

vated by the fact that, although old Italian violins are identical with modern violins with respect to tone quality, ease of playing and the decay of tones, there was still some quality about them that was distinctive enough for certain perceptive individuals to distinguish them without knowing their identity in advance. Saunders thinks that the loudness of the instrument is responsible for at least part of the difference, and, by modifying quite inexpensive (\$5) fiddles so that their tones were louder, produced a striking improvement in their performance. The volume of tone seems to be very sensitive to the thickness of the top plate where it is attached to the rest of the violin body, and by thinning this edge a gain of several decibels was obtained. Saunders notes that most old Italian violins are only about 2 mm thick there, and feels that this contributes to their superiority. Among the other interesting data resulting from this investigation is the fact that loudness of tone depends upon the number of strings present; hence the "Air for the G-string" is 2.3 db higher when the other strings are relaxed.

Stereophonic sound, the acoustic analog of three-dimensional movies and still pictures, was first investigated in detail by the Bell Telephone Laboratories in 1931. Nine articles on this topic (the "reproduction of sound giving the illusion of auditory perspective") have been published as Part II of the September 1953 issue of the *Journal of the Society of Motion Picture and Television Engineers*. The first six papers were given at the Society's Los Angeles convention in the spring of this year, and the rest were originally presented at a meeting of the American Institute of Electrical Engineers in 1934. The earlier articles contain much fundamental material that is still of value, being devoted to "Basic Requirements for Auditory Perspective", "Physical Factors in Auditory Perspective", and "Loudspeakers and Microphones for Auditory Perspective". A brief foreword by William B. Snow serves to introduce the various papers.

Nuclear excitation without an actual collision of nuclear particles, a previously unconfirmed phenomenon that has been considered likely by theorists for a number of years, now appears to be a demonstrated fact. MIT physicists Clyde L. McClelland and Clark Goodman, writing in the August 1st *Physical Review*, report they have found experimental evidence for supposing that their low-energy protons, when directed at tantalum and certain other metallic targets, have brought target nuclei to such a state of excitement that they have thrown off gamma rays solely as a result of the interaction of Coulomb fields.

Equipment and Techniques

The bubble chamber, a new instrument for detecting the passage of ionizing particles, is described by Donald A. Glaser in the August 1st issue of *The Physical Review*. The device consists of a heavy-walled cylindrical Pyrex bulb 3 cm long and 1 cm inside diameter which is filled with ether and maintained at a con-

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stant temperature of about 140° C. "To prepare for taking a picture of a track, the ether was compressed by admitting compressed nitrogen to the pressure regulator at a pressure of 300 pounds per square inch so that no vapor bubbles remained in the system. Then the gas was allowed to escape, so that the ether suddenly became highly superheated at atmospheric pressure. On the average the liquid remained quietly in this unstable condition for several seconds until a violent eruptive boiling occurred." The presence of ions in the superheated ether promotes the growth of bubbles until they are large enough to be observed. Hence, by using a coincidence telescope arrangement to actuate a flash-bulb and camera, the bubble track defining the path of a particle traversing the bulb can be photographed. Two pictures of tracks obtained in this way with the chamber shielded by 10 cm of lead are presented which are taken to be of minimum ionization, indicating the sensitivity of the method.

The *September Review of Scientific Instruments* is, as was promised, devoted to the Brookhaven Cosmotron. This instrument (a feeble word for describing the 2000 + ton assembly) was begun in the spring of 1948 when AEC funds were made available for its construction, and the first beam was produced in May of 1952 at an energy of 1 Bev. The following month saw the beam energy increased to slightly over 2 Bev, and, when present work to compensate for the effects of magnet saturation is completed, approximately 3 Bev is expected to be attained. The initial chairman of the Cosmotron group was M. Stanley Livingston of MIT, who was followed by Milton G. White of Princeton and the present chairman, George B. Collins. The collection of twenty-nine articles in this issue of *RSI* was edited by M. Hildred Blewett, a member of the Cosmotron staff, and provides a comprehensive review of the design details of the machine. While not many people will be interested for purposes of duplicating the Cosmotron, this information is of considerable intrinsic interest and much of the work described should be useful in other applications. Single copies of the September issue of *RSI* can be obtained from the American Institute of Physics, 57 East 55 Street, New York 22, N. Y., for \$1.00.

A large-screen oscilloscope making use of a 21-inch direct-view cathode-ray tube is now being manufactured, and is described as being especially suitable for classroom and lecture demonstrations. The instrument has a calibrated time base and a maximum deflection sensitivity of 10 mv per inch. Undistorted trace lengths range from 10 inches for dc to 10 000 cycles up to 28 inches for dc to 2000 cycles; standard picture tubes other than the 21AP4 used here can be obtained on special order. The Technomatic Instrument Company, 2316 Pico Boulevard, Santa Monica, California, makes these oscilloscopes and may be contacted for further information.

ORACLE, otherwise known as the "Oak Ridge Automatic Computer, Logical Engine", was completed dur-

ing the summer and is claimed to be the fastest general-purpose digital computer now in existence. The work was done at Argonne National Laboratory under the direction of J. C. Chu for Oak Ridge, and cost \$350 000. ORACLE is said to boast two especially noteworthy features besides its speed: the largest internal memory system yet constructed, enabling the reception, retention, and processing of as many as 2048 twelve-digit decimal numbers; and its remotely-controlled auxiliary memory system using magnetic tape which provides for the storage of four million twelve-digit numbers. The internal memory unit makes use of eighty three-inch cathode ray storage tubes, and there are 3500 electronic tubes in the entire instrument.

High-speed computation services for scientific and industrial organizations are being offered at the Philadelphia Research Center of Burroughs Corporation. Burroughs has announced that an expanded programming staff now permits the handling of exploratory problems with its Model I laboratory computer for business, manufacturing, trade, and scientific groups wishing to evaluate the use of electronic computers. Inquiries may be addressed to the Electronic Instruments Division, Burroughs Research, 511 N. Broad St., Philadelphia 23, Pennsylvania. Remote control of the computer by coded teletype from Wayne University's computation laboratory, over 500 miles away in Detroit, was undertaken this past summer during a special course on automatic digital computers. Wayne is assembling its own computer with aid from Burroughs, and when it is complete the telegraph connection with Philadelphia will be discontinued.

Education

Eastman Kodak Company has announced that it has agreed to contribute \$1.4 million to the educational development fund of the University of Rochester for use in expanding the University's facilities and its teaching, scholarship, and student guidance programs.

The University of Chicago is offering three post-doctoral fellowships in statistics for 1954-55. The purpose of these fellowships, which are open to holders of the doctor's degree or its equivalent in research accomplishment, is to acquaint established research workers in the biological, physical, and social sciences with the role of modern statistical analysis in the planning of experiments and other investigative programs, and in the analysis of empirical data. The development of the field of statistics has been so rapid, it is stated, that most current research falls far short of attainable standards. The fellowships (representing the fourth year of a five-year program supported by The Rockefeller Foundation) are intended to help reduce this lag by giving statistical training to scientists whose primary interests are in substantive fields rather than in statistics itself. The closing date for applications is February 15, 1954; instructions for applying may be obtained from the Committee on Statistics, University of Chicago, Chicago 37, Illinois.

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