

half of equatorial values at about  $10^\circ$  geomagnetic latitude, and were just measurable at  $20^\circ$  geomagnetic latitude. The variation with wavelength of effective source temperatures in this frequency range was found to be proportional to  $\lambda^3$ ; galactic radio noise is proportional to  $\lambda^{3.32}$ . The mid-August equatorial source temperature at 30 Mcy/sec was about  $1.5 \times 10^4$  degrees Kelvin, a value comparable to that of galactic radio noise. The time decay of the synchrotron radiation appeared to be correlated with particle loss from the lower edge of the artificial radiation belt. At 30 Mcy/sec, the decay rate was about 10 percent every 2 weeks during August.

Peterson reported on calculations of the spectral distribution and intensity of synchrotron radiation from the observed spatial distribution of the artificial radiation belt. An energy spectrum of electrons similar to that from the decay of fission products was found necessary to explain the spectral distribution of the synchrotron radiation. Observed electron fluxes at the lower edge of the artificial belt showed good agreement between calculated and observed intensities of radio emission. Calculations were insensitive to fluxes at higher latitudes because of the strong dependence of emission on magnetic field.

Hess reported on the composite model of the radiation belt that was developed by combining data from the Ariel, Injun, Telstar and Traac satellites. After a fission spectrum had been assumed, the fluxes from the different detectors were converted to total fluxes of electrons of all energies. These were compared in terms of the magnetic coordinates ( $B$  and  $L$ ), and showed good agreement where direct comparisons were possible. The electron flux map shown on the cover was obtained in this manner. This is an idealized dipole representation of the electron fluxes. The actual flux distribution is somewhat different, especially at low altitudes. At an altitude of a few hundred kilometers significant fluxes are measured only in the south Atlantic, because of irregularities in the earth's magnetic field. The fluxes in the map on the cover at most places in space are probably reliable to a factor of 2 or 3. This flux map is for 1 week after the explosion; some decay has taken place since then.

Van Allen expressed doubt that the summary contour diagram shown on the cover should be accepted as repre-

senting the intensities of artificially injected electrons. This doubt arises from two separate considerations: (i) The Injun 1 counting rate contours at low altitudes curl away from the earth at latitudes of  $35^\circ$  to  $40^\circ$  in such a way as to suggest that the artificial belt is limited effectively to a radial extent of less than 2.7 earth radii. (ii) Much of the summary diagram has a striking resemblance in both form and absolute intensities to those of the natural radiation belts found with Explorer XII and with other satellites by the Iowa group. A central experimental difficulty is that Telstar was fired after the Johnston Island burst, and hence no direct subtraction of pre-burst data with the same detectors can be made for these data. It appears that most of the radiation damage data and the synchrotron noise are consistent with either a limited or an extended artificial belt. Several other members of the audience felt quite strongly that the flux plot as presented did represent artificial electrons out well past the field line  $L = 2$ . Further study is being given to this question.

Kaufmann presented calculations on the expected time decay of the electron flux. These calculations were based on the assumption that coulomb scattering is the dominant loss process. The times agree qualitatively with observations at low altitudes. On the field line of  $L = 1.25$ , Van Allen reported that a decay of about 2 times was observed on Injun from 100 hours to 1000 hours after the explosion. The calculated characteristic time of decay on this field line is a few months, that is, in moderately good agreement. For the field line of  $L > 1.3$  the characteristic times became very long—years. At high altitudes processes other than coulomb scattering may contribute to the loss of particles.

This symposium was organized by Col. McCormac of the Defense Atomic Support Agency and Dr. Hess of the National Aeronautics and Space Administration. Proceedings of the conference will be published in the near future.

W. N. HESS

PAUL NAKADA

Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Maryland

#### References

1. B. J. O'Brien, C. D. Laughlin, J. A. Van Allen, L. A. Frank, *J. Geophys. Res.* **67**, 1209 (1962); B. J. O'Brien, *ibid.*, **67**, 1227 (1962).
2. B. J. O'Brien, C. D. Laughlin, J. A. Van Allen, *Nature*, in press.

## Forthcoming Events

### November

1-2. **Alkaline Pulping Conf.**, Savannah, Ga. (Technical Assoc. of the Pulp and Paper Industry, 360 Lexington Ave., New York 17)

1-2. **Chemtronics**, conf., New York, N.Y. (E. C. Torkelson, Bell Telephone Laboratory, 463 West St., New York)

1-2. **Educational Conf.**, annual, New York, N.Y. (A. E. Traxler, Educational Records Bureau, 21 Audubon Ave., New York 32)

1-2. **Kidney**, annual conf., Princeton, N.J. (National Kidney Disease Foundation, 145 E. 35 St., New York 16)

1-2. **Medical Practice Management**, 1st annual conf., Las Vegas, Nev. (Soc. of Professional Business Consultants, 420 Madison Theatre Bldg., Detroit 26, Mich.)

1-2. **Product Engineering and Production**, natl. conf., San Francisco, Calif. (H. R. Traver, Hewlett-Packard Co., 1501 Page Mill Rd., Palo Alto, Calif.)

1-3. **American Chemical Soc.**, annual southeastern regional meeting, Gatlinburg, Tenn. (F. A. Griffiths, Maryville College, Maryville, Tenn.)

1-3. **Delayed Effects of Captivity**, intern. medical congr., Brussels, Belgium. (R. Laumond, Intern. Confederation of Former Prisoners of War, 46 rue Copernic, Paris 16<sup>e</sup>, France)

2-3. **American Geophysical Union**, regional meeting, Seattle, Wash. (F. A. Richards, Dept. of Oceanography, University of Washington, Seattle)

2-3. **Fat as a Tissue**, intern. research conf., Philadelphia, Pa. (Division of Research, Medical Science Bldg., Lankenau Hospital, Philadelphia 51)

4-7. **Engineering in Biology and Medicine**, annual conf., Chicago, Ill. (Program Committee, P.O. Box 1475, Evanston, Ill.)

4-9. **American Acad. of Ophthalmology and Otolaryngology**, Las Vegas, Nev. (W. L. Benedict, 15 Second St., SW, Rochester, Minn.)

4-10. **Interamerican Red Cross Conf.**, San Juan, Puerto Rico. (American Natl. Red Cross, 17 St. between D and E Sts., NW, Washington, D.C.)

5-7. **American Soc. for Cell Biology**, annual, San Francisco, Calif. (ASCB, Box 2982, Duke Univ. Medical Center, Durham, N.C.)

5-7. **Protection against Radiation Hazards in Space**, symp., Gatlinburg, Tenn. (E. P. Blizard, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

5-9. **American Inst. of Mining, Metallurgical, and Petroleum Engineers**, fall meeting, Chicago, Ill. (Executive Secretary, AIME, 345 E. 47 St., New York 17)

5-9. **German Ceramics Soc.**, annual, Baden-Baden. (Deutsche Keramische Gesellschaft, Menzenbergerstr. 47, Bad Honnef am Rhein, Germany)

5-9. **Metallurgical Congr.**, intern., Chicago, Ill. (C. Wells, American Soc. for Metals, 7301 Euclid Ave., Cleveland, Ohio)

5-9. **Practical Applications of Short-Lived Radioisotopes Produced in Small Research Reactors**, seminar, Vienna, Austria. (Intern. Atomic Energy Agency, 11 Kärntner Ring, Vienna 1)

5-17. World Meteorological Organization, South-West Pacific Regional Assoc., Noumea, New Caledonia. (Secretariat, WMO, Geneva, Switzerland)

7-10. Acoustical Soc. of America, Seattle, Wash. (W. Waterfall, Amer. Inst. of Physics, 335 E. 45 St., New York 17)

7-10. Corrosion of Metals, symp., Kanpur, India. (Defense Research Laboratory, Kanpur)

7-10. Fetal and Infant Liver Function and Structure, conf., New York, N.Y. (E. T. Minor, New York Acad. of Sciences, 2 E. 63 St., New York 21)

7-10. Geological Soc. of America, Houston, Tex. (F. Betz, Jr., GSA, 419 W. 117 St., New York, N.Y.)

8-9. Operations Research Soc. of America, Philadelphia, Pa. (G. D. Shellard, New York Life Insurance Co., 51 Madison Ave., New York 10)

8-10. American Soc. of Cytology (formerly Inter-Soc. Cytology Council), annual, St. Louis, Mo. (P. A. Younge, 1101 Beacon St., Brookline 46, Mass.)

8-10. Gerontological Soc., Miami Beach, Fla. (R. W. Kleemeier, Dept. of Psychology, Washington Univ., St. Louis, Mo.)

8-13. International Office of Epizootics, American regional conf., Mexico City, Mexico. (R. Vittoz, 12 rue du Prony, Paris 17<sup>e</sup>, France)

9-8. Dec. United Nations Educational, Scientific, and Cultural Organization, general conf., Paris, France. (UNESCO, Place de Fontenoy, Paris 7<sup>e</sup>)

11-16. World Medical Assoc., general

assembly, New Delhi, India. (L. H. Bauer, 10 Columbus Circle, New York 19)

11-17. Veterinary Medicine, Pan American congr., Mexico City, Mexico. (J. Santivanez, P.O.B. 1697, Coral Gables 34, Fla.)

11-22. Plastics, intern. fair and convention, Göteborg, Sweden. (Interfair, Inc. AB, Intern. Trade Fair, S. Tullgatan 4, Malmö C, Sweden)

12-13. Genetics Symp., Columbia, Mo. (Director, Postgraduate Medical Education, M176 Medical Center, Univ. of Missouri, Columbia)

12-14. Paleontological Soc., Houston, Tex. (H. B. Whittington, MCZ, Harvard Univ., Cambridge 38, Mass.)

12-15. Magnetism and Magnetic Materials, conf., Pittsburgh, Pa. (Inst. of Radio Engineers, Office of the Professional Groups Secretary, 1 E. 79 St., New York 21)

12-16. Australasian Corrosion Assoc., annual conf., Auckland, New Zealand. (Conference Secretary, ACA, Box 995, Auckland)

12-16. Conservation and Management of Temperate Marshes and Wetlands, conf., Arles or Saintes-Maries-de-la-Mer, France. (L. Hoffman, Station Biologique de la Tour de Valat, Par Le Sambuc (B. du Rh.), France)

12-16. Problems of Methodology of Agricultural Problems, conf., U.N. Economic Commission for Europe, Geneva, Switzerland. (UNECE, Palais des Nations, Geneva)

12-17. Czechoslovak Medical Congress,

Prague. (K. Ráška, Czechoslovak Medical Soc. J. E. Purkyně, Sokolská 31, Prague)

12-24. Aeronautical Fixed Telecommunications Network, European-Mediterranean regional meeting, Paris, France. (Intern. Civil Aviation Organization, Intern. Aviation Bldg., 1080 University St., Montreal 3, P.Q., Canada)

13-15. Birth Defects, science writers' seminar, Ann Arbor, Mich. (Science Information Div., National Foundation, 800 Second Ave., New York 17)

13-15. Institute of Radio Engineers, Northeast research and engineering meeting, Boston, Mass. (L. G. Cumming, IRE, 1 E. 79 St., New York 21)

13-18. American Rocket Soc., annual meeting and space flight exposition, Los Angeles, Calif. (ARS, 500 Fifth Ave., New York 36)

13-22. Soil, intern. conf., Wellington, New Zealand. (ISC, Secretary General, P.O. Box 8001, Wellington)

14-17. Society of Naval Architects and Marine Engineers, annual, New York, N.Y. (Secretary, SNAME, 74 Trinity Place, New York 6)

15-17. Cold Metal Working, intern. conf., Budapest, Hungary. (Hungarian Soc. of Mechanical Engineers, Szabadság tér 17, Budapest 5)

15-18. American Anthropological Assoc., Chicago, Ill. (S. T. Boggs, 1530 P St., NW, Washington 5)

15-18. International Federation of Blood Donors' Organizations, congr., Monaco. (V. Formentano, Largo Volontari del Sangue 1, Milan, Italy)

16-17. American Mathematical Soc., Tallahassee, Fla. (AMS, 190 Hope St., Providence 6, R.I.)

16-17. Communications, symp., Montreal, P.Q., Canada. (A. B. Oxley, Canadian IRE Symp. on Communications, Box 802, Station B, Montreal)

17. American Mathematical Soc., Los Angeles, Calif. (AMS, 190 Hope St., Providence 6, R.I.)

18-21. American Speech and Hearing Assoc., New York, N.Y. (K. O. Johnson, 1001 Connecticut Ave., NW, Washington 6)

18-21. Brain Mechanisms for External Inhibition (closed meeting), Los Angeles, Calif. [Air Force Office of Scientific Research (attention: SRL), Washington, D.C.]

19-20. Mid-America Electronics Conf., Kansas City, Mo. (J. Warfield, Dept. of Electrical Engineering, Univ. of Kansas, Lawrence)

19-21. European Packaging Federation, congr., Paris, France. (EPF, 3 rue La Boétie, Paris 8<sup>e</sup>)

19-23. Radioactive Dating, intern. symp., Greece. (Intern. Atomic Energy Agency, 11 Kärntner Ring, Vienna 1)

19-26. Paris Intern. Dental Sessions, Paris, France. (G. Delbart, 3 place de la Gare, Mantes, S.-et-O., France)

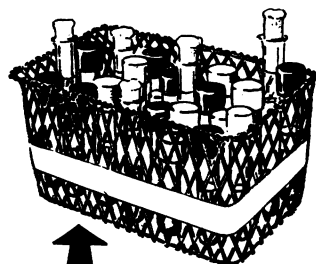
20. Manufacturing Chemists' Assoc., mid-year conf., New York, N.Y. (MCA, 1825 Connecticut Ave., NW, Washington 9)

20-24. Fish Diseases, intern. symp., Turin, Italy. (R. Vittoz, Intern. Office of Epizootics, 12 rue de Prony, Paris 17<sup>e</sup>, France)

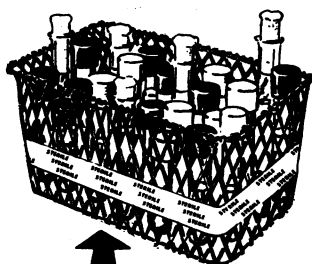
22-23. International Waste Rubber and Plastics Federation, conf., Antwerp, Bel-

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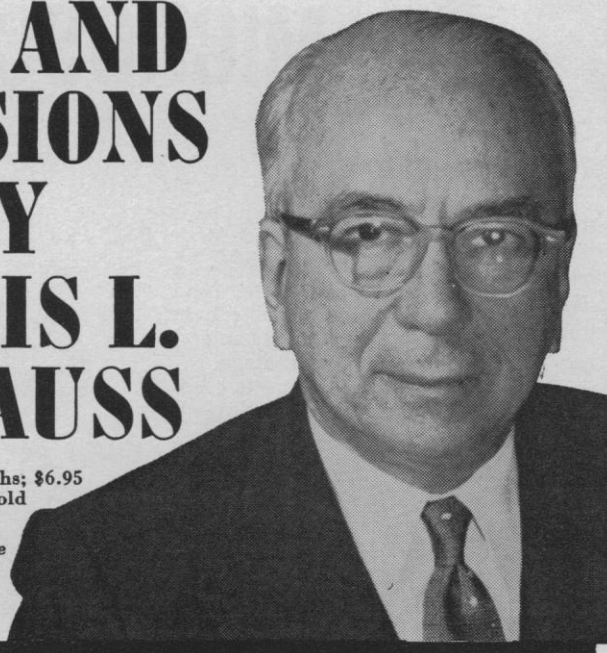


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gium. (R. G. Kirkpatrick, Moorgate Hall, Moorgate, London, E.C.2, England)

22–24. Central Assoc. of Science and Mathematics Teachers, St. Louis, Mo. (J. Kennedy, Indiana State College, Terre Haute)

22–24. National Council for Geographic Education, Chicago, Ill. (L. Kenamer, Univ. of Texas, Austin)

22–27. Automation and Instrumentation, congr., Milan, Italy. (Federazione delle Associazioni Scientifiche e Tecniche di Milano, Via del Politecnico 10, Milan)

22–27. Thermotechnology, intern. conf., Milan, Italy. (A Barbieri, Via Marcona 15, Milan)

22–3. Latin American Forestry Commission, Santiago, Chile. (U.N. Food and Agriculture Organization, Regional Office, Casilla 10095, Santiago)

23–24. American Mathematical Soc., Chicago, Ill. (AMS, 190 Hope St., Providence 6, R.I.)

23–24. American Physical Soc., Cleveland, Ohio. (K. K. Darrow, APS, Columbia Univ., New York 27)

23–24. American Soc. of Animal Science, Chicago, Ill. (C. E. Terrill, Animal Husbandry Research Div., Agricultural Research Center, Beltsville, Md.)

24–25. American College of Chest Physicians, Los Angeles, Calif. (ACCP, 112 E. Chestnut St., Chicago 11, Ill.)

26–28. Atomic Industrial Forum, annual clinical meeting, Los Angeles, Calif. (Circulation and Records Dept., AMA, 535 N. Dearborn St., Chicago 10, Ill.)

25–30. American Soc. of Mechanical Engineers, New York, N.Y. (ASME, 345 E. 47 St., New York 17)

25–30. Radiological Soc. of North America, annual, Chicago, Ill. (M. D. Frazer, 1744 S. 58 St., Lincoln, Neb.)

26–27. Combustion Inst., western states section, Sacramento, Calif. (G. Fenech, Combustion Inst., 16902 Bollinger Dr., Pacific Palisades, Calif.)

26–28. Atomic Industrial Forum, annual, Washington, D.C. (R. Barlow, AIF, 850 Third Ave., New York 22)

26–29. American Nuclear Soc., Washington, D.C. (O. Bizzell, Isotope Technology, Development Branch, Div. of Isotopes Development, U.S. Atomic Energy Commission, Washington 25)

27–28. Medical Conf., North Atlantic Treaty Organization, Paris, France. (NATO, Information Service, Port Dauphine, Paris 16\*)

27–29. AtomFair, American Nuclear Soc.—Atomic Industrial Forum, Washington, D.C. (R. Barlow, Atomic Industrial Forum, 850 Third Ave., New York 22)

27–30. Biological Future of Man, symp., London, England (by invitation only). (Ciba Foundation, 41 Portland Pl., London, W.1)

28–30. Human Factors Soc., annual, New York, N.Y. (G. E. Rowland. Rowland and Co., Box 61, Haddonfield, N.J.)

28–30. National Foundation Birth Defects Centers, conf., Miami, Fla. (Science Information Div., National Foundation, 800 Second Ave., New York 17)

28–30. Reinforced Plastics, intern. conf., London, England. (British Plastics Federation, 47–48 Piccadilly, London, W.1)

(See 14 September issue for comprehensive list)