

Scientific Meetings

Instrumentation and Automation

What is instrumentation? What is automation? The meanings of these new words in the popular and scientific vocabulary have not yet entirely crystallized—the words still mean different things, at different times, to different people! Broadly, *instrumentation* has come to mean the part of science and technology that deals with the development, manufacture, and utilization of instruments—in both science and industry—for sensing, comparing, measuring, displaying, recording, computing, and controlling.

A simple explanation of *automation* was provided at the Instrument Society of America's conference and exhibit that was held in Los Angeles 12–16 Sept. A. O. Beckman, past president of the society and chairman of the host committee, stated, "We should differentiate between mechanization and automation. Simply stated, mechanization replaced or amplified human brawn. Automation, on the other hand, supplements the human brain. When you 'automate' a manufacturing process, you include what we call feedback or self-correction. A simple example of this is the common room thermostat. The thermostat automatically controls the operation of a gas furnace, for instance, to compensate for changes in room temperature. When the room gets too warm, your thermostat turns off the furnace; when it gets too cool, it turns it on. A simple instrument thus relieves us of the necessity of remembering to read the thermometer, of deciding whether to turn the furnace on or off, and then of doing what is decided. This is automation."

Automation then, is the application of instrumentation to obtain automatic operation of machines and processes in either industry or science.

Automation in industry is already well established in petroleum refineries, chemical manufactures, and mass production of automobiles and electronic components, and so forth; it is widely expected to result in completely automatic factories in the near future.

In science and engineering, automation deals not so much with the control and processing of physical materials and objects as with "information"—the sig-

nals or records of events or measurements. It involves gathering, sifting, sorting, collating, computing, correcting, displaying, analyzing, storing, and utilizing the signals that represent the observations, as well as other signals that represent information derived therefrom.

All these aspects of instrumentation and automation were exemplified in the many products and developments that were shown by the 350 manufacturers participating in the ISA Exhibit, for which more than 14,000 people registered. Also these and many more aspects of instrumentation and automation were discussed in the technical papers presented at the 50-odd technical sessions that were held at the Shrine Auditorium and the University of Southern California.

Some trends noted in the last year or two still continue. There is increasing emphasis on automatic data-reduction equipment and methods for transforming measurements in digital representation for ease and accuracy in transmission, storage, and utilization by digital computers. In addition, there are a larger variety of electronic equipments now available in which transistors and magnetic amplifiers have largely replaced the conventional electron tubes.

A few of the many new measuring instruments exhibited were a sonic flowmeter (Fischer and Porter), a pressure-compensated totalizing gas flowmeter (Librascope, Inc.), frequency modulated pressure gages (Byron Jackson), an aircraft position and homing indicator (Control Engineering Corp.), and self-generating accelerometers, good at frequencies to 10,000 cycles per second with a range to 50,000 *g* (Endevco Corp.). A high-speed camera (Beckman and Whitley) that takes 25 pictures at rates up to 1.2 million per second can also be used to record interferometer patterns analogous to transient pressures in the range of 0 to 50,000 pounds per square inch with frequencies up to 50,000 cycles per second.

New analytic instruments included a thermal gas analyzer, and an automatic infrared spectrophotometer (Beckman Instruments, Inc.), a Raman recording spectrometer (Perkin-Elmer Corp.), an electron paramagnetic resonance spectrometer (Varian Associates), a water-

vapor analyzer that measures 0 to 100 parts per million in hydrocarbons (Mine Safety Appliance Co.), and an x-ray absorption meter for measuring sulfur in hydrocarbons (Tracerlab Corp.).

All the technical meetings were well attended. Preprints of many of the papers were available at the conference or from the ISA headquarters, 1319 Allegheny Ave., Pittsburgh, Pa. A feature of these conferences that is growing in importance and value is the associated "clinics." These consist of demonstration sessions where selected manufacturers explain in detail the theory and operation of some particular class of instruments to groups small enough so that each person in attendance can participate fully in the discussions. Three such 3-day clinics were arranged on "Analytic instruments," "Computers," and "Instrument maintenance," each serving 200 to 500 persons. In addition there was a 1-day "Workshop on Data Handling" in which 12 groups, each limited to 25 to 50 persons, discussed informally selected phases of the data-handling field. The small workshop type of meeting permits a somewhat larger group to be "in" on the type of conversation that usually goes on between experts in the halls.

It is perhaps unfortunate that there was not a session on instrumentation and the philosophy of science, and possibly this would be a good symposium for some future meeting of the AAAS. One of the most significant trends in the growing field of instrumentation is its explosive growth into the "information-handling" field. This is popularly associated with the great successes of the large high-speed digital computers in solving long and complex mathematical problems and in mechanizing some of the clerical operations of the Census Bureau, insurance companies, and banks. To the extent that any scientific experiment, procedure, or analysis can be reduced to identifiable and repetitive operations, automation may be applied to such parts of science to increase efficiency and output. In these times of shortage of brain power, any development that promises such increased efficiency should be warmly welcomed. Scientists in all fields should make it their business to learn more about the possibilities of applying in their own laboratories these new techniques from the automatic factory, the guided missile, and the mechanized office.

At the Los Angeles meeting, the council of the ISA approved major changes in the society's constitution, providing for seven additional vice presidents to be selected on a regional basis and to serve on the executive board.

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Meeting Notes

■ The fifth Pan American Congress of Ophthalmology will be held in Santiago, Chile, 9-14 Jan. 1956, under the auspices of the Pan American Association of Ophthalmology, of which Moacyr E. Alvaro, São Paulo, Brazil, is president. In accordance with a custom of inviting a distinguished ophthalmologist of the host country to preside, Christobal Espildora Luque of Santiago will be president of the congress.

The scientific program will consist of 11 symposia, in which the speakers will be in general divided between physicians of the United States and Canada and those of Mexico, Central America, and South America.

An important feature of the program will be the Harry S. Gradle lecture, honoring the memory of the first president and one of the founders of the association, the late Dr. Gradle of Chicago. The lecture will be delivered by Frederick C. Cordes, clinical professor and chairman of the division of ophthalmology at the University of California Medical School, San Francisco.

Reports will be received from committees, including those on prevention of blindness; medicolegal ophthalmology; industrial ophthalmology; research; fellowships; interprofessional relationship; establishment of examining boards in Latin America; standardization of ophthalmic hospitals and clinics; graduate education, particularly through home study courses. The Committee on Prevention of Blindness is planning a program to include as topics of discussions: definitions of blindness and amblyopia for medicolegal purposes; bases for classification of causes of blindness; and preparation for the program to combat blindness in Latin American countries.

Several physicians of the United States will take part in the scientific exhibit. From the Armed Forces Institute of Pathology, Walter Reed Medical Center, Washington, D.C., there will be an exhibit on diseases of the optic nerve, shown by Lorenz Zimmerman, chief of the ophthalmic pathology section, and William R. Armstrong, ophthalmology section. From the School of Aviation Medicine, Randolph Field, Tex., will come an exhibit entitled "The mechanism and prevention of penetrating wounds of the eye from high speed splinters," shown by H. W. Rose.

Brittain F. Payne, executive surgeon and director of clinics and pathology, New York Eye and Ear Infirmary, with two associates, Edgar B. Burchell and Marie Cullen, will demonstrate "Graduate instruction in histopathology of the eye." The American Board of Ophthalmology will be represented by explanatory material concerning its membership and operation.

■ The Western Spectroscopy Association, organized in 1953 to fill the need felt by spectroscopists in the 11 western states for regular West Coast scientific meetings concerned with the general field of molecular spectroscopy, will hold its third annual conference at the University of California, Berkeley, 26-27 Jan. 1956. The program will consist entirely of invited papers, with one session devoted to a panel discussion on "Frontiers of research in infrared and microwave spectroscopy." Another half-day will be devoted to astrophysical spectroscopy, one to paramagnetic resonance spectroscopy, and one to the spectra of dye molecules and rare-earth ions.

There will be an instrument exhibit, chiefly of commercial spectroscopic equipment, and various social events will be planned. All interested persons are welcome to attend this meeting. Further information may be obtained from the present chairman of the association, Dr. John W. Otvos, Shell Development Company, Emeryville, Calif.

■ The fifth annual Symposium on Blood is scheduled to be held at Wayne University, College of Medicine, on 21 Jan. 1956. A total of 15 papers related to recent advances in hematology will be presented.

Society Elections

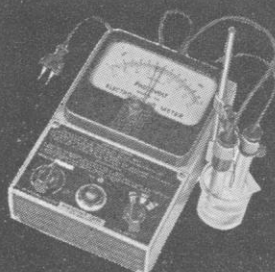
■ Society of Nuclear Medicine: pres., Milo Harris, 252 Paulsen Bldg., Spokane, Wash.; pres.-elect, Norman J. Holter, Helena, Mont.; sec., R. G. Moffat, 2656 Heather St., Vancouver 9, British Columbia; treas., R. Labbe, University of Oregon.

■ Council of American Bioanalysts: pres., Marion F. Dooley, Dallas Tex.; pres.-elect, Thomas S. Hosty, State Department of Public Health, Montgomery, Ala.; treas., Elisabeth Zacher, Oakland Clinical Laboratory, Oakland, Calif. Vice presidents are Victor Dozoretz, Dozoretz Clinical Laboratory, Buffalo, N.Y.; Gustina Zimmerman, Zimmerman Laboratory, Flint, Mich.; and Frank Kolos, Physicians Clinical Laboratory, San Francisco. The executive secretary is Lucian Hertert, Hertert Clinical Laboratory, 490 Post St., San Francisco.

■ Geological Society of America: pres., George S. Hume, Scientific Services, Copeland Bldg., Ottawa, Ontario, Canada; past pres., Walter H. Bucher, Columbia University; v. pres., Richard J. Russell, Louisiana State University; sec. and executive officer, H. R. Aldrich, G.S.A., 419 W. 117 St., New York 27; treas., J. Edward Hoffmeister, University of Rochester. Hume and Aldrich are representatives to the AAAS Council.

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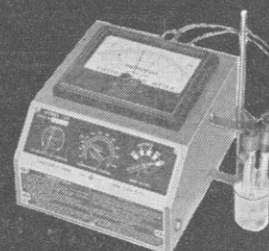
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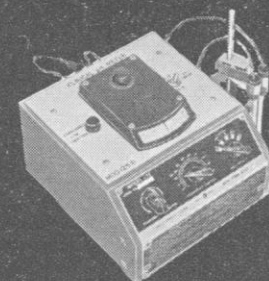
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■ Association of Military Surgeons of the United States: pres., Winfred P. Dana, U.S. Navy; sec.-editor, Robert E. Bitner, Suite 718, 1726 I St. NW, Washington 6, D.C.; exec. sec., Stuart E. Womeldorph, Suite 718, 1726 I St. NW, Washington 6. The vice presidents are Amos R. Koontz, Arden Freer, H. H. Twitchell, Wallace H. Graham, John W. Cronin, and James P. Cooney. Representative to the AAAS Council is Joseph H. McNinch.

■ American Dental Association: pres., Bernerd C. Kingsbury, San Francisco; pres.-elect, Harry Lyons, Medical College of Virginia; 1st v. pres., Francis J. Herz, San Francisco; 2nd v. pres., M. C. Hansen, Racine, Wis.; 3rd v. pres., Marvin E. Kennebeck, Office of the Surgeon General, U.S. Air Force, Washington,

D.C.; sec., Harold Hillenbrand, 222 E. Superior St., Chicago; treas., H. B. Washburn, St. Paul, Minn. Representative to the AAAS Council is H. Trendley Dean.

■ International Association of Milk and Food Sanitarians, Inc.: pres., Harold S. Adams, Indiana University Medical Center; pres.-elect, Paul Corash, Milk Division, City Health Department, New York; sr. past pres., John D. Faulkner, U.S. Public Health Service, Washington, D.C.; jr. past pres., I. E. Parkin, Pennsylvania State College; 1st v. pres., William Hoskisson, Arden Sunfreze Crys., Salt Lake City, Utah; 2nd v. pres., Harold B. Robinson, U.S. Public Health Service, Washington, D.C.; sec.-treas., H. H. Wilkowske, University of Florida; exec. sec., H. L. Thomasson.

■ Society of General Physiologists: pres., C. Stacy French, Department of Plant Biology, Carnegie Institution of Washington, Stanford, Calif.; v. pres. and pres.-elect, Daniel Mazia, University of California, Berkeley; sec., Abraham M. Shanes, National Institutes of Health, Bethesda 14, Md.; treas., Irvin M. Klotz, Northwestern University.

■ American Documentation Institute: pres., Joseph Hilsenrath, National Bureau of Standards, Washington, D.C.;

pres.-elect, James W. Perry, Western Reserve University; past pres., Scott Adams, National Institutes of Health, Bethesda, Md.; sec., Staffan Rosenborg, Library of Congress, Washington 25, D.C., treas., Kenneth H. Fagerhaugh, Carnegie Institute of Technology. Representative to the AAAS Council is Milton O. Lee.

Forthcoming Events

January

9-10. National Symposium on Reliability and Quality Control in Electronics, 2nd, Washington, D.C. (J. W. Greer, Bureau of Ships, Navy Dept. Code 815, Washington 25.)

9-10. Operations Research Soc. of America, 8th national, Ottawa, Ont., Canada. (J. Abrams, Dept. of National Defense, Ottawa.)

9-14. Pan American Cong. of Ophthalmology, 5th, Santiago, Chile. (T. D. Allen, 575 Lincoln St., Winnetka, Ill.)

10. American Ethnological Soc., New York, N. Y. (A. G. James, 695 Park Ave., New York 21.)

10-11. Calcium and Phosphorous Metabolism in Man and Animals with Special Reference to Pregnancy and Lactation, New York, N.Y. (R. R. Marshak, Craigie Hill Rd., Springfield, Vt.)

12. American Genetic Assoc., Washington, D.C. (S. L. Emsweller, Plant Industry Sta., Beltsville, Md.)



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12. British Columbia Acad. of Science, Vancouver, Canada. (W. J. Polglase, Dept. of Biochemistry, Univ. of British Columbia, Vancouver 8.)

12-14. Use of Isotopes in Agriculture, East Lansing, Mich. (E. W. Phelan, Argonne National Lab., Lemont, Ill.)

16-18. Documentation Conf., Cleveland, Ohio. (J. H. Shera, School of Library Science, Western Reserve Univ., Cleveland 6.)

17-20. American Pomological Soc., Rochester, N.Y. (R. B. Tukey, Horticulture Dept., Purdue Univ., Lafayette, Ind.)

20-27. Pan American Cong. of Gastro-Enterology, 5th, Havana, Cuba. (N. M. Stapler, 1267 J. E. Uriburu, Buenos Aires, Argentina.)

23-26. American Soc. of Heating and Air-Conditioning Engineers, Cincinnati, Ohio. (A. V. Hutchinson, ASHAE, 62 Worth St., New York 13.)

23-27. Inst. of Aeronautical Sciences, New York, N.Y. (S. P. Johnston, IAS, 2 E. 64 St., New York 21.)

26-27. Western Spectroscopy Assoc. 3rd annual, Berkeley, Calif. (J. W. Otvos, Shell Development Co., Emeryville, Calif.)

27-28. Conf. on Protein Metabolism, 12th annual, New Brunswick, N.J. (W. H. Cole, Rutgers Univ., New Brunswick.)

27-28. Western Soc. for Clinical Research, 9th annual, Carmel-by-the-Sea, Calif. (A. J. Seaman, Univ. of Oregon Medical School, Portland 1.)

30-1. International Conf. on Fatigue in

Aircraft Structures, New York, N.Y. (A. M. Freudenthal, 716 Engineering, Columbia Univ., New York 27.)

30-3. American Inst. of Electrical Engineers, New York, N.Y. (N. S. Hibshman, AIEE, 33 W. 39 St., New York 18.)

31-3. American Soc. of Sugar Beet Technologists, 9th biennial conf., San Francisco, Calif. (Western Beet Sugar Producers, Inc., 461 Market St., San Francisco 5.)

31-4. American Physical Soc., New York, N.Y. (K. K. Darrow, Columbia Univ., New York 27.)

February

1-2. Armour Research Foundation Midwest Welding Conf., Chicago, Ill. (H. Schwartzbart, Armour Research Foundation, Illinois Inst. of Technology, Chicago.)

1-3. Case Studies in Operations Research, Cleveland, Ohio. (Operations Research Group, Dept. of Engineering Administration, Case Inst. of Technology, 10900 Euclid Ave., Cleveland 6.)

2-3. National Symposium on Microwave Techniques, Philadelphia, Pa. (S. M. King, Inst. of Radio Engineers, 1 E. 79 St., New York 21.)

5-8. National Citizens' Planning Conf., Washington, D.C. (Miss H. James, 901 Union Trust Bldg., Washington 5.)

9-10. Soc. of American Military Engineers, annual, Chicago, Ill. (D. A. Sullivan, 72 W. Adams St., Chicago 90.)

16-17. National Conf. on Transistor Circuits, 3rd, Philadelphia, Pa. (J. D. Chapline, Remington Rand, Inc., 2300 W. Allegheny Ave., Philadelphia 29.)

19-23. American Inst. of Mining and Metallurgical Engineers, New York, N.Y. (E. O. Kirkendall, AIME, 29 W. 39 St., New York 18.)

19-23. Soc. of Economic Geologists, New York, N.Y. (O. N. Rove, Union Carbide and Carbon Corp., New York 17.)

20-22. American Educational Research Assoc., annual, Atlantic City, N.J. (F. W. Hubbard, AERA, 1201 16 St., NW, Washington 6.)

23-25. National Soc. of College Teachers of Education, Chicago, Ill. (C. A. Eggertsen, School of Education, Univ. of Michigan, Ann Arbor.)

24-25. American Physical Soc. Houston, Tex. (K. K. Darrow, APS, Columbia Univ., New York 27.)

26-29. American Inst. of Chemical Engineers, Los Angeles, Calif. (F. J. Van Antwerpen, AIChE, 25 W. 45 St., New York 36.)

28-29. Scintillation Counter Symposium, 5th, Washington, D.C. (G. A. Morton, RCA Laboratories, Princeton, N.J.)

March

12-16. National Assoc. of Corrosion Engineers, 12th annual, New York, N.Y. (Secretary, NACE, Southern Standard Bldg., Houston 2, Tex.)

(See 18 Nov. issue for comprehensive list)