(C. Beukenkamp, Public Relations Chairman, 993 Park Ave., New York 28.)

26–29. American Meterological Soc., New York, N.Y. (K. C. Spengler, AMS, 3 Joy St., Boston 8, Mass.)

26–29. American Soc. of Heating and Air Conditioning Engineers, 65th annual, Philadelphia, Pa. (W. M. Vidulich, ASHACE, 62 Worth St., New York 13.)

26–29. Institute of the Aeronautical Sciences, 27th annual, New York, N.Y. (IAS, 2 E. 64 St., New York 21.)

27–30. Society of Plastics Engineers, Inc., 15th annual tech. conf., New York, N.Y. (L. A. Bernhard, SPE, 65 Prospect St., Stamford, Conn.)

28–29. Nuclear Fuel Elements, 1st intern. symp., New York, N.Y. (H. H. Hausner, 1st Intern. Symp. on Nuclear Fuel Elements, 730 Fifth Ave., New York 19.)

28–31. American Physical Soc., annual, New York, N.Y. (E. R. Fitzgerald, Dept. of Physics, Pennsylvania State Univ., University Park.)

29–31. Western Soc. for Clinical Research, 12th annual, Carmel-by-the-Sea, Calif. (W. N. Valentine, Office of the Secretary, Univ. of California Medical Center, Department of Medicine, Los Angeles 24.)

February

1–6. American Inst. of Electrical Engineers, winter general, New York N.Y. (N. S. Hibshman, 33 W. 39 St., New York 18.)

9–11. Nature of Coal, symp., Bihar, India. (Director, Central Fuel Research Inst., P. O. Fuel Research Inst., Dhanbad District, Bihar.)

12–13. Solid State Circuits Conf., Philadelphia, Pa. (A. B. Stern, General Electric Co., Bldg. 3, Syracuse, N.Y.)

14. Short Range Navigation Aids., Montreal, Canada. (Intern. Civil Aviation Organization, Maison de l'Aviation Internationale, Montreal.)

15–19. American Inst. of Mining, Metallurgical, and Petroleum Engineers, annual, San Francisco, Calif. (E. O. Kirkendall, AIME, 29 W. 39 St., New York 18.)

16–19. Problems in Field Studies in Mental Disorders, intern. work conf., New York, N.Y. (J. Zubin, American Psychopathological Assoc., 722 W. 168 St., New York 32.)

20–21. Epidemiology in Mental Disorders, annual meeting of the American Psychopathological Assoc., New York, N.Y. (J. Zubin, APA, 722 W. 168 St., New York 32.)

26–28. Genetics and Cancer, 13th annual symp. on fundamental cancer research, Houston, Tex. (Editorial Office, Univ. of Texas, M. D. Anderson Hospital and Tumor Inst. Texas Medical Center, Houston 25.)

27–1. National Wildlife Federation, 23rd annual convention, New York, N.Y. (NWF, 232 Carroll St., NW, Washington 12.)

March

1–5. Gas Turbine Power Conf., Cincinnati, Ohio. (O. B. Schier, ASME, 29 W. 39 St., New York, N.Y.)

Equipment

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Science *does not assume responsibility for the accuracy of the information. A coupon for use in making inquiries concerning the items listed appears on page 1302.*

■ INVERTER provides a square-wave output at 115 v, 400 cy/sec, at currents up to 750 ma. Input is 26 v d-c (±5 percent). Units can operate at temperatures up to 85°C. A filter is available to provide semisoidal output. (Power Sources Inc., Dept. 465)

■ VOLTAGE-SENSITIVE CAPACITORS can be varied in capacitance as much as 60 percent by application of d-c potential up to 200 v. Capacitance minimum is 60 μμf. The capacitors are also temperature-sensitive. Two models have maximum voltage sensitivity at room temperature and 70°C respectively. (Mucon Corporation, Dept. 468)

■ PULSE GENERATORS are plug-in units factory set to provide a specified pulse rate. Units are available with pulse width from 1.0 to 8 μsec and pulse repetition frequencies from 400 to 15,000 cy/sec. Output is ± 6 v during operation from a 6 v d-c source. Tolerance on pulse width and frequency is ± 10 percent. Output load resistance is 75,000 ohm. Dimensions are 1 in^3. (ESC Corporation, Dept. 469)

■ STRAIN GAGE RECORDING SYSTEMS for balancing, controlling, scanning, and recording output of 24 to 96 gages are available in 24-channel modules. Strain values are recorded on multipoint, strip-chart recorders. Individual gage-factor and range-selector controls are provided for each channel. Polarity is automatically indicated. Each module includes a regulated power supply and a programmer. (B & F Instruments, Inc., Dept. 470)

■ PRESSURE TRANSDUCER is of the double-coil, variable-reluctance type; a flat diaphragm is used as the pressure-sensing element. Pressure range is adjustable by a factor of 2 or more. Units are interchangeable without change in output. Output is 0.3 v/v over a carrier frequency range from 400 cy/sec to 70 kcy/sec. (Yuba Consolidated Industries, Inc., Dept. 491)

■ TRANSISTOR PREAMPLIFIERS have input impedance of 1 megohm and output impedance of 600 ohm. Gain is 20 db. Equivalent input noise is 10 μv; frequency range is 100 to 80,000 cy/sec. The amplifiers are available in cylindrical waterproof models or in rectangular splashproof models. (Chesapeake Instrument Corp., Dept. 496)

■ SAMPLING SWITCH is characterized by a closure time of the order of 40 μsec and a contact-break time less than 20 μsec. Precious-metal contacts of the device are mounted in barrel-stave fashion around the drive shaft and are actuated by a rotating air jet that strikes them in rapid succession. The movable contact remains in the deflected closure position until the air jet has passed. A typical model has 45 contact pairs and operates at a sampling speed of 20 rev/sec. (Norman Hardy Associates, Dept. 495)

■ GEAR BOX is adjustable to provide gear reductions from 1 : 1 to 3125 : 1 for use in servo and instrument equipments. Gears are AGMA precision 1 or better. Models with zero backlash are available. Dimensions are 2.875 in. in diameter by 1.090 in. long. (Precision Mechanisms Corp., Dept. 497)

■ DUAL-KEYBOARD TYPEWRITER provides one keyboard of scientific and mathematical characters. The two keyboards are adjusted so that the scientific symbols of one fall accurately into place on the script typed by the other. A total of 180 characters are provided. (Imperial Typewriter Co., Ltd., Dept. 489)

■ MEDICAL SLIDE RULE, 2 ft long, acts as a prompter or reminder if fed with symptom information. Approximately 80 symptom strips are stored on the back of the slide rule, and approximately 340 disease categories are listed on one side of the front. From one to six symptom strips can be inserted under a window. Where lines of these come together, they can be read off against the disease by an arrowed line that slides above the window. (Blundell Rules Ltd., Dept. 484)

■ INFRARED DETECTOR is a lead selenide cell capable of responding to radiation of 4.5 μ wavelength at room temperature with time constant of less than 10 μsec. The range of sensitivity can be extended to 5 μ by cooling to Dry Ice temperature. At the lower temperature, the time constant is increased to above 20 μsec. Practically any configuration is said to be feasible with minimum-size sensitive area of 0.25 mm². (Eastman Kodak Co., Dept. 488)

■ BEAM-SWITCHING TUBE TESTER will test both statically and dynamically each of the beam-switching tube's ten constant-current output positions; the stability of the electron beam when formed at a given position; and the characteristics of the high-impedance switching element of the tube. Plug-in adapters permit testing of seven types of tubes. Built-in meters allow direct measurement of parameters. Neon lights indicate beam position. (Burroughs Corp., Dept. 502)

JOSHUA STERN
National Bureau of Standards

(Continued from page 1246)

a vowel to provide a pronounceable syllable. The sequence of vowels is obvious, including the single irregularity; the sequence of consonants is easily fixed by the mnemonic "ankers," although the reason for it, if any, I have forgotten. At any rate, the sounds were thought to be readily discernible. Since "no" is an obvious representation of zero, one counts: "na, ne, ni, ko; ka, ke, ki, ro; ra, re, ri, so; sa, se, si, nano, . . ." and the rest is surely obvious.

It was recognized long ago that the same numeral "6," for example, can represent six, sixty, six hundred, . . . , or six-tenths, . . . , depending on its position within a sequence of numerals; indeed, it is not uncommon to read "six-five-one" instead of "six hundred and fifty-one." It should be equally obvious that "no-point-sa-ri" should be a perfectly acceptable and unambiguous rendering of "00. 1101, 1011." The system is therefore logically complete as far as integers and binary fractions are concerned. For other fractions, a simple use of "over" is sufficient.

It is with no little regret that I report that although both Flanders and I (but especially he) practiced assiduously for some time our "no-na" arithmetic, and although we acquired a modicum of skill in addition, nevertheless we failed miserably with multiplication. The decimal grooves were too deeply sunk in our aging cortices, and we finally gave it up as a bad job. But if I can ever catch an innocent, unsuspecting 6-year-old—a grandchild, perhaps—when his parents are not looking, I hope to show that he can become an arithmetical polyglot without half trying.

A. S. Householder
Oak Ridge National Laboratory, Oak Ridge, Tennessee

The requirements for oral communication of magnitudes are not the same as those for checking or transcribing numbers. An example will make this clear. To communicate the number 651000 one might call out "six-five-one-oh-oh-oh," and for checking purposes this is common practice. As Householder points out, the listener, on hearing the "six," does not know whether its significance is 60, 600, 6000, and so on. He has no information about magnitude until the decimal point is suddenly explicitly or implicitly reached, at which time he must have counted the number of digits expressed and have retained in his memory the digits of significance to him. If this were an easy task, words like *hundred, thousand,* and *million* would not be needed. Many users of computers have used a hexadecimal number system that adds the letters, a, b, c, d, e, and f to the decimal symbols already available. For checking binary numbers this system or that described by Householder are quite adequate.

Two requirements must be met by a system of names for communication of magnitudes: (i) The speaker and the listener must be free to express or accept as much or as little precision as desired. (ii) The most significant information must be communicated first. It should be borne in mind that numbers like 256 or 512 are round numbers in the binary system. To become conversant with binary magnitudes one must be able to express, for example, the information that a given vacuum tube functions properly with about "hi" volts on the plate or that the population of the United States is approximately "dagxi."

Real usefulness of the ability to communicate magnitudes by means of binary numbers, whether for pedagogic purposes or otherwise, can only be demonstrated experimentally. The response by educators to the publication of my proposal suggests that such experiments will soon be made. To encourage uniformity among experimenters who may need to extend the system, I have assigned the terms "lu = 2^{12}," "pro = 2^{16}," "ti = 2^{20}" and "xi = 2^{24}."

Joshua Stern
National Bureau of Standards, Washington, D.C.

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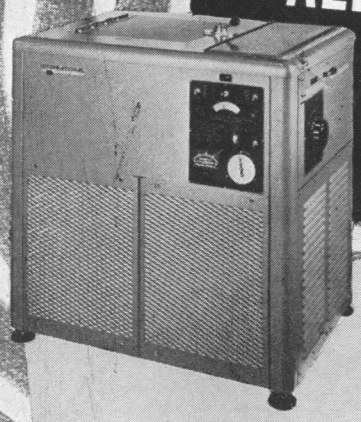

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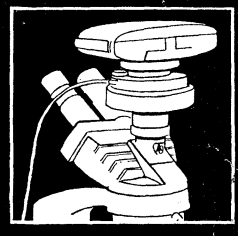

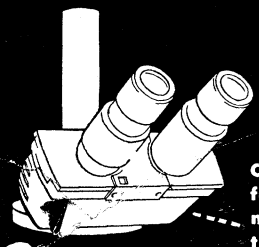

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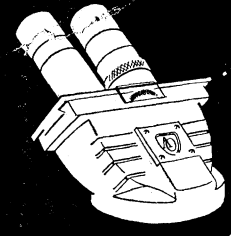

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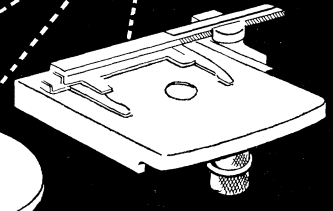

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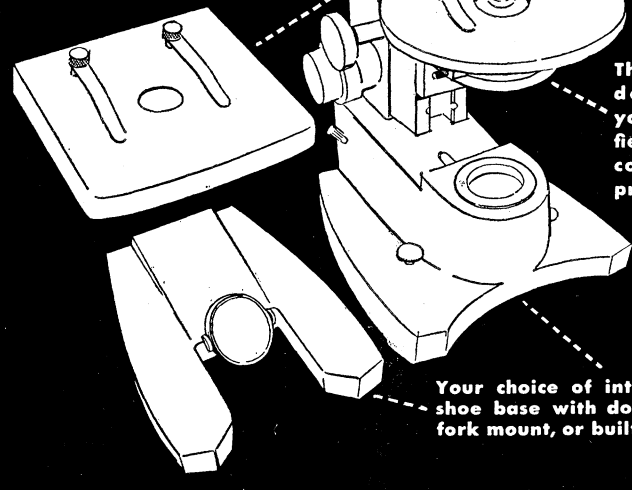

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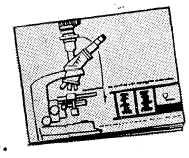

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