Gerald F. Ross (S'51-A'53-M'57-SM'60) was born in New York, N. Y., on December 14, 1930. He received the B.E.E. degree from the College of the City of New York, N. Y., in 1952, and the M.E.E. and Ph.D. degrees in electrical engineering from the Polytechnic Institute of Brooklyn, Brooklyn, N. Y., in 1955 and 1963, respectively.

In 1952 he was employed as a research assistant at the University of Michigan Laboratories, Ann Arbor, where he developed microwave receivers. In 1953 he served as an Electronics Officer in the U. S. Air Force at the Holloman Air Development Center, Alamogordo, N. Mex. He joined the W. L. Maxson Corporation, New York, N. Y., in 1954 where he designed and developed electronic countermeasure equipment. In 1958 he joined the Sperry Gyroscope Company, Great Neck, N. Y., where he was engaged in the analysis and synthesis of phased array radar systems. In July, 1965, he transferred to the Sperry Rand Research Center, Sudbury, Mass., where, as a member of the research staff, he is currently involved in the study of wideband radar systems.

Dr. Ross is a member of Tau Beta Pi, Eta Kappa Nu, and Sigma Xi.

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Robert Seckelmann (M'62), for a photograph and biography please see page 51 of the January, 1966, issue of these TRANSACTIONS.

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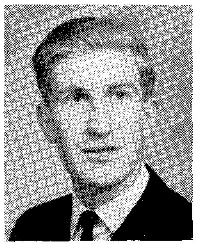

Ian Whiteley (S'65) was born in Huddersfield, Yorkshire, England, on May 23, 1943. He received the B.Sc. degree in electrical engineering from The University of Leeds, Yorkshire, England, in 1964. In the same year he began research for a doctoral dissertation on the subject of new types of microwave filters.

Mr. Whiteley is a graduate member of the Institution of Electrical Engineers.

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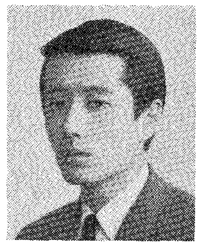

Sadahiko Yamamoto (S'63) was born in Osaka, Japan, on February 18, 1940. He received the B.S. degree in 1962, and the M.S. degree in 1964, both in electrical communication engineering, from Osaka University, Osaka, Japan. At present he is working for the Ph.D. degree at the graduate school of Osaka University, conducting research on the transmission theory of the multi-conductor line.

Mr. Yamamoto is a member of the Institute of Electrical Communication Engineers of Japan.

Microwave Abstracts

Based on technical merit and timeliness, microwave papers in journals published outside the United States have been selected and compiled below, many with annotations. Reprints of the papers may be obtainable by writing directly to the author or to the source quoted. The papers are in English unless noted otherwise.

—K. Tomiyasu, *Associate Editor for Abstracts*
General Electric Co., Schenectady, N. Y.

PAPERS FROM JOURNALS PUBLISHED IN THE UNITED KINGDOM

Compiled by Dr. E. A. Ash, University College, London, England

64
Design of a 4 Gc/s Nitrogen-Cooled Non-Degenerate Parametric Amplifier, by D. Chakraborty, G. F. D. Millward, and D. Geden (Post Office Research Station, Dollis Hill, London, N. W. 2, England); *Radio and Electronic Engineer*, vol. 31, pp. 27–32, January 1966.

The amplifier is pumped at 23 GHz, and the idler cavity is formed in an enlarged section of the pump waveguide. The signal circuit is formed in coaxial line, fitted with a low-pass filter. The identical units used in cascade give an overall gain of 30 dB, with a 3-dB bandwidth of 60 MHz. The noise temperature of the complete amplifier was 45°K, of which approximately 30°K is attributable to the inherent noise performance of the first stage. The amplifier is designed for satellite communication application.

65
Varactor Diode Measurements, by F. J. Hyde, S. Deval, and C. Toker (University College of North Wales, Bangor, Wales); *Radio and Electronic Engineer*, vol. 31, pp. 67–75, February 1966.

A critical discussion is presented of the relative merits of diode assessment, using impedance measurements at various frequencies, and resonant transmission measurements. Results obtained on particular diodes are compared. The satisfactory measure of correlation observed gives confidence in the use of the simple equivalent circuit.

66
The Performance of Backward Diodes as Mixers and Detectors at Microwave Frequencies, by T. Oxley and F. Hilsden (Associated Semiconductor Manufacturers Ltd., Wembley Laboratories, Wembley, Middlesex, England); *Radio and Electronic Engineer*, vol. 31, pp. 181–191, March 1966.

The design and construction of a type of germanium gold bonded diode is discussed and the performance described in some detail. At *X*-band, zero bias tangential sensitivities of −62 dBm (1 MHz video bandwidth) have been achieved. The low level of flicker noise suggests the attainment of a 16 dB noise figure at an IF of 3 kHz.

67

An Investigation into the Effects of Charge Storage on the Efficiency of a Varactor Diode Doubler, by B. C. Heap (Ferranti Ltd., Wythenshawe, Manchester 22, England); *Radio and Electronic Engineer*, vol. 31, pp. 225–233, April 1966.

The effect of charge storage on the efficiency is investigated theoretically and experimentally on a 500–1000 MHz doubler. It is concluded that charge storage effects play a relatively minor role in determining the efficiency. The enhanced efficiency frequently observed when forward conduction takes place is attributed to impedance changes which lead to a reduction in circuit losses.

68

Gallium Arsenide Varactor Diodes, by C. A. P. Foxell and K. Wilson (Associated Semiconductor Manufacturers Ltd., Wembley Laboratories, Wembley, Middlesex, England); *Radio and Electronic Engineer*, vol. 31, pp. 245–255, April 1966.

The design, construction and performance of units for C, X, and Q bands are described. The Q band device had a cutoff frequency of 700 GHz; further improvements leading to cutoff frequencies in excess of 1000 GHz are foreseen.

69

Evaluation of High Quality Varactor Diodes, by D. A. E. Roberts and K. Wilson (Associated Semiconductor Manufacturers Ltd., Wembley Laboratories, Wembley, Middlesex, England); *Radio and Electronic Engineer*, vol. 31, pp. 277–285, May 1966.

Measurements of high cutoff frequency varactors have been carried out at various frequencies in the range 1 MHz to 40 GHz. The methods adopted include bridge measurements, slotted line measurements, and series and parallel transmission measurements. Attempts to compare the results obtained on the basis of the usual simple equivalent circuit led to discrepancies, which could however be explained in terms of a more complex equivalent circuit. The physical basis of this modified circuit is discussed.

70

Analysis of Varactor Multipliers with Idlers, by J. O. Scanlan and P. J. R. Laybourn (University of Leeds, Leeds, England); *Radio and Electronic Engineer*, vol. 31, pp. 359–367, June 1966.

Presents a detailed analysis based on a Fourier expansion of the voltage across the varactor, valid for both abrupt and graded junctions. Numerical results for efficiency and for optimum source and load impedances are presented for triplers and quadruplers.

71

Energy, Power and Group Velocity, by F. N. H. Robinson (Oxford University, Oxford, England); *International Journal of Electronics,* vol. 19, pp. 149–151, August 1965.

Presents a general and very concise proof of the equivalence of group and energy velocities in lossless systems.

72

Characteristic Impedance of Rectangular Transmission Lines, by W. S. Metcalf (University of Cambridge, Cambridge, England); *Proc. IEE,* vol. 112, pp. 2033–2039, November 1965.

Presents results derived from a relaxation computation for a wide range of configurations.

73

Variational Method for the Analysis of Waveguide Coupling, by A. J. Sangster (Ferranti Ltd., Edinburgh 5, Scotland); *Proc. IEE,* vol. 112, pp. 2171–2179, December 1965.

The coupling between two identical rectangular waveguides with an aperture in their common broad wall is calculated in terms of invariant expressions, for both the forward and the backward flowing power. Using simple trial functions, the results for the specific case of a transverse rectangular slot are shown to be in better agreement with experiment than those deduced from classical "small aperture" theory.

74

Electromagnetic Momentum Associated with Waveguide Modes, by John Brown (University College, London, England); *Proc. IEE,* vol. 113, pp. 27–34, January 1966).

A general relationship between momentum transfer and mechanical forces in waveguides is derived. The concept of momentum transfer is shown to be of value in deriving some general results relating to discontinuities. One of the examples given to illustrate the approach is the calculation of the series elements in the equivalent circuit of a thick inductive post.

75

Parametric Action in Transistors: Theory, by F. J. Hyde (University College of North Wales, Bangor, Wales); *Proc. IEE.* vol. 113, pp. 209–213, February 1966.

Presents an analysis for mixing both in the emitter base junction and in the collector base junction. It is shown that under most conditions the former effect is very weak.

76

Parametric Action in Transistors: Experiment, by I. Gök and F. J. Hyde (University College of North Wales, Bangor, Wales); *Proc. IEE,* vol. 113, pp. 214–218, February 1966.

A germanium microalloy-diffused drift transistor was used in the common base configuration as a 10 MHz amplifier, and an L-band pump frequency was applied. The experimental results were found to be in good agreement with the predictions of the theory presented in the companion paper.

77

Numerical Solution of Uniform Hollow Waveguides with Boundary Conditions of Arbitrary Shape, by J. B. Davies and C. A. Muilwyk (University of Sheffield, Sheffield, England); *Proc. IEE,* vol. 113, pp. 277–284, February 1966.

A general program based on finite difference methods, has been devised to compute cutoff frequencies, field distribution and impedances for uniform waveguides of arbitrary cross-sectional shape. The method is found to give results with 0.1 percent accuracy, with very moderate computing costs.

78

Surface Wave in a Plasma Column: Dipolar Wave, by P. Leprince and J. Pommier (University of Paris, Orsay, France); *Proc. IEE,* vol. 113, pp. 588–592, April 1966.

A theoretical treatment, which neglects temperature effects, leads to dispersion characteristics for modes having an $\exp(-jm\phi)$ variation. For $m=1$ it is found that there are regions in which the propagation is in the form of a backward wave. Experimental results are in good agreement with the predictions.

79

Propagation in Isotropic Plasma Wavequides, by P. J. B. Clarricoats, A. D. Olver, and J. S. L. Wong (University of Leeds, Leeds, England); *Proc. IEE,* vol. 113, pp. 755–766, May 1966.

Propagation characteristics for a solid or annular plasma column in a waveguide are presented. The analysis takes the effect of glass containing walls fully into account. A number of possible applications in both passive and active devices are discussed.