SAN ANDREAS FAULT

Index Issue
In graphic recording nothing is as versatile as the Brush 2300.

There's hardly a recording requirement that cannot be met by this new addition to the complete Brush line. Your application possibilities are almost unlimited...whether they're industrial or aero-space. Check out these facts.

1 to 16 Analog channels...or 120 event channels...or any combination of both
Meets MIL RFI Specs and Safety Codes
Writing Speeds...0 to 30,000 in./sec.
Start and Restart time...50 milliseconds
Inputs from microvolts to kilovolts
Choice of Galvanometers and Amplifiers
Internal chart take-up
Full remote control

Add to this a low cost-per-channel and you'll understand why we believe the Brush 2300 satisfies the widest range of requirements in graphic recording today.

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27 MARCH 1964
Now you can afford the convenience and accuracy of automatic data plotting with an X-Y recorder. This new unit offers all the specifications and features necessary to insure the ease of operation usually found only in recorders twice the price.

- 8½" x 11" or 11" x 17" chart size
- Zener reference voltages which eliminate periodic battery replacement
- Front panel switch allows easy chart paper insertion
- 100 K input impedance
- 0.25% accuracy
- Built-in electronic time base
- 1 mv/in. maximum sensitivity, switch selectable in 5 steps to 10 v/in.
- Electric pen lift
- Snap-on pen assembly
- Model HR-96T (8½" x 11") $995
- Model HR-98T (11" x 17") $1095

New model HR-101 X-Y recorder features 100 K input impedance, electric pen lift, zener reference voltages and snap-on pen assembly. Also available in 8½" x 11" chart size. Ideal for medical and industrial laboratories, these recorders allow persons previously unable to enjoy automatic data plotting because of price to utilize the conveniences and accuracies of X-Y recording. Price FOB Houston: HR-101-10 (8½" x 11") $795, HR-101-10 (11" x 17") $895. Availability: 45 days ARO. Houston Instrument Corp., 4950 Terminal Ave., Bellaire, Texas 77401.

New Millivoltmeter Offers Wide Frequency Range

Model VM-77B is a versatile, general purpose instrument for laboratory and production work. It has 12 ranges between 0.001 volts and 300 volts AC full scale and a frequency range of 10 cps to 4.5 megacycles. Input impedance is 10 megohms 20 pf. Amplifier output maximum is 1 volt RMS. Price FOB Houston: $195. Availability: 2 weeks ARO. Houston Instrument Corp., 4950 Terminal Ave., Bellaire, Texas 77401.

Multi-Channel Analyzer Recorder Readout

Through a unique design approach to null detection, these new X-Y recorders are fast, accurate, sensitivity-adjustment-free point plotters for use with pulse-height analyzers and averaging computers. Models HR-95TN (8½" x 11") and HR-97TN (11" x 17") feature better than 0.01% sensitivity, 7 point/sec. maximum point plotting speed, 0.25% overall accuracy and 0.1% repeatability. Price FOB Houston: HR-95TN $1525, HR-97TN $1625. Availability: 30 days ARO. Houston Instrument Corp., 4950 Terminal Ave., Bellaire, Texas 77401.
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With S/P disposables, your washing, cleaning, sterilizing problems go up in smoke

Use them once, then incinerate. No more scraping. Or washing. Air drying. Re-assembling. Sterilization. Or cooling. All of these steps toward re-use “go up in smoke” when you use S/P disposables in your laboratory. They’re convenient, time-saving and economical. They reach you chemically clean, eliminating the possibility of contamination. S/P has a wide variety of time-saving disposables. Petri dishes, beakers, pipettes, funnels, liquid samplers, test tubes, syringes, storage bags for solids and liquids, needles and... well, quite a few more. Too many to list here. But we have listed our extensive line of disposables in a special illustrated brochure. Just write to our Evanston office for your copy of this comprehensive catalog. Or ask your S/P Representative to see his samples.
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Hydrogen iodide is a colorless, pungent, corrosive gas. It is over four times as heavy as air. Matheson supplies it as a liquefied gas in cylinders at a pressure of about 95 psig @ 70°F. In the presence of heat or light, hydrogen iodide decomposes into hydrogen and iodine. Matheson adds a special inhibitor to hydrogen iodide to maintain maximum stability in the cylinder. Storage at temperatures less than 34°F. also improves the stability.

Applications and suggested uses for Hydrogen Iodide:

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2. As a catalyst in the hydrogenation of carbohydrates, coal and wood.
3. As a catalyst in the thermal decomposition of tert.-butyl alcohol.
4. As a catalyst for converting volatile hydrocarbons to liquid hydrocarbons.
5. For the reduction of graphitic oxide.

Physical constants (partial listing):
Molecular weight 127.92
Specific volume @ 70°F. and 1 atm. 3 cu. ft./lb.
Boiling Point @ 1 atm. —31.9°F. (-35.5°C)
Freezing Point @ 1 atm. —59.4°F. (-50.8°C)
Specific Gravity, O°C. (Air=1) 4.4
Specific Heat, gas, Cp, 25°C. 0.053BTU/(lb.) (°F.)
Dissociation at 1000°C. 33%

Hydrogen Selenide
Hydrogen Selenide is a colorless, toxic gas with a characteristic and penetrating odor. In concentrations of 1.5 ppm or higher, it is strongly irritating to the eyes and nasal passages. It is shipped as a liquefied gas in cylinders at a pressure of about 110 psig @ 70°F. and can also be supplied as a gas mixture in hydrogen or nitrogen, or other inert reducing gases.

Applications and suggested uses for Hydrogen Selenide:
1. For the formation of photosensitive crystalline metallic selenides.
2. For the preparation of various selenophenes by reaction with acetylenic compounds.
3. For the preparation of organic diselenides by reaction with ketones.

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Molecular Weight 80.98
Boiling Point @ 1 atm. —42.7°F. (-41.5°C)
Freezing Point @ 1 atm. —83.2°F. (-64°C)
Density @ D.P. 2.004g./ml.
Critical Temperature 270.4°F/(138°C)

Arsine
Arsine is a colorless, highly toxic gas having a disagreeable garlic-like odor. It is comparatively stable at room temperature, but it is unstable at elevated temperatures, decomposing into its elements. It is supplied as a gas mixture in hydrogen, nitrogen or other inert or reducing gases.

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<tr>
<th>Sample</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb (A-A)</td>
<td>Serum, LDH (liver path.)</td>
</tr>
<tr>
<td>Ser. Prot. myeloma</td>
<td>Ser. Prot. (liver path.)</td>
</tr>
<tr>
<td>Ser. Prot. (macroglobulinemia)</td>
<td>Ser. Prot. (nephritis)</td>
</tr>
<tr>
<td>Ser. Prot. (sarcoid)</td>
<td>Ser. Prot. (rheum. fever)</td>
</tr>
<tr>
<td>Ser. Muc. (schizophrenia)</td>
<td>Urine HCG (pregnancy)</td>
</tr>
</tbody>
</table>

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Conventional Absorbance Measurements also easier, more accurate. Digital readout: 0.00 to 3.000 D. D. Sensitivity, dark current controls and shutter eliminated. Line operated.

Chromatogram of Dowex-I column eluted with Formic Acid shows section with AMP peaks only. Record made with Gilford Model 2000 equipped with Gilford Flow-Through Cuvettes and Automatic Blank Compensator.

Salmon Sperm DNA profile illustrates linear registration of both temperature and absorbance changes on the same scale. Gilford Model 2000 equipped with Gilford Linear Thermosensor which measures temperature changes in cuvette chamber.

Reproduction of continuous linear recording of assay of G-6-P Dehydrogenase illustrates one of the many types of enzyme kinetic recordings obtainable virtually automatically with the Model 2000 or Series 200 Modular Gilford System.

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Further information, including copies of the brochures illustrated, is available on request. Write to Instrument Marketing Division, Perkin-Elmer Corporation, 910 Main Avenue, Norwalk, Conn.
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The most automatic calculator ever produced—the Monro-Matic® IQ-213—reduces computational activity to mere push-button procedures. Touch the memory recall button, for instance, and a ten digit constant sets itself on the keyboard automatically. And don’t worry about clearing the keyboard—that’s all done automatically, too. As is positioning of the carriage, setting zeros, as well as other tasks normally associated with changing from one arithmetic sequence to another. The IQ-213 features a single keyboard, too, for both regular and three-factor multiplication—and all answers are displayed. What’s more, it has the largest display capacity of any calculator on the market. In short, it will do your figurework faster, simpler, and more accurately than any calculator ever devised. And it’s easier to operate. For details, call your local Monroe representative. Or write us. Monroe Calculating Machine Company, Inc., Orange, N.J.  

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Essentially, the SBR consists of the basic Series S microscope body equipped with dust-proof, quadruple nose-piece, mounted in ball bearings; rotating binocular head; and rotating, rectangular graduated mechanical stage whose coaxial controls can be operated with either hand.

Tension-adjustable, focusing controls are located on both sides of the instrument. And a stage-stop lever can be preset to prevent accidental contact between the slide and objective. All controls are low-positioned.

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But, apart from the ruggedness, versatility and smooth mechanical responsiveness of the Nikon SBR, the quality that commends it above all else is its optics. You will find it difficult to duplicate its performance with any other microscope — for uniformity and brightness of field, image resolution, and for the visual comfort and ease you enjoy even with prolonged use.

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For complete details, write to Dept. S-3
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A technique for determining the statistical variability of input data. Now accomplished with integrated MNEMOTRON digital computer systems.

Variables reflected by X or Y may be:

- Time interval between successive events.
- Time latency of stimulated responses.
- Time that a signal dwells above a preset level.
- Time of occurrence of specific events after stimulation.
- Time duration of an event.
- Amplitude of successive events.
- Amplitude of signal at specific points in time.
- Amplitude of signal peaks.
- Amplitude of signal after fixed delay from stimulation.

Automated histograms permit detection and quantification of pattern changes over a complete range of information. The investigator need no longer limit himself to confined, and therefore biased, samples in order to be able to effectively interpret his data. Previously, interpretation required tedious, time-consuming manual processing of strip-chart or film records. However, recent advances in digital computer techniques now provide for on-line data reduction and immediate analysis of bioelectric phenomena. Thus, the researcher can quickly obtain statistical information in a condensed and easily comprehensible form. Results may be represented in diverse forms of amplitude or time interval histograms. In the case of amplitude histograms, counts proportional to the amplitude of the input signal are deposited in a memory location—or, a count is deposited in a memory location whose number is proportional to the amplitude of the signal. In the case of time interval histograms, counts proportional to the time interval of the input signal are deposited in a memory location—or, a count is deposited in a memory location whose number is proportional to the signal time interval. Hence, the investigator is supplied with a distribution curve of the signal source and can easily determine preferential amplitudes or time intervals.
TYPICAL FIELDS OF APPLICATION

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  Interspike intervals, action potential firing rates, amplitudes of nerve firings, etc.

- **CARDIOLOGY**
  R-R intervals, P-R-T amplitude distributions, etc.

- **ELECTROENCEPHALOGRAPHY**
  Amplitude distributions of evoked responses, latency distributions, wave intervals, etc.

- **BEHAVIORAL PSYCHOLOGY**
  Reaction time distributions, learning time curves, etc.

- **CELL BIOLOGY**
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This module consists of adjustable baseline voltage selector which permits CAT operation to be related to specific voltage amplitude inputs. The Model 605 Amplitude Discriminator transmits a pulse to the CAT when the preselected baseline amplitude is exceeded, and another pulse when the voltage drops below the preset amplitude. These pulses control the CAT.

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FEATURES

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730-Mev protons were used in doses ranging from 125 to 2000 rads. Loss of hair was the most constant symptom and no simple clinical signs could be used as reliable biodosimeters, particularly at the lower proton energies.

Neutron irradiation presents special problems in dosimetry. D. Hightower and H. M. Swartz (Walter Reed Army Institute) have developed a technique for measuring neutron penetration by tissue activation based on determining the amount of sodium-24 in tissue samples. It is expected that this technique will eventually permit a better experimental determination of depth dose. Russian investigators proposed a universal radiation dose unit, described a method of determining the contribution of cascade neutrons to the proton flux by using activation detectors, and also discussed Russian equipment for measuring the flux and tissue dose rate of intermediate-energy neutrons.

The pathological effects of neutron irradiation were considered under three main topics: acute effects, delayed effects, and possible applications in radiotherapy. Acute radiation mortality as a function of dose rate was explored over the exceptionally wide range of from 23 rads/min to 10^5 to 10^6 rads/min by E. J. Ainsworth and co-workers (U.S. Naval Radiological Defense Laboratory). They inferred from their results that, in terms of acute radiation responses to fission neutrons, radiation at high intensities was not significantly more or less injurious than at low dose rates. F. Hirose (Hiroshima University) found that 14.1-Mev acute neutron irradiation produced about 50 percent greater tissue damage than x-rays and that injuries in the hematopoietic bone marrow may play a significant role as a cause of acute death of mice from fast neutron irradiation.

The relation between aging and chromosome aberrations produced in mice by acute and chronic neutron and γ-irradiation was shown by H. J. Curtis (Brookhaven National Laboratory). The results strongly supported the concept that natural and radiation-induced aging are caused by spontaneous and radiation-induced chromosomal aberrations (mutations), respectively, in the somatic cells of animals. J. F. Fowler concluded the sessions on pathology by giving a comprehensive review of the use in radiotherapy of slow neutron capture, fast neutrons, and beams of protons, deuterons, alpha particles, and negative π mesons. Slow neutron capture therapy lacks promise.
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SCIENCE, VOL. 143
primarily because of the very poor depth doses. This may be overcome,
at least in part, by surgically removing the bulk of the tumor before ir-
radiation or by use of epithermal neutrons when these become available
with sufficient flux. Fast neutron therapy combines the advantages of greater
depth dose and lack of a reduced effect under anoxic conditions, which are char-
acteristic of x- and γ-irradiation. Pro-
ton, deuteron, and alpha particle beams
are not high LET (linear energy trans-
fer) particles, except in the terminal
fraction of a millimeter of their track,
and hence do not give the oxygen ad-
vantage obtainable with fast neutron beams. Negative π meson beams are par-
particularly promising for radiotherapy,
because they combine an improved
physical dose distribution with tissue
interactions which give alpha particles
of high LET (6 Mev, 50 kev/µ) so
that they would yield nearly the maxi-
mum effect with anoxic tumor cells.

A major portion of the symposium
was devoted to studies on cellular and
genetic effects of neutron irradiation,
particularly with reference to their rela-
tive biological effectiveness compared
to x- and γ-irradiation. J. J. Broerse
and G. W. Barendsen (Netherlands)
reported on the damage to reproduc-
tive capacity of cultures of human
kidney cells when irradiated with
monoenergetic neutrons. Within the
energy range of from 3 to 15 Mev there
was a shift from an exponential
to an accumulative survival curve,
indicating a shift from predominantly
“1-hit” events to a “multiple-event”
dose response. Most of the papers in
this symposium, and in the literature
in general, report values of relative
biological effectiveness of below 10 for
fission spectrum neutron versus x- or
γ-ray effects. These are based mostly
on mortality or certain pathological
symptoms.

Three of the papers reported higher
values of relative biological effective-
ness; each was based on more specific
genetic criteria. T. Fujii (National
Institute of Genetics, Japan) found that
14-Mev neutrons were about 13 times
more effective than γ-rays in produc-
ing chlorina mutants in wheat. A. G.
Searle and R. J. S. Phillips (Harwell)
observed that with specific locus (point)
mutations in mice the relative
biological effectiveness of fast neutrons
versus γ-rays at low intensity is
about 26, and possibly as high as 50.
H. H. Smith and his co-workers
(Brookhaven National Laboratory) re-
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Ported an average relative biological effectiveness of about 70 for loss of a specific chromosome arm in maize due to irradiation with monoenergetic neutrons (0.43 to 1.80 Mev) compared with 250 kvp x-rays. It appears that more studies on relative biological effectiveness based on subtle intracellular events may be needed, particularly with reference to establishing minimum permissible doses of neutron irradiation for man.

In discussing the use of neutron irradiation in agriculture and applied genetics, A. R. Gopal-Ayengar and M. S. Swaminathan concluded that neutrons have an important place in the array of mutagens available by virtue of the relative insensitivity to modification of biological responses they produce, the absence of secondary physiological effects associated with their action, and their high relative biological effectiveness values for induction of chromosome aberrations and mutations.

Harold H. Smith
Biology Department, Brookhaven National Laboratory, Upton, New York

Forthcoming Events

April


1-2. Methods for Measurement of Weak Beta-Emitters, Karlsruhe-Leopoldshaven, Germany. (Gesellschaft Deutscher Chimiker, Gesellschaft für Strahlenforschung, Postfach 9075, Frankfurt/Main, Germany)


1-3. Optical Soc. of America, spring meeting, Washington, D.C. (M. E. Warga, ASA, 1155 16th St., NW, Washington, D.C. 20036)

1-4. National Soc. for Programmed Instruction, annual, San Antonio, Tex. (NSPI Program Committee, Trinity Univ., 715 Stadium Dr., San Antonio, Tex.)

1-5. Latin Oto-Rhino-Laryngology Soc., 15th congr., Bologna, Italy. (G. Motta, Via Modica 6, Milan, Italy)


2-3. Alexander Graham Bell Assoc. for the Deaf, southeastern meeting, New Orleans, La. (R. Tegeder, Utah School for the Deaf, 846 20th St., Ogden)
2-3. Obstetrics and Gynecology, seminar, Gainesville, Fla. (Mrs. D. Miller, Div. of Postgraduate Education, College of Medicine, Univ. of Florida, Gainesville)
2-3. Industrial Applications of New Technology, conf., Atlanta, Ga. (Director, Short Courses and Conferences, Georgia Inst. of Technology, Atlanta, Ga. 30332)
2-4. American Acad. of Oral Pathology, Bethesda, Md. (R. J. Gorlin, Univ. of Minnesota, Minneapolis)
3-4. Biology colloquium, Corvallis, Ore. (C. M. Gilmour, School of Science, Oregon State Univ., Corvallis)
3-5. Fleming’s Lysozyme, 3rd intern. symp., Milan, Italy. (G. Podio, Museo della Scienza e della Tecnica, Via Modica, 6, Milan)
3-5. American Soc. of Internal Medicine, annual, Atlantic City, N.J. (A. V. Whitehall, 3410 Geary Blvd., San Francisco, Calif.)
3-5. American Assoc. of Pathologists and Bacteriologists, annual, Chicago, Ill. (E. A. Gall, Dept. of Pathology, Cincinnati General Hospital, Cincinnati 29, Ohio)
4. Arizona Acad. of Science, Tempe. (H. B. Whitehurst, Dept. of Chemistry, Arizona State Univ., Tempe)
5-8. International Acad. of Pathology, annual, Chicago, Ill. (F. K. Mostofi, Armed Forces Inst. of Pathology, Washington, D.C. 20012)
5-10. Asia-Pacific Acad. of Ophthalmology, 2nd congr., Melbourne, Australia. (R. N. Mellor, 82 Collins St., Melbourne)
7-11. Applied Mathematics and Mechanics, Giessen, Germany. (K. Maruhn, Mathematisches Institute, Justus Liebig Univ., Giessen)

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9–11. Southwestern Psychological Assoc., annual, San Antonio, Tex. (C. C. Cleland, 2104 Meadowbrook Dr., Austin, Tex. 78703)
9–13. Roentgen Cong., German, Wiesbaden, Germany. (H. Lossen, Deutscher Röntgenkongress, Fichtenplatz 20, Mainz, Germany)
10. Natural Phenolic Compounds, symp., Tokyo, Japan. (M. Shimokoriyama, Dept. of Botany, Univ. of Tokyo, Hongo, Tokyo)
12. Industrial Fibers, European inst., Milan, Italy. (F. Tommy-Martin, 40 rue du Stand, Geneva, Switzerland)
12–13. American Soc. for Artificial Internal Organs, Chicago, III. (B. K. Kusserow, Dept. of Pathology, Univ. of Vermont College of Medicine, Burlington)
12–17. Society of Motion Picture and Television Engineers, semiannual technical conf., Los Angeles, Calif. (J. M. Waner, Eastman Kodak Co., 6706 Santa Monica Blvd., Hollywood 38, Calif.)
12–18. Chemistry of Natural Products, intern. symp., Kyoto, Japan. (Science Council of Japan, Ueno Park, Tokyo, Japan)
13–15. Microelectronics, 3rd annual symp., St. Louis, Mo. (T. F. Murtha, P.O. Box 4104, St. Louis, Mo. 63136)
13–16. American Acad. of General Practice, Atlantic City, N.J. (M. F. Cahal, Volker Blvd. at Brookside, Kansas City 12, Mo.)

SCIENCE, VOL. 143
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30-2. Agricultural History Soc., annual, Cleveland, Ohio (A. G. Bogue, History Dept., Univ. of Iowa, Iowa City)

30-2. American Cleft Palate Assoc., 22nd annual, Los Angeles, Calif. (ACPA, Parker Hall, Univ. of Missouri, Columbia 65202)

30-2. Midwestern Psychological Assoc., 36th annual, St. Louis, Mo. (F. A. Mote, Psychology Dept., Univ. of Wisconsin, Madison 53706)


30-6. Mexican Natl. Acad. of Medicine, Mexico City. (A. Lavarez-Bravo, Unidad de Congressos del Centro Mexico, Bloque "B", Av. Chauhtenoc 330, Mexico, D.F.)

May

1. Chemical Inst. of Canada, Rubber Chemistry Div., annual, Niagara Falls, Ont. (CIC, 48 Rideau St., Ottawa, Ont.)

1-2. Association of Clinical Scientists, Philadelphia, Pa. (R. P. MacFate, 54 W. Hubbard St., Chicago, Ill. 60610)

1-2. Minnesota Acad. of Science, Moorhead. (M. R. Boudrye, 3100 38th Ave. S., Minneapolis 6, Minn.)

1-2. Nebraska Acad. of Sciences, Lincoln. (C. B. Schultz, 101 Morrill Hall, Univ. of Nebraska, Lincoln 8)

1-2. North Dakota Acad. of Science, Fargo. (B. G. Gustafson, Univ. of North Dakota, Extension Div., Grand Forks)

1-3. Society of Biological Psychiatry, Los Angeles, Calif. (H. E. Himwich, SBP, Galesburg State Research Hospital, Galesburg, Ill.)

1-4. American Psychoanalytic Assoc., annual, Los Angeles, Calif. (Mrs. H. Fischer, APA, 1 E. 57 St., New York N.Y.)

2-3. Academy of Psychoanalysis, annual, Los Angeles, Calif. (J. R. Royce, The Academy, 125 E. 65 St., New York, N.Y. 10021)

3-7. Electrochemical Society, spring meeting, Toronto, Ont., Canada. (ES, 30 E. 42 St., New York, N.Y. 10017)


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6-8. Society for Experimental Stress Analysis, spring meeting, Salt Lake City, Utah. (B. E. Bossi, 21 Bridge Sq. Westport, Conn.)


7-8. International College of Surgeons, British section, summer meeting, London. (Secretariat, 1516 Lake Shore Dr., Chicago, Ill. 60610)


7-9. Society of Neurological Surgeons, Rochester, Minn. (SNS, Duke Univ. Medical Center, Durham, N.C.)

7-10. International Assoc. for Bronchology, 14th congr., Vienna, Austria. (Secretariat, Vienna Acad. of Medicine, 4, Alserstr., Vienna 9)


10-14. Cardiology, 3rd Asian-Pacific congr., Kyoto, Japan. (S. Hayase, Medical Clinic, Kyoto Univ. Hospital, Sakyo-ku, Kyoto)


10-15. Photographic Science and Engineering, intern. conf., Palisades Park, N.J. (Executive Secretary, Soc. of Photographic Scientists and Engineers, Box 1609, Main Post Office, Washington, D.C.)


11-16. Assessment of Radioactive Body Burdens in Man, symp. IAEA, Heidelberg, Germany. (IAEA, Div. of Public Information Kärtnerstrasse 11, Vienna, Austria)

11-14. Aerospace Medical Assoc., 35th annual, Bal Harbour, Fla. (W. J. Ken-
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