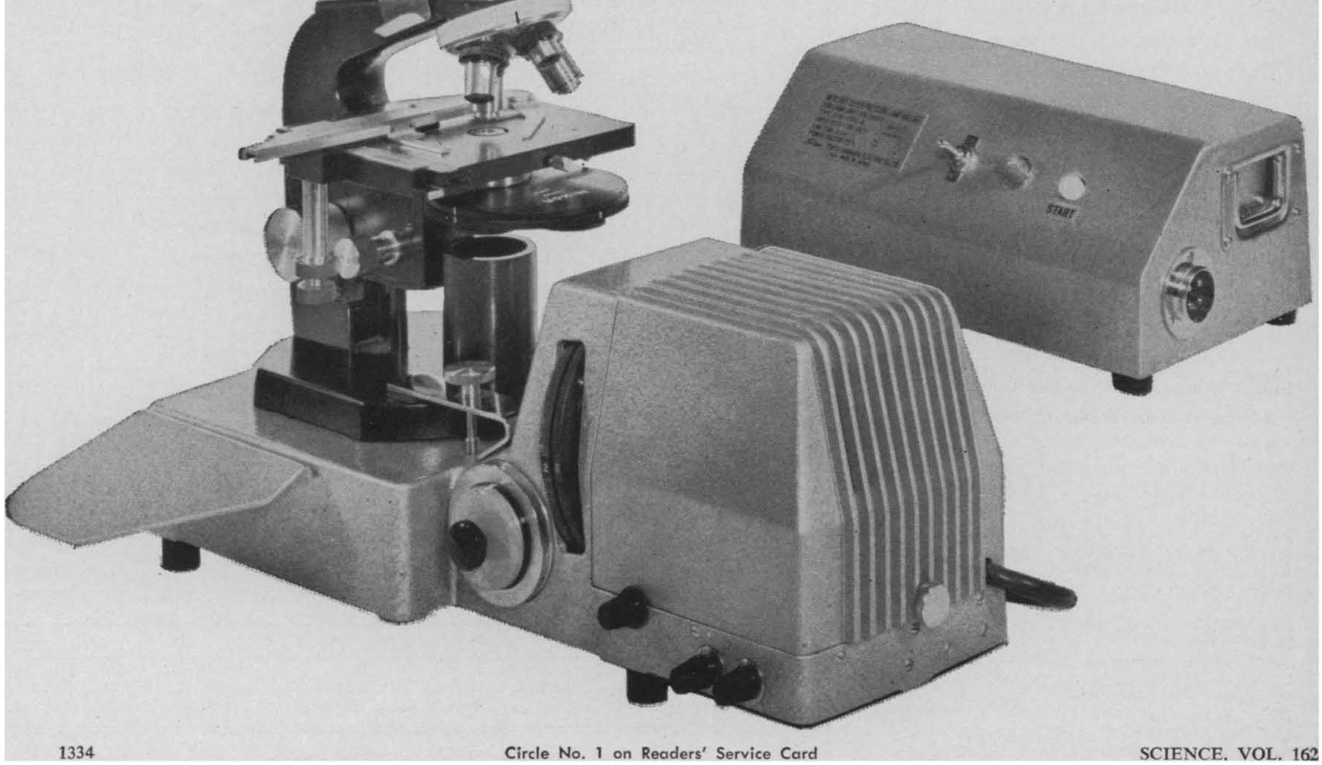

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SCIENCE

Social Science Research on Foreign Areas

When the Camelot affair exploded in 1965, President Johnson asked the Department of State to begin screening government-sponsored social science research on foreign areas in order to assure the propriety of the studies and to guard against adverse effects on U.S. foreign relations. Under the procedures it established for this purpose, the Department of State has not tried to assess the merit or method of proposed studies, but only to avoid risk of damage to our foreign relations. Thus, projects supported by such agencies as NIH, NSF, or the Department of Agriculture have been exempted or cleared quickly. More searching scrutiny has been given to projects likely to be subject to political interpretation or misinterpretation: for example, those sponsored by the Department of Defense and other agencies with political and overseas responsibilities, projects manifestly related to foreign relations, and those involving extensive contact with foreign nationals.

Since 1965, the Department has reviewed 377 projects from 20 agencies. Half were cleared; 44 percent were cleared subject to classification of the results or to other conditions; and 6 percent were denied clearance or were withdrawn by the sponsoring agency. Another 525 decisions concerned an investigator's travel plans, clearance of a report, or other follow-up actions.*

Discussions with representatives of the agencies that must submit projects for clearance and with some of their social science advisers have turned up (i) a few criticisms over delays in securing approval, (ii) the generalization that the easiest way to get a project approved is to promise to classify the results, but (iii) no strong protests over the way in which the Department of State has carried out its project-screening responsibilities.

However, the State Department review follows at least one, and often several, reviews within the sponsoring agency in terms of its own criteria, which often include sensitivity to foreign relations problems. Multiple reviews, the wish of agency heads to avoid clashes with the Department of State, and criticisms by some members of Congress concerning the usefulness of social science research in general and foreign area research in particular constitute a series of dampers that are reported to have reduced the amount of research and to have shifted some agency programs into safer directions. It seems easier to play it safe than to run the risk of difficulties and criticism.

Most of the research in question has been intended to help an agency determine its policies and carry out its missions. A smaller part can be classed as basic research on social processes. Playing it safe has never been the best formula for achieving imaginative and productive research results, and in this case is depriving the agencies of information of value in planning and conducting their major activities.

The whole situation calls for something quite the opposite from an additional damper. Within recent months, a Defense Science Board study group and the National Research Council's Advisory Committee on Government Programs in the Behavioral Sciences have both advocated an interagency group to plan, coordinate, and actively support foreign area research for government agencies. An agency for this purpose is needed to counteract some of the existing dampers. It could be brought into being quickly if the Department of State and the Office of Science and Technology agree.—DAEL WOLFLE

* Department of State Foreign Affairs Research Council, "A Report on the First Three Years" (August 1968), 19 pages, multilithed.

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Calendar of Events

National Meetings

January

20–22. American Inst. of **Aeronautics and Astronautics**, New York, N.Y. (AIAA, 1290 Sixth Avenue, New York 10019)

20–22. Society of **Thoracic Surgeons**, San Diego, Calif. (F. C. Byron, City of Hope Medical Center, 1500 E. Duarte Rd., Duarte, Calif. 91010)

20–22. **Aerospace Sciences** Mtg., 7th, New York, N.Y. (P. P. Wegener, Dept. of Engineering and Applied Science, 208 Dunham Lab., Yale Univ., New Haven, Conn. 06520)

21–24. **Physiological Aspects of Crop Yield**, Lincoln, Neb. (F. A. Haskins, Dept. of Agronomy, Univ. of Nebraska, Lincoln 68503)

22–24. Symposium on **Membrane Function and Electron Transfer to Oxygen**, Miami, Fla. (Dept. of Biochemistry, Univ. of Miami Medical School, P.O. Box 875, Biscayne Annex, Miami 33152)

23–25. American Soc. for **Engineering Education**, Baton Rouge, La. (E. H. Wright, American Soc. for Engineering Education, 2100 Pennsylvania Ave., NW, Washington, D.C. 20037)

23–25. **Radiotherapy** Symp., Miami, Fla. (M. Vuksanovic, Radiation Therapy Div., Univ. of Miami Medical School, 1700 NW Tenth Ave., Miami 33136)

23–27. American **Mathematical** Soc., 75th, New Orleans, La. (H. M. Geham, Univ. of Buffalo, Buffalo, N.Y. 14214)

24–27. American **Group Psychotherapy** Assoc., New York, N.Y. (M. Schiff, Room 702, 1790 Broadway, New York 10019)

25–27. **Mathematical** Assoc. of America, 52nd, New Orleans, La. (H. L. Alder, Mathematical Assoc. of America, Univ. of California, Davis 95616)

26–28. Conference of **Immunologists**, Pasadena, Calif. (J. S. Garvey, Div. of Chemistry and Chemical Engineering, California Inst. of Technology, Pasadena 91109)

26–31. Modern **Dispatch Techniques of Interconnected Power Systems**, New York N.Y. (Inst. of Electrical and Electronics Engineers, Inc., 345 E. 47 St., New York 10017)

27–30. American Soc. of **Heating, Refrigerating and Air-Conditioning Engineers**, Inc., Chicago, Ill. (J. H. Cansdale, American Soc. of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 345 E. 47 St., New York 10017)

28–30. **Fast Burst Reactor**, Albuquerque, N.M. (G. R. Keepin, Box 1663, Los Alamos, N.M. 87544)

29. New York **Heart** Assoc., New York, N.Y. (New York Heart Assoc., Inc., Heart House, 2 E. 64 St., New York 10021)

29–31. **Health Physics** Soc., 3rd, Los Angeles, Calif. (J. S. Handloser, EG&G, 130 Robin Hill Rd., Goleta, Calif. 93017)

30–1. Developmental Aspects of **Perception, Hearing, Speech and Learning**, Gainesville, Fla. (G. R. Kilgore, J. Hillis Miller Health Center, Univ. of Florida, Gainesville 32601)

31–2. Southern **Radiological** Conf., 13th, Point Clear, Ala. (M. Eskridge, Mobile Infirmary, P.O. Box 4097, Mobile 36604)

February

2–7. American Soc. for **Testing and Materials**, Denver, Colo. (T. A. Marshall, Jr., The Society, 1916 Race St., Philadelphia, Pa. 19103)

3–5. American College of **Surgeons**, Omaha, Neb. (Communications Div., 55 E. Erie St., Chicago, Ill. 60611)

3–6. American **Physical** Soc., New York, N.Y. (D. W. Havens, Columbia Univ., New York 10027)

3–6. American Assoc. of **Physics Teachers**, New York, N.Y. (M. W. Zemansky, The Association, 335 E. 45 St., New York 10017)

5–6. **Sanitary Engineering** Conf., 11th, Urbana, Ill. (J. H. Austin, 3230 Civil Engineering Bldg., Univ. of Illinois, Urbana 61801)

5–7. American Acad. of **Occupational Medicine**, Boston, Mass. (B. D. Dinman, Inst. of Industrial Medicine, Univ. of Michigan Medical Center, W 5634, Ann Arbor 48104)

5–8. American **Educational Research** Assoc., Los Angeles, Calif. (R. A. Dershimer, The Association, 1126 16th St., NW, Washington, D.C. 20036)

10–11. **Industrial Electronics and Control Instrumentation**, Washington, D.C. (H. P. Kalmus, Harry Diamond Labs., Dept. of Army, Washington, D.C. 20438, or E. Mittelmann, 549 W. Washington Blvd., Chicago, Ill. 60606)

10–11. **Transducer** Symp., Washington, D.C. (E. Mittelmann, 549 W. Washington Blvd., Chicago, Ill. 60606)

10–13. **Weed Science** Soc. of America, Las Vegas, Nev. (F. A. Holmes, E. I. du Pont de Nemours & Co., 701 Welch Rd., Palo Alto, Calif. 94304)

11–13. **Aerospace and Electronics Systems**, Los Angeles, Calif. (R. W. Gregory, Northrop Nortronics, Palos Verdes Peninsula, Calif.)

12–14. **Chemical Marketing Research** Assoc., Washington, D.C. (R. H. Mattson, Glidden-Durkee, Div. of SCM Corp., 900 Union Commerce Bldg., Cleveland, Ohio 44115)

14–15. American **Psychopathological** Assoc., 59th, New York, N.Y. (M. Fink, New York Medical College, 5 E. 102 St., New York 10029)

16–20. Soc. of **Economic Geologists**, Washington, D.C. (R. A. Laurence, P.O. Box 1549, Knoxville, Tenn. 37901)

16–20. American Inst. of **Mining, Metallurgical, and Petroleum Engineers**, 98th, Washington, D.C. (W. V. O'Connell, Public Relations, The Institute, 345 E. 47 St., New York 10017)

18–20. **Biophysical** Soc., Toronto, Ont., Canada. (W. A. Brodsky, Univ. of Louisville, Reynolds Bldg., Louisville, Ky. 40208)

18–22. American College of **Radiology**, Atlanta, Ga. (W. C. Stronach, 20 N. Wacker Dr., Chicago, Ill. 60606)

19–21. **Solid State Circuits** Conf., Philadelphia, Pa. (Office of Technical Activities, Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

20–22. **Catalysis** Soc., 1st North American mtg., Atlantic City, N.J. (J. H. Sinfelt, Central Basic Research Lab., Esso Research and Engineering Co., P.O. Box 45, Linden, N.J. 07036)

20–22. Central **Surgical** Assoc., Chicago, Ill. (V. L. Williams, 1325 S. Grand Blvd., St. Louis, Mo. 63104)

23–28. Intersociety Committee on **Pathology**, Los Angeles, Calif. (O. Neibel, CAP, 230 N. Michigan Ave., Chicago, Ill. 60601)

26–2. American College of **Cardiology**, New York, N.Y. (W.D. Nelligan, 9650 Rockville Pike, Bethesda, Md. 20014)

27–1. **Experimental Nuclear Magnetic Resonance** Conf., 10th, Pittsburgh, Pa. (J. M. Anderson, Dept. of Chemistry and Chemical Engineering, Univ. of Illinois, Urbana 61801)

27–1. American **Physical** Soc., St. Louis, Mo. (W. W. Havens, Jr., The Society, 335 E. 45 St., New York 10017)

March

1–7. American **Concrete** Inst., 65th, Chicago, Ill. (The Institute, 22400 W. Seven Mile Rd., Detroit, Mich. 48219)

2–7. Pittsburgh Conf. on **Analytical Chemistry and Applied Spectroscopy**, Inc., 20th, Cleveland, Ohio. (W. M. Hickam, 1969 Pittsburgh Conf., Westinghouse Research Labs., Pittsburgh, Pa. 15235)

3–5. National Conf. on **Underwater Technology**, 3rd, San Diego, Calif. (J. T. Quirk, Ocean Engineering Div. U. S. Naval Civil Engineering Lab., Port Hueneme, Calif. 93041)

3–6. American Assoc. of **Junior Colleges**, Education Material and Equipment Exposition, Atlanta, Ga. (American Junior College Exposition, P.O. Box 1016, Alexandria, Va. 22313)

3–7. Symposium on **Arthritis and Related Disorders**, New York, N. Y. (Office of the Recorder, New York Univ. Post-Graduate Medical School, 550 First Ave., New York 10016)

4–6. National **Space** Mtg. of the Inst. of Navigation, Houston, Tex. (R. H. Battin, M.I.T. Instrumentation Lab., 75 Cambridge Parkway, Cambridge, Mass. 02139)

4–7. **Offshore Exploration** Conf., 4th, San Diego, Calif. (OECON IV, P.O. Box 88, Palos Verdes Estates, Calif. 90274)

5–7. **Fundamental Cancer Research**, 23rd symp., Houston, Tex. (D. E. Anderson, Univ. of Texas, M. D. Anderson Hospital and Tumor Inst., Houston)

5–7. **Particle Accelerator** Conf., Washington, D.C. (E. H. Eisenhower, Center for Radiation Research, Natl. Bureau of Standards, Washington 20234)

9–11. American Assoc. of **Pathologists and Bacteriologists**, San Francisco, Calif. (K. M. Brinkhous, Dept. of Pathology, Univ. of North Carolina, School of Medicine, Chapel Hill 27514)

9–14. American Soc. of **Photogrammetry**, Washington, D.C. (G. L. Loelkes, 8608 Cherry Valley Lane, Alexandria, Va. 22309)

10–12. **Flight Test, Simulation,** and **Support** Conf., 3rd., Houston, Tex. (J. C. McLane, Jr., Structures and Mechanics Div., Engineering and Development Directorate, NASA Manned Spacecraft Center, Houston 77058

10–12. Society of **Toxicology**, Williamsburg, Va. (J. F. Borzelleca, Dept. of Pharmacology, Medical College of Virginia, Richmond 23219)