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SCIENTIFIC INFORMATION REPORT
Electronics and Engineering

(22)

Summary No. 3940

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W A R N I N G

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SCIENTIFIC INFORMATION REPORTElectronics and Engineering (22)

This is a serialized report consisting of unevaluated information prepared as abstracts, summaries, and translations from recent publications of the Sino-Soviet Bloc countries. It is issued in six series. Of these, four, Biology and Medicine, Electronics and Engineering, Chemistry and Metallurgy, and Physics and Mathematics, are issued monthly. The fifth series, Chinese Science, is issued twice monthly, and the sixth series, Organization and Administration of Soviet Science, is issued every 6 weeks. Individual items are unclassified unless otherwise indicated.

Table of Contents

| | <u>Page</u> |
|--|-------------|
| I. Electronics | 1 |
| Annotated Index Selections | 1 |
| Audio Frequency and Ultrasonics | 9 |
| Circuit Theory | 13 |
| Communications | 22 |
| Components | 25 |
| Discharge Phenomena | 27 |
| Information Theory | 28 |
| Instruments and Equipment | 29 |
| Materials | 33 |
| Radar | 38 |
| Wave Propagation and Antennas | 39 |
| Miscellaneous | 41 |
| II. Engineering | 42 |
| Computers, Automatic Control Engineering | 42 |
| Materials | 51 |
| Power Engineering | 52 |
| Miscellaneous | 54 |
| III. Conferences | 63 |

I. ELECTRONICS

Annotated Index Selections1. Abstracts on Radio Engineering and Radio Electronics

Annotirovanny Ukazatel' Literatury po Radioelektronike
(Annotated Index of Literature on Radio Electronics),
No 15 and 16, 1962

Following are translations of selected abstracts from the above source. Numbers in brackets indicate the issue from which each abstract was selected.

1. "Metody teorii tselykh funktsiy v radiofizike, teorii svyazi i optike (Methods of the Theory of Integral Functions in Radiophysics, Communications Theory, and Optics), by Ya. I. Khurgin and V. P. Yankovlev; Moscow, Fizmatgiz Publishing House, 1962, 220 pp, illustrated. [15]

"Many problems of the theory of linear systems using methods of the theory of integral functions are examined. The apparatus of the theory of interpolation of integral functions is used to obtain a proof of the Kotel'nikov theorem and several of its generalizations. Methods of the theory of integral functions are applied to the solution and interpretation of a number of problems in optics and antenna theory. Three problems of the theory of antenna synthesis are examined: (1) the possibility of synthesizing an antenna with an arbitrarily assigned directivity pattern; (2) determination of field distribution while maintaining a directivity pattern with a given reactive power and maximum possible radiation power; and (3) determination of field distribution while maintaining a directivity pattern with a given width of the central beam and minimum side lobe level.

2. "Matematicheskaya obrabotka nablyudeniy (Mathematical Processing of Observations), by B. M. Shchigolev; Moscow, Fizmatgiz Publishing House, 1962, 344 pp. [15]

"This book is based on the program of the university course 'Mathematical Processing of Observations.' It includes not only problems related to the processing of observations in the narrow sense, but also problems of approximate calculation which are not always found in problems of observation processing, such as: point interpolation from tables of functions if the values of the function were computed from its formula (for example, with the aid of a series). The book includes the following sections: (1) operations with approximate numbers (estimation of errors of approximate numbers, errors in the results of basic

arithmetic operations, estimation of the error of functions of approximate arguments); (2) point interpolation; (3) information from probability theory; (4) fundamentals of the theory of random errors of measurements (the method of least squares); and (5) processing of statistical material (processing of single-valued statistical populations, elementary theory of the correlation of two values).

3. "Radio i televideniye (Radio and Television), No 3, 1962. [15]

"New High-Power Radio Transmitter 'Srednyaya Chekhiya,'" pp 36-40, illustrated.

"A television transmitter installed in 1961 near Prague is described. The picture signal is transmitted at a frequency of 49.25Mc, and sound, at a frequency of 56.75 Mc. Power of the final stage of the video transmitter is 30 kw; audio, 10 kw. The antenna is located on the top of a 150-meter tower made of welded steel plate reinforced with welded ribs. A general view of the transmitter, antenna, control desk, and individual units is given.

"Some Problems of the Standardization and Design of Wire Broadcasting Networks," by I. A. Shamshin, pp 25-32, illustrated.

"The author examines some of the problems of standardization and design of spot broadcasting networks. A table of norms based on qualitative indexes for first, second-, and third-class channels is given. Also examined are maximum permissible power of transformers located at the input of individual cable lines, maximum permissible loads for different lines, etc. It is noted that, as a result of experience and special research work, the manual Elektricheskiye normy proyektirovaniya radiotranslyatsionnykh setey [Electrical Norms for the Design of Rebroadcasting Networks] has been revised and supplemented.

"OIRT Testing Table, 1961," pp 41-42, illustrated.

"The television testing table developed in Czechoslovakia and intended for use in an international exchange of television programs is described. In this table, the optical density of all white parts should be 0.2; of all black parts, 2; and grey (in the outer part of the table), 0.8. The optical density of fields of the brightness graduation scale increases gradually from 0.35 to 1.7, while the densities of adjacent fields differ by 0.15.

4. "Tekhnicheskiy informator (Technical Informer), No 1, 1962.
[15]

"Airborne Radio LUN 3521," p 806, illustrated.

"The article gives the technical characteristics, an external view, and a brief description of the LUN 3521 aircraft radio set manufactured in Czechoslovakia and intended for communications between ground and small transport and sport planes. The radio set is a simplex ultrashort-wave telegraph station with AM reception in a 108-132 Mc band and transmission in a 118-132 Mc band. The set may operate in a temperature range of -45 to +50°C and relative humidity of 95 to 98% and at an atmospheric pressure corresponding to an altitude of 1,200 meters. The transmitter supplies the antenna with a high frequency power of not less than 2 watts at a percentage modulation of 95-98%. Sensitivity of the receiver is 10 microvolts with a signal-to-noise ratio of 10 db, depth of modulation of 30%, and a 1,000-cycle signal. Designation of the ground station is LUN 3521.1.

"New Type of Instrument for Taking Frequency Characteristics TESLA 12 XZ 045," p 809, illustrated.

"The article gives the technical data on a low-frequency indicator with the designation TESLA 12 XZ 045, which is used for measurements of the low-frequency channel of radio broadcast and television receivers, amplifiers for sound recording and reproduction, electronic converters, etc. The frequency range of the instrument is 20 c to 20 kc; accuracy of frequency adjustment is 12% \pm 5 c; frequency drift with network voltage fluctuations of 10% is not more than 10 c; nonlinear distortion at a frequency of 100 c is \leq 1.5%. The frequency characteristics are observed visually by means of a cathode-ray tube with long afterglow. Time required to cover the entire frequency band is approximately 7 sec. The output of the instrument is symmetrical.

"Constant Frequency Signal Generator TESLA 12XG019," p 810, illustrated.

"The 12XG019 generator, which is a source of 10 constant frequencies in the low frequency band, is described. It is designed for joint use with the TESLA 12XX018 nonlinear distortion measuring instrument, but may be used for a great many other measurements. Basic features of the generator are its very small nonlinear distortions, high frequency stability and accuracy, independence upon network voltage fluctuations, and wide controllable range of output levels. The generator is supplied with a voltage output divider and measuring instruments graduated in nepers or decibels. Technical data of the instrument: constant frequencies of 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, 12.16, and 20 kc; frequency adjustment accuracy is greater than \pm 5%; frequency stability after 20 minutes of operation is 2×10^{-4} per hour; frequency drift with network voltage fluctuations of \pm 10% is less than $\pm 2 \times 10^{-4}$; coefficient of nonlinear distortion is 0.1%.

"Transmission Measuring Instrument TESLA MI 54" p 811, illustrated.

"The transmission measuring set TESLA MI54 is designed for measuring attenuation of telephone lines, the amplification factor of telephone amplifiers, and crosstalk between two lines. Input impedance of the receiver is 600 ohms; a high-ohm input may be used for measuring levels. The transmission measuring set consists of two basic parts: a transmitter and a receiver. The master oscillator part of the transmitter contains a single tube self-oscillator operating at frequencies of 300, 800, and 2,400 c. The receiver part contains a single-tube stage with input and output transformers and a sensitive measuring instrument. Input voltage with an impedance of 600 ohms: 2 ± 0.5 nep when measuring gain and 0.5 nep when measuring attenuation. Internal impedance of the transmitter is 600 ± 30 ohms at a frequency of 800 c and 600 ± 60 ohms at frequencies of 2,400 and 30 c. Nonlinear distortion of the transmitter at frequencies of 300 and 800 c is $< 5\%$, and at a frequency of 2,400 c, $< 10\%$. The instrument weighs 12 kg.

"TESLA BM 296 Instrument for Measuring Interelectrode Capacitance." p 812, illustrated.

"An instrument designed for measuring interelectrode capacitance of electron tubes is described. A compensation circuit is used for the measurements. The external construction of the instrument is such as to avoid the effect of electrical capacitance of the hands on the measured object. Technical data of the instrument: measurement limits of transfer capacitance are $2 \cdot 10^{-4} \div 20$ pf, of parallel capacitance $0 \div 30$ pf, and additional capacitance $0 \div 36$ pf; accuracy of measurements of transfer capacitance is $\pm 5\%$, $\pm 10^{-4}$ pf, of parallel capacitance ± 0.1 pf; measurement frequency is approximately 500 kc. A wiring diagram for measuring small capacitances by the compensation method is given. The instrument is manufactured by the TESLA firm (Czechoslovakia).

"TESLA BM 271 Instrument for Measuring Loss Factor," p 813, illustrated.

"The article gives brief technical data for an instrument manufactured in Czechoslovakia and designed for measuring the loss factor of samples of insulating materials in a frequency range of 100 c to 30 Mc. The instrument may also be used to measure impedances of various parts of high-frequency circuits, for example, inductance coils, capacitors, and wire and nonwire resistors, as well as the Q-factor and self-capacitance of inductance coils, natural resonance frequencies, and input impedance of electron tubes in the cold and heated states. The advantage of the instrument is in the possibility of measuring circuits containing a high-ohm parallel ohmic component. The instrument operates according to the resonance substitution method. Accuracy of frequency

adjustment is $\pm 1\%$. Measurement limits: $6 \div 1,000$ pf (Capacitance), 0.3 mh $\div 1$ h (inductance), one kilohm $\div 100$ Megohms (resistance). Additive error in measuring loss factor is $\pm 1 \cdot 10^{-4}$. A wiring diagram of the instrument is given.

"TESLA BM 384 Millivoltmeter," p 814, illustrated.

"A block diagram, an external view, and technical data are given for the Czechoslovak-manufactured millivoltmeter TESLA BM 384, designed for use in laboratories and industry. The operating range of the instrument is from 0.1 mv to 200 v at a frequency of 20 c to 3 Mc. The instrument may be used to measure frequency characteristics of low-frequency and wideband amplifiers, adapter characteristics, and the characteristics of microphones, photoelements, transformers, band filters, etc.; the scale of the instrument is also graduated in decibels. The basic part of the instrument is a four-stage wideband amplifier with a cathode repeater in the input. Basic measuring error is not more than $\frac{1}{10}\%$ of full deflection of the needle of the instrument, $\frac{2}{10}\%$ of the measured value. The voltmeter may be used as a wideband amplifier with an amplification factor of 500.

"TESLA HDZ60 Dispatching Equipment," p 815, illustrated.

"A description is given of the Czechoslovak-manufactured TESLA HDZ60 dispatching equipment designed for large plants and providing operative and direct connection of the main dispatcher with all working areas. The HDZ60 equipment may be connected to several of the smaller DZ20U dispatching devices, each having 20 stations. The communication systems of the dispatcher and operator are mutually independent. The number of stations is determined by the equipment in the rack and may be from 30 to 60. Four state lines make it possible for the dispatcher to communicate with automatic or common battery stations, as well as with the local telephone network. It is also possible to record important conversations for playback or control. The dispatcher desk is equipped with a special cutoff lock for protection against outside interference.

5. "Avtomaticheskoye regulirovaniye i upravleniye (Automatic Regulation and Control), Collection of Articles; Moscow, Publishing House of the Academy of Sciences USSR, 1962, 526 pp, illustrated. [16]

"This collection includes reports presented at the Seventh Conference of Young Scientists of the Institute of Automatics and Telemechanics of the Academy of Sciences USSR, held in March 1960. The collection encompasses a broad category of scientific and technical questions of automatic regulation and control. The material is divided into seven sections: automatic regulation, automatic control, automatic computer equipment, statistical methods in automation, the theory of relay circuits and finite automatons, and automated electric drive.

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6. "Nelineynnye kolebaniya v sistemakh avtomaticheskogo regulirovaniya i upravleniya (Nonlinear Oscillations in Automatic Regulation and Control Systems), by K. K. Belya; Moscow, Mashgiz Publishing House, 1962, 261 pp, illustrated. [16]

"The author discusses some precise methods of determining periodic movements of higher orders with linear-piecewise characteristics in nonlinear systems of automatic regulation and control. Methods of investigating the stability of periodic movements and methods of avoiding or compensating for self-oscillations and other negative phenomena which are produced by nonlinear characteristics are examined. The author also gives some numerical methods of producing transient processes in linear and linear-piecewise systems of automatic regulation which permit a wide application of computer technology in the investigation of nonlinear dynamic systems. The book is written for scientific workers and engineers of design bureaus and industrial enterprises who are concerned with problems of the automatic regulation and control of dynamic and production objects. The book may also be of use to aspirants and students specializing in nonlinear automatic systems.

7. "Raschet i proyektirovaniye diskretnykh sistem upravleniya (Calculation and Design of Discrete Systems of Control), by L. T. Kuzin; Moscow, Mashgiz Publishing House, 1962, 681 pp, illustrated. [16]

"This book gives a systematic account of methods of calculating and designing discrete control systems by means of the mathematical apparatus of z-transformation, including systems with variable parameters, nonlinear systems, systems with several intervals of discreteness, and systems in which the discrete signal operates with intervals during the course of particular time intervals (systems with a finite relay closure time). Particular attention is devoted to problems of the design and synthesis of discrete systems for random operations. The book may be recommended to engineers, students, aspirants, and scientific workers specializing in the field of discrete control systems.

8. "Elektronnyye tsifrovyye integriruyushchiye mashiny. Tsifrovyye differentsial'nyye analizatory (Electronic Digital Integrators. Digital Differential Analyzers), by F. V. Mayorov; Moscow, Mashgiz Publishing House, 1962, 406 pp, illustrated. [16]

"The theory of digital integrators, their functional circuits, and methods of solving various problems are presented in this book. The author examines circuit elements and individual units of machines using semiconductors and ferrites. Multichannel equipment for converting analog values to discrete values and equipment for introducing various functions into the machine are described. The author examines the areas of application of digital integrators for scientific-technical calculations, automatic control of processes, and electronic modeling. The book is intended for scientific and engineering-technical workers and for students of higher educational institutions specializing in the field of digital computers.

9. "Sovremennoye sostoyaniye i tendentsii razvitiya priborov SVCh (Present Status and Trends in the Development of Superhigh Frequency Instruments), by S. V. Kukarin; Moscow, Sovetskoye Radio Publishing House, 1962, 230 pp, illustrated. [16]

"This book presents the features of the status of the foreign radio electronics industry in the area of the design and manufacture of magnetrons, klystrons, traveling- and backward-wave tubes, instruments with retarding fields, resonant dischargers, crystal detectors, quantum mechanical instruments, and parametric amplifiers. The construction and principles of operation of several new types of instruments which have appeared abroad in recent years are described. Although the information contained in the book is not exhaustive, it, nevertheless, gives an idea of the present state and basic trends in the development of superhigh frequency radio electronics. The book is written for engineers and technicians interested in superhigh frequency electronic instruments.

10. "Metody statisticheskogo posledovatel'nogo analiza i ikh radiotekhnicheskiye prilozheniya (Methods of Statistical Sequential Analysis and Their Radio Engineering Applications), by A. Ye. Basharinov and B. S. Fleyshman; Moscow, Sovetskoye Radio Publishing House, 1962, 350 pp, illustrated. [16]

"The author examines the question of the theory of statistical sequential analysis and formulas for calculating the indexes of selection procedures in simple (two alternative) and complex situations. The expediency of using sequential analysis for the solution of a series of statistical problems of radio engineering is justified by the high efficiency of sequential procedures in comparison with other known statistical procedures. The author gives examples of the application of methods of sequential analysis to problems of signal selection in a noise background, to problems of industrial control, to search theory, reliability control, etc. The book is written for scientific workers and engineers working in the fields of radio engineering, automatic control, production control, and other allied areas.

11. "Posledovatel'nyye preobrazovateli nepreryvnykh velichin v chislovyye ekvivalenty (Series Converters of Analog Values to Numerical Equivalents), by A. K. Zavolokin; Moscow/Leningrad, Gosenergoizdat Publishing House, 1962, 70 pp, illustrated. [16]

"This brochure examines methods of the design and classification of devices for converting mechanical and electrical values to the corresponding numerical equivalents. An analysis is made of specific features peculiar to various types of converters, and block diagrams and basic characteristics of converter equipment are given. The book is intended for engineering and technical workers concerned with the application of digital techniques for the automation and control of industrial processes.

12. "Poluprovodnikovyye i magnitnyye beskontaktnyye pribory v ustroystvakh STsB (Semiconductor and Magnetic Contactless Instruments in Signal, Centralization, and Blocking Equipment), by A. M. Bryleyev and others; Moscow, All-Union Printing and Publishing Union of the Ministry of Railroads, 1962, 230 pp, illustrated. [16]

"The authors present brief characteristics of contactless elements used in automatic and remote control railroad equipment; principles of circuit design are examined and descriptions are given of signaling, centralization, and blocking equipment using contactless elements which have been introduced in railroad transportation. The book is written for engineers and technical workers concerned with the design, manufacture, and operation of contactless equipment for signaling, centralization, and blocking.

13. "Elektroizmeritel'nyye pribory (Electrical Measuring Instruments), by Sh. M. Aluker; Moscow, Proftekhizdat Publishing House, 1962, 286 pp, illustrated. [16]

"Fundamental problems of the design, exploitation, and repair of electrical measuring instruments are examined in this book. The book is intended to be used as a textbook for the training of electromechanical and instrument-building engineers in professional-technical schools. It may also be useful to readers who are directly concerned with the operation and repair of electrical measuring equipment.

14. "Reaktivnaya lampa (The Reactance Tube), by I. V. Lobanov; Moscow, Voenizdat Publishing House, 1962, 102 pp, illustrated. [16]

"This brochure examines in a popular style the construction, principles of operation, and areas of application of reactance tubes and so-called controlled reactance elements which perform identical functions in communications engineering. Particular attention is devoted to the characteristics of their operation as frequency modulators.

15. "Potentsiometry (Potentiometers), by A. T. Belevtsev; Moscow, Oborongiz Publishing House, 1962, 354 pp. [16]

"This book examines the theoretical principles, methods of design, and construction of potentiometers and describes their manufacturing technology; examples are also given of the use of potentiometers for performing mathematical operations in automatic control

and remote transmission circuits. The section of the book devoted to manufacturing technology presents, in addition to known technological processes, information on the technology of manufacturing multiturn and metal film potentiometers. The book is written for a broad category of engineers, technicians, and radio amateurs.

16. "Prikladnaya elektrokimiya (Applied Electrochemistry), by N. P. Fedot'yev and others; Leningrad, Khimizdat Publishing House, 1962, 638 pp, illustrated. [16]

"The authors describe processes of hydroelectrometallurgy, electroplating, electrolysis of molten compounds, electrolysis without separation of metals, and chemical current sources. The chapter on 'Electroplating' examines corrosion of metals and methods of controlling it, the structure of electroplated coatings, zinc-, copper-, nickel-, chrome-, tin-, silver-, gold-plating, oxidation, quality control of electroplated coatings, etc. The chapter on 'Chemical Sources of Electrical Energy' contains material on plumbic acid batteries, their manufacture, alkali nickel-iron, and nickel-cadmium batteries and their production, nonsegmented and hermetic batteries, and primary galvanic elements."

Audio Frequency and Ultrasonics

2. Simulation of Sea Surface by Sinusoidal Surface Limited

"On the Fluctuation of Amplitude and Phase of a Sound Wave Reflected From a Sinusoidal Surface," by E. P. Gulin, Acoustics Institute, Academy of Sciences USSR, Moscow; Moscow, Akusticheskiy Zhurnal, Vol 8, No 3, Jul-Sep 62, pp 285-291

A calculation of fluctuations of a sound wave reflected from a sinusoidal surface showed that such a surface does not sufficiently simulate the surface of the sea for purposes of computing acoustic parameters of a water surface, but a qualitative correspondence of the two surfaces does indicate an influence of the quasi-harmonic properties of the sea swells on the nature of the scattering of a sonic field at the surface of the sea.

3. Coherent and Incoherent Scattering of Sound at Layers in Water

"Coherent Scattering of Sound From an Accumulation of Discrete Inhomogeneities in the Case of Pulsed Irradiation," by V. P. Glotov, Acoustics Institute, Academy of Sciences USSR, Moscow; Moscow Akusticheskiy Zhurnal, Vol 8, No 3, Jul-Sep 62, pp 281-284

A calculation was made of the coherent scattering of a sound in a body of water from an accumulation of discrete inhomogeneities (layers) for the case of irradiation of square pulses. A relationship is established between the intensity of the coherent component and the intensity of noncoherent component of the scatter field recorded at the transmit-receive point.

4. Amplification Factor of Obliquely Incident Sound Wave Upon Parabolic Mirror

"On the Calculation of the Amplification Factor During the Oblique Incidence of a Sound Wave on a Parabolic Mirror," by T. S. Belle, V. M. Gorbunkov, and L. D. Rozenberg, Acoustics Institute, Academy of Sciences USSR, Moscow, Akusticheskiy Zhurnal, Vol 8, No 3, Jul-Sep 62, pp 273-280

Using a generalization of the Debey formula, the authors computed the geometric aberration and the amplification factor of points near the major optical axis of a parabolic concave mirror. A heterocentric convergent beam is considered as being homocentric, but with phase aberration equivalent to a disruption of homocentricity. The expressions obtained were integrated by two methods: on the BESM-2 digital computer, with the assistance of V. Kuz'min, and with the MFTI analog computer, with the assistance of V. M. Belikov.

5. Gap of Information on Ultrasonic Cavitation

"Ultrasonic Cavitation. A Survey," by M. G. Sirotyuk, Acoustics Institute, Academy of Sciences USSR, Moscow; Moscow; Moscow, Akusticheskiy Zhurnal, Vol 8, No 3, Jul-Sep 62, pp 255-272

On the basis of the survey of Soviet and Western works (76-item bibliography), it is concluded that real values have not yet been determined for the threshold of cavitation, the final stage of collapse of cavitation bubbles in the shock wave, the temperature of the gas at the moment of collapse of the bubbles, and the reason for the luminescence of the cavitation bubbles.

6. Effect of Ultrasound on Dynamic Hysteresis Loops

"The Influence of Ultrasound on Dynamic Hysteresis Loops," by A. I. Drokin and D. A. Laptay; Moscow, Primeniye Ul'traakustiki k Issledovaniyu Veshchestva (The Application of Ultra-acoustics to the Study of Matter - a collection of articles), No 12, 1960, pp 87-95 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-5-34m)

A study was made of the influence of ultrasound on partial hysteresis loops in dynamic operations, using solid specimens (L-shaped sheet 0.5-mm thick) and E-shaped cores made from 0.36-millimeter sheets of transformer iron. A GU-3 generator excited a magnetostrictive oscillator at 22 kilocycles, with a maximum intensity of 4 watts per square centimeter.

It was found that the narrowing of the partial hysteresis loop during the exposure of the specimens to ultrasound increases with increased intensity of the ultrasound. On the other hand, in the case of highly magnetized fields, the narrowing effect of the loop as a result of reduced field during exposure to sound is not apparent.

7. Improvement of Texture of Steel and Alloys by Exposure to Ultrasound

"The Effect of Ultrasound on the Crystallization of an Ingot," by V. I. Leont'yev; Sbornik Trudov. Institut Metallovedeniya i Fiziki Metallov Tsentral'nogo Nauchno-Issledovatel'skogo Instituta Chernoy Metallurgii (Collection of Works. The Institute of Metals Science and the Physics of Metals, Central Scientific-Research Institute of Ferrous Metallurgy), No 6, 1959, pp 100-116 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-5-40b)

The effect of ultrasound of the crystallization of metal castings was studied with the aim of producing fine-grained structure in refractory metals. The high melting points necessitated the use of a special vibrator with extension rods (conical concentrator with cylinder introduced into the mold) and mold to introduce the ultrasonic vibrations into the melt. At a frequency of 18 kilocycles and an acoustic power of one kilowatt the test metals and alloys were exposed at pouring temperatures up to 1,800 degrees centigrade. An alloy with one percent zinc and the steels Kh25N20 and Kh27 were used as test materials.

It was shown that the effect of the ultrasound in the metallic melt causes an intensive volume crystallization at a great number of crystallization centers produced by the ultrasound; a certain power has to be reached before the ultrasound is effective, and the texture of the ingot depends largely on the length of exposure. The best results were obtained with wide molds and low heat elimination.

8. Ultrasonic Study of Structure in Steel

"Certain Peculiarities of the Propagation of Ultrasound in Steels During a Change of Temperature Within a Wide Interval," by G. A. Lushnikov and Yu. I. Murav'yev, Trudy Instituta Metallurgii Akademii Nauk SSSR, No 8, 1961, pp 173-177 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-5-48v)

Measurements were made of the rate of propagation and decay of ultrasound in metallic specimens (various steels) in a temperature range of 20-1,300 deg C for the purpose of determining the possibility of a connection between these parameters and the structure of the specimens. The measurements were made with the pulsed ultrasonic UZD-12-T defectoscope with certain modifications. The tests showed that the ultrasonic method can be used to study structural transformations in metal.

Circuit Theory9. Phase Error Correction in Resonance Amplifiers

"Correction of Phase Errors in High-Frequency Resonance Amplifiers With AGC," by V. P. Kovrigin; Moscow, Radiotekhnika, Vol 17, No 8, Aug 62, pp 26-31

The author examines various methods of decreasing phase-amplitude errors in high-frequency resonance amplifiers with automatic gain control. It is concluded that such correction is best achieved by the use of current feedback and the proper selection of capacitance of the circuit. The use of band-elimination circuits has no noticeable advantages and worsens the selectivity. The author suggests that, if possible, the use of ferrites in the amplifier circuits should be avoided and iron carbonyl dielectrics, which provided a minimum phase error $\Delta\varphi \geq 0.1^\circ$ in the experiments, should be used.

10. Amplitude-Phase Detectors

"Power Amplifying Amplitude-Phase Detectors," by M. A. Rakov; Moscow, Elektrosvyaz', No 8, Aug 62, pp 20-23

This investigation has shown the possibility of building an amplitude-phase detector incorporating switching transistors which ensures proportionality of conversion with simultaneous power amplification of the measured signal. Such a two-unit detector operates with two variable relationships. In the first place, the phase relationship at the output of the first mixing unit depends on the amplitude of the measured signal. In the second place, the magnitude of the dc load component of the second unit depends on this phase relationship. The second unit may be in the form of a conventional phase detector. The existence of such a double relationship permits substantial power amplification while maintaining proportionality between the magnitude of the measured voltage and the dc output voltage.

Fundamental and second harmonic amplitude-phase detectors are examined in some detail. The importance of such an amplitude-phase detector lies in the fact that the power amplification factor is but slightly affected by the ratio of the measured and auxiliary voltages.

11. Reflection of Electromagnetic Waves From a Wire Grid-Conducting Surface Combination

"Reflection of Electromagnetic Waves From a System, Wire Grid/Conducting Surface," by D. Kvavadze, M. Tevdorashvili, and K. Nizhnianidze; Tbilisi, Trudy Tbilisskogo Universiteta, Vol 86, 1960, pp 117-123 (from Referativnyy Zhurnal--Avtomatida-i Radioelektronika, No 6, Jun 62, 6-7-41d)

An experiment was conducted for the purpose of determining the coefficient of reflection R of electromagnetic waves from a system made up of a wire grid and conducting surface for an inclined incidence of the wave and for various grid parameters (wave length = 3.27 cm). The grid had a period d and a wire diameter a. The experiment covered two cases: where the vector E of the incident wave lies in the plane of the system, and where \vec{H} lies in the same plane.

The dependence of the coefficient of reflection on the angle of incidence, on the lattice constant, on the diameters of the wires, and on the deflection angle of the system around the horizontal axis is plotted graphically for the case of a 14-mm spacing between the wire grid and the conducting surface. The maximum relative error in the measurement of the coefficient of expansion was 15 percent.

12. Determining Thermistor Ratings for Manuals

"On the Rating of Semiconductor Thermistors," by S. P. Kolosov, Trudy Moskovskogo Aviatsionnogo Instituta, No 139, 1961, pp 137-141 (from Referativnyy Zhurnal--Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-4-40shch)

The minimum amount of information is determined which is necessary in order to compute any static or dynamic function of electrical circuits containing semiconductor thermistors. This information includes: the temperature characteristic; the volt-ampere characteristic at constant temperature; the temperature characteristic (for heated thermistors); a generalized temperature of the thermistor corresponding to the conditions of the volt-ampere curve; and the thermal time constant T, corresponding to the same conditions.

13. Switching With By-Pass Circuits

"The Designing of Switching Circuits in the Presence of By-Pass Circuits," by Chen Chün-liang, Problemy Peredachi Informatsii (Problems of Information Transmission - a collection of articles), No 9, 1961, Moscow, Academy of Sciences USSR, pp 116-129 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-169ye)

A description is given of a method of designing switching (1, k) terminals by using a "symbolic" double recording of Boolean functions devised earlier by the author (Problemy Peredachi Informatsii, No 6, 1960). In the design process, by-pass circuits are developed as a result of the utilization of direct outlets. It is shown that the circuits can be united without disrupting the operating conditions and that the circuitry can be simplified by means of by-pass circuits. The rules for manipulating the symbols are explained.

14. Estimating the Complexity of Switching Circuits

"On Estimating the Complexity of a Switching Circuit," by Chen Chün-liang, Problemy Peredachi Informatsii (Problems of Information Transmission - a collection of articles), No 8, 1961, Moscow, Academy of Sciences USSR, pp 45-66 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-168n)

A graphic method of estimating the complexity of a contact (switching) terminal (1, k) is described. Assuming that the emergence of all functions is equiprobable, that portion (probability) of functions is determined which has precisely a given number of branches or contacts on various cross sections of a circuit of n-variables; the number of contacts for the circuit as a whole is computed. Particular attention is paid to the functions which reflect the presence of direct outputs. It is shown that a nonequiprobable distribution manifests itself very little in the result. The conclusions arrived at can be used, for example, in the designing of machines for synthesizing switching circuits.

15. Stability of Third-Order Linear Systems

"On the Problem of the Stability of Linear Systems of the Third Order" (no author indicated), Uchenyye Zapisi Yaroslavskogo Tekhnologicheskogo Instituta (Scientific Reports of the Yaroslavl' Institute of Technology), No 7, - 1961, pp 37-43 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-111Shch)

The conditions of stability of a transient process are derived (which, mathematically, denotes a limitation of the general solution) for the equation $y''' + P(x)y'' + Q(x)y' + R(x)y = 0$, the coefficients of which are continuous and differentiable functions. For obtaining a qualitative limitation of the solutions of the derived equation, a new method is demonstrated which is based on the expansion of the left side (a third-order linear operator) into a symbolic product of the differential factors.

16. Stability of Oscillations of Linear Systems With Variable Parameters

"On the Stability of the Oscillations of Linear Systems With Variable Parameters," by F. A. Mikhaylov, Trudy Moskovskogo Aviatsionnogo Instituta, No 139, 1961, pp 39-70 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-111d)

A system of linear homogeneous differential equations with variable (time dependent) coefficients may be reduced to one linear homogeneous differential equation of the n^{th} order with variable coefficients, if the asymptotic behavior of only one variable is considered. All variables x_1, x_2, \dots, x_n are derivatives of actual values and are caused by the initial perturbations. The zero solution of the obtained equation represents free oscillations, the stability of which is also studied here under the assumption that the oscillations will be stable in relation to the value of x , if all the partial solutions of this equation, arising from an arbitrary finite n -dimensional region of the initial values and their derivatives, are limited. If the absolute values of all the indicated solutions are equal to zero, then the oscillations are asymptotically stable. From this aspect, the solution of the problem is reached with the aid of a cononical transformation of the initial equation into an equivalent system of linear first-order differential equations.

Two such transformations are considered here: one where the coefficients of the initial equation are continuous and are differentiated at least once; and the other where the coefficients can be differentiated a sufficient number of times. Both of these transformations are reduced to systems of first-order equations (different, of course, in both cases) of the new variables. The coefficients of these equations are connected with the coefficients of these equation are connected with the coefficients of the original equation and a method is given for determining them. For the obtained systems of differential equations, it is possible to construct a matrix of the coefficient A. This matrix can also be used to obtain a second matrix A^* by a transition to complexly conjugate values and by transposing the lines into columns. Then the sufficient conditions of stability of the oscillations include the fact that the integral $\int_0^t \mu dt$ is limited from above where $t \rightarrow \infty$. Here μ is the maximum characteristic number of the Hermitian matrix $B = (A + A^*)/2$.

This estimation of the limitation from above is derived for any partial solution. The necessary conditions of stability are connected with the estimates of the growth, bounded from below, of the absolute values of the partial solutions. The solution of this problem is complex and is of no essential interest. The problem is solved for the second case (obtaining the canonical transformation). The results obtained are not applicable to all equations of oscillations.

17. Evaporation and Ionization in Arc Discharge Considered Single Complex Phenomenon

"On the Interrelationship of the Processes of Evaporation and Ionization in an Arc Discharge," by M. N. Turko; Krasnoyarsk, Nekotoryye Voprosy Emissionnoy i Molekulyarnoy Spektroskopii (Some Problems of Emission and Molecular Spectroscopy—a collection of articles), 1960, pp 42-52 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, No 6, Jun 62, 6 Zh 373)

A study was made of certain regularities of the distribution of ions and neutral atoms in the interelectrode space of a low-ampere AC arc. Measurements indicated that the ionization of the atoms in the plasma of the arc discharge is determined by the temperature and composition of the plasma, which depend on the physicochemical properties of the electrodes and the nature of the processes of evaporation at the surfaces of the cathode and anode. For this reason, the degree of ionization of the atoms in the positive column depends on whether the evaporation is from the cathode or from the anode. Observed changes in the degree of ionization were explained by the difference in the evaporation of an anode of pure metal and one of an alloy containing iron. The ionization of the atoms in the plasma depends

on the conditions of the transition of the electrode materials from the solid to the gaseous phase. In the near-electrode regions, where a disruption of thermodynamic equilibrium was detected, the rising voltage of the electrical field begins to influence the degree of ionization of the atoms considerably. The processes at the electrodes of the arc and in the plasma string of the arc discharge - the processes of evaporation and ionization - can be considered a single complex of phenomena.

18. Preliminary Check on Thermodynamic Equilibrium Improves Accuracy in Spectral Analysis

"On the Problem of the Establishment of Thermodynamic Equilibrium in Discharges," by N. A. Prilezhayeva and V.V. Kokhanenko; Krasnoyarsk, Nekotoryye Voprosy Emissionnoy i Molekulyarnoy Spektroskopii (Some Problems of Emission and Molecular Spectroscopy-a collection of articles), 1960, pp 3-8 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, No 6, Jun 62, 6 Zh 342)

Inasmuch as recent literature frequently mentions the absence of thermodynamic equilibrium in arc and spark discharges produced at atmospheric pressure (such as in arcs in molecular and inert gases), the authors present, in their opinion, a much needed preanalysis of the conditions of the establishment of thermodynamic equilibrium and compare these conditions with available experimental data. Although the calculation of such conditions is not yet complete, since it requires a knowledge of several still unknown constants, an experimental study was made on the bases of an equality of the temperatures which characterize the energies for all degrees of freedom of the particles. For molecular gases in particular, $T_{el} = T_{col} = T_{rot}$ should apply. A measurement of these temperatures for an arc discharge in air and for a glow discharge in nitrogen indicated that, in both cases, (at a higher) pressure (200 mm Hg for the arc discharge and 90 mm Hg for the glow discharge) these temperatures become equal or nearly equal ($T_{el} = T_{rot}$ for the arc discharge and $T_{col} = T_{rot}$ for the glow discharge). This indicates a condition approximating thermodynamic equilibrium. The data obtained here show that the use in practice of a spectral analysis of discharges in molecular and inert gases requires an initial check on the establishment of thermodynamic equilibrium, since a disruption of the latter could, in individual cases, lead to an anomalous course of the intensity of the lines which make up the homologous pair and to a considerable error in the qualitative spectral analysis.

19. Power Consumption in the Forming of Ion Beams

"Power Consumption in the Forming of a Beam of Ions," by V. S. Belosel'skiy, Trudy Voronezhskogo Universiteta (Works of Voronezh University), Vol 55, 1961, pp 73-78 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, No 6, Jun 62, 6 Zh 314)

An estimate is made of the power required to produce ions in a source chamber, of the forming of the ion beam, and of radiation losses. It is shown that the basic consumptions of power are proportional to the acceleration voltage by a factor of $5/2$, whereas the forming current is proportional to this voltage by a factor of $3/2$. Thus the limit of the current of an ion source is proportional to the power consumption by a factor of $3/5$: $I = (W/K)^{3/5}$.

An equation is derived for the coefficient K, the so-called "design parameter," which expresses the relationship among the atomic weight of the ion, the cathode-to-anode distance, the ion charge, the cross section of the beam of electrons, the ionization potential, and the forming [extraction] potential. An analysis of this equation for the coefficient K indicates the possibility of reducing the power consumption, particularly by an optimum choice of the ratio of the forming [extraction] to ionization potential or by increasing the gradient of the forming voltage.

20. Electron Flow, Resonance Frequency and Q-Factor in the Reflex Klystron

"An Experimental Study of the Electron Conductivity of the Reflex Klystron," by N. P. Budinkova; Saratov, Nauchnyy Yezhegodnik. Saratovskiy Universitet, Fizicheskiy Fakultet i Nauchno-issledovatel'skiy Institut Mekhaniki i Fiziki, 1955 (1955 Scientific Yearbook. Saratov University, Physics Faculty and the Scientific-Research Institute of Mechanics and Physics), 1960, pp 7-14 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6Zh 96)

An experimental method and results obtained with it are given for a study of the electron conductivity of the reflex klystron. The method of experimentation is based on the measurement of the resonance frequency and the Q-factor of the resonator in relation to the electron flow mechanism. A graphical representation is given of the active and reactive components of the conductivity of the electron flow, measured under various conditions.

21. Scatter of Elliptically Polarized Waves by Aspherical Particles in Radar Operation

"Scattering of Elliptically Polarized Radio Waves by Aspherical Atmospheric Particles," by Yu. M. Gershenzon and A.B. Shupyatskiy, Trudy Tsentral'noy Aerologicheskoy Observatorii (Works of the Central Aerological Observatory), No 36, 1961, pp 102-108 (from Referativnyy Zhurnal - Avtomatika i Radioelektronika, No 6, Jun 62, 6 Zh 213)

The question of the scattering of elliptically polarized radio waves of radar signals by atmospheric particles of aspherical configuration is considered theoretically. The particles are approximated by ellipsoids of rotation, whereby it is assumed that their dimensions are considerably smaller than the wave length; the scattering is assumed to be incoherent. Computations are performed for the case of the reception and transmission of the elliptically polarized waves by a single antenna. The advantages of using elliptically polarized waves are indicated.

22. Electronic Tuning of Retarding-Field Oscillator

"On the Electronic Tuning of an Oscillator With Retarding Field," by V. N. Shevchik and Ye. M. Ashavskaya; Saratov, Nauchnyy Yezhegodnik. Saratovskiy Universitet, Fizicheskiy Fakultet i Nauchno-issledovatel'skiy Institut Mekhaniki i Fiziki, 1955 (Scientific Yearbook. Saratov University, Physics Faculty and the Scientific-Research Institute of Mechanics and Physics-1955), 1960, pp 108-109 (from Referativnyy Zhurnal--Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6Zh94)

The results are discussed of an experimental study of the electronic tuning range of an oscillator with retarding field for decimeter range operation. It was found that the electronic tuning range of such an oscillator is comparable to that of the standard reflex klystron.

The advantages of the oscillator are the simple design and the possibility of using industrial triodes.

23. Electron Beam Focus in Magnetic Field

"On the Question of Focusing an Electron Flow in a Magnetic Field," by L. E. Bakhrakh; Saratov, Nauchnyy Yezhegodnik. Saratovskiy Universitet. Fizicheskiy Fakultet and Nauchno-issledovatel'skiy Institut Mekhaniki i Fiziki, 1955, (Scientific Yearbook. Saratov University. Physics Faculty and Scientific-Research Institute of Mechanics and Physics, 1955), 1960, pp 140-141 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6Zh86)

A theoretical study was made of the influence of the thermal velocity of electrons on the focusing of an electron beam in a longitudinal magnetic field. The calculation was done for a Brillouin flow.

24. Carcinotron Theory

"On the Theory of the Carcinotron," by V. N. Shevchik and Yu. D. Zharkov; Saratov, Nauchnyy Yezhegodnik. Saratovskiy Universitet, Fizicheskiy Fakultet i Nauchno-issledovatel'skiy Institut Mekhaniki i Fiziki, 1955 (Scientific Yearbook. Saratov University, Physics Faculty and the Scientific-Research Institute of Mechanics and Physics-1955), 1960, pp 109-110 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6Zh93)

The results are discussed of a theoretical study of the interaction of an electron flow and the delay system of a backward-wave tube oscillator. The entire set of space harmonics is taken into account. The study is reduced to a consideration of a cascade grouping of electrons successively separated by given high-frequency intervals. A formula is derived for the active output of the interaction of the electron flow and the high-frequency intervals. It is noted that the calculation of the interaction with higher space harmonics is particularly essential when the high-frequency intervals are small.

Communications25. Method of Multichannel Communication Proposed

"A Method of Multichannel Communication," by L. A. Korobkov, USSR Patent, Class 21a⁴, 49; 22a², 36/22, No 128905, 1.06.60 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 7-7-195)

"It is noted that methods of multichannel pulse communication with signal bunching are complex, require a wide frequency band, and do not have sufficiently wide protective zones between adjacent channels. To eliminate these faults, it is proposed that, at the transmitting end, the signals of each channel be time bunched for a period of several cycles with simultaneous compression of each group. At the receiving end, the bunched signals are separated and converted to pulse signals of the multichannel system. The bunching method requires that the pulse signals be recorded in a static line storage element and copied in an orthogonal direction (by columns). The protective zones between groups are determined by arranging the pulses of one channel in a time interval equal to the ratio of the bunching period to the number of channels. The method of channel separation is distinguished by the fact that the group of signals of each channel is recorded in a static column storage element and copied by lines. A block diagram and detailed description of the proposed method are given."

26. Avoiding Intermodulation Noise in Assignment of Marine Radio Telephone Frequencies

"Intermodulation Noise and Methods of Assigning Frequencies of Marine Short-wave Installations," by Chia-Sun, Informatsionnyy Sbornik. Tsentral'nyy Nauchno-issledovatel'nyy Institut Morskogo Flota (Collected Information. The Central Scientific-Research Institute of the Maritime Fleet), No 60, 1961, pp 57-67 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 6, Jun 62, 6-7-184 g)

The importance of the problem of intermodulation noise in marine short-wave (radio telephone) systems which employ a series of uniformly spaced channels is discussed. Potential sources of such noise are the uneven components of a higher order, the greatest danger coming from the third-order components. The intermodulation noise components are generated in the nonlinear parts of the system: in the short-wave multi-stages of the receiver, in the output stages of the transmitter, and in the places where two lines are poorly joined. The generation mechanism of the noise in each of these parts of the system is discussed, and methods of alleviating the noise situation are suggested. The assignment of frequencies for the shore stations should take into account the reduction of intermodulation noise.

The distribution of frequencies for the international maritime radio telephone service and the intermodulation-noise components are tabulated. The choice of frequencies and number of channels for ship-board installations are discussed.

27. Recent Soviet Patents in the Field of Communications

"Authorship Certificates" Moscow, Elektrosvyaz', No 8, Aug 62, pp 73-74

Class 21a¹, 35₁₀. No 143842; by D. A. Saf'yan. Method of Selecting Line-Frequency Synchro-Signals.

Class 21a², 18₀₁. No 143843; by M. V. Mints. Cathode Follower.

Class 21a², 18₀₁. No 144199; by Yu. L. Kurkin and N. S. Kurkina. Transistorized Precision Voltage Amplifier With Large Output Resistance.

Class 21a², 53₀₂. No 143844; by V. V. Zorin and B. V. Kolesnichenko. Voltage Regulator.

Class 21a⁴, 8₀₂. No 144201; by A. P. Kokovashin and I. K. Igolkin. Device for Automatic Retuning of High-Frequency Oscillators.

Class 21a⁴, 22₀₁. No 143436; by A. A. Gorbachev. Method of Noise Suppression During Reception of AM Oscillations.

Class 21a⁴, 46₀₄. No 144202; by V. D. Kuznetsov and N. V. Talyzin. Device for Combining the Operation of Two Radars From a Common Antenna System.

Class 21a⁴, 48₆₈. No 143439; by A. K. Stolyarov and A. L. Mikaelyan. Ferrite Valve.

Class 21a⁴, 71. No 143442; by V. A. Yugov and L. D. Vorob'yev. Film Thermister Power Meter for Microwaves.

Class 21a⁴, 71. No 143443; by P. G. Pozdnyakov and Yu. S. Snopov. Method for Continuous Control of Natural Electric Oscillation Frequency of Quartz Plates During Abrasive Processing.

Class 21a⁴, 71. No 143444; by A. A. Zalevskiy. Superheterodyne Metering Receiver for Microwaves.

C-O-N-F-I-D-E-N-T-I-A-L

Class 21a⁴, 71. No 143847; by P. M. Pyatoshin, B. V. Aleksandrov, and L. V. Sukhov. Device for Measuring Equivalent Dynamic Parameters of Piezoelectric Resonators.

Class 21b, 25₀₁. No 143446; by N. A. Marasanov, V. V. Ten'kovtsev, and A. M. Novakovskiy. Sealed Alkaline Cadmium-Nickel Storage Battery.

Class 21b, 8. No 143849; by M. D. Kocherginskiy, L. F. Pen'kova, Sh. K. Shagin, and M. V. Sakina. Electric Storage Battery.

Class 21c, 5₄₀. No 144206; by V. V. Roditi. Noise Suppressing Drive.

Class 21c, 64₅₀. No 143868; by G. T. Maksimov. Semiconductor Pulse-Width Modulator.

Class 21d², 45₀₁. No 143897; by G. I. Kitayev. Device for Voltage Multiplication.

Class 21e, 12. No 143908; by I. B. Bolotin. Method for Parasitic EMF Compensation Induced in the Circuits of EMF Hall Transducer.

Class 21e, 36₁₀. No 143920; by V. S. Popov. Device for Measuring the Ratio of Two Electric Voltages.

Class 21g, 4₀₁. No 143924; by N. Ye. Gilodo and R. D. Amolynya. Polarized Multicontact Pulsed Relay.

Class 21g, 4₀₅. No 144237; by A. M. Ritin. Contactless Polarized Relay.

Class 42m, 29. No 143597. V. B. Marakhovskiy. Output Device for Computers.

Components28. Czech Germanium Photodiode Described

"Subminiature Germanium Phototube 10PN40," Tekh. informator (Technical Informer), No 3, 1961, article No 687 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 7-3-86)

"The electrical parameters of the Tesla 10PN40 subminiature photodiode (height -- 21 mm, diameter -- 2.15 mm) are given. Because of its small size and high resistance, the photodiode may be used with either tube or transistor amplifier stages for reading punched cards, detecting infrared radiation, and recording and controlling illuminance. Its sensitivity, expressed as voltage with a 100-kilohm resistance, supply voltage of 45 v, and illuminance of 20,000 lux from a 2,400° K source, reaches 20 v. The back dark current with a supply voltage of 10-50 v is less than 15-20 microamps. Dark noise voltage in a frequency range of 20 cycles to 20 kc is less than 15 mv. Maximum voltage and current are 50 v and 10 ma. Maximum dissipation power and temperature are 40 mw and 75° C, respectively. Thermal resistance is 0.8° C/mw. Maximum operating frequency is 15 kc."

29. Contactless Decoder

"Investigation of Frequency-Signal Contactless Decoder," by D. A. Abdulayev and T. A. Zakirov, Power Engineering and Automation Institute; Tashkent, Izvestiya Akademii Nauk Uzbek SSR, Seriya Tekhnicheskikh Nauk, No 4, 1962, pp 24-29

The application of frequency discriminators in systems with dispersed objects is highly promising. The basic component of such a device is the contactless decoder as suggested originally by F. A. Katkov. A ferrite-diode unit in the form of a core with rectangular hysteresis loop was used as an output element of the matrix decoder. Due to the simplicity of the putput element construction, the reliability of the unit is high. It was shown that the suggested circuit has compensating properties for the signal voltage through the action of a local voltage source.

Such a compensating effect is of great importance in controlling a large number of objects dispersed along a communication line.

30. Recording the Static Characteristics of Power Transistors

"A Method of Obtaining the Static Characteristics of Transistors Which Operate in a Large-Signal Regime," by N. V. Terpugov; Moscow, Poluprovodnikovyye Pribory i Ikh Primeneniye

(Semiconductor Devices and Their Use -- a collection of articles), No 7, 1961, pp 127-136 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-4-65y)

For the recording of the static characteristics of power transistors, a method is considered which is based on the guarantee of a constant power distribution at the collector ($P_k = \text{const}$). The collector-DC required for a given power is fixed by an input DC regulator. Any points of the static characteristics where $P_k = \text{const}$ are reached by feeding from the DC power source to the input of the power transistor, in series with the signal, a certain pulsed emf of short duration and high reciprocal duty cycle. The direct currents and voltages are read by instrument; the pulsed currents, by calibrated oscilloscope. It is well to record a family of static characteristics for the admissible power distribution at the collector for a given temperature of the ambient medium. For the region of low collector voltages, where this method produces a large error, another method is suggested, which is based on the fact that the elevation of the temperature of the collector junction above that of the ambient medium is proportional to the power distribution at the collector. To attain the required conditions for $P_k = \text{const}$, the tested power transistors are placed in a thermostat, thus dispensing with the need for radiators in the DC power sources and instruments, as well as in the bracing. It is a simple matter to determine the admissible power distribution at the collector for a given type of radiator.

31. Static Characteristics of Tunnel Diodes Used in Triggers

"Tunnel Diodes and Their Use in Triggers," by B. N. Kononov and A. S. Sidorov; Moscow, Poluprovodnikovyye Pribory i Ikh Primeneniye (Semiconductor Devices and Their Use -- a Collection of articles), No 7, 1961, pp 341-357 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-4-64 zh)

A method is given for recording the static volt-ampere characteristics of germanium tunnel diodes. The parameters of 15 test tunnel diodes were measured and the results tabulated. A relationship was noted between the ratio of the maximum-to-minimum current and the minimum voltage corresponding to the minimum current; the maximum-to-minimum current ratio increased minimum voltage. The temperature dependence of the characteristics was determined. With increased temperature, the maximum of the volt-ampere characteristic shifts downward, whereas the minimum shifts upward and to the left. On one of the diodes, an analysis was made of the rate of transient processes in the trigger.

Discharge Phenomena

32. Rotating Probe Investigations of an A-C Arc

"Some Results of Probe Investigations of an A-c Arc," by M. N. Turko and I. I. Korshakevich, Nekotoryye voopr. emission. i molekulyarn. spektroskopii (Some Problems of Emission and Molecular Spectroscopy); Krasnoyarsk, 1960, pp 34-41 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, item 7Zh374)

"A rotating probe was used to investigate some properties of an a-c arc in air at atmospheric pressure. The application of the Langmuir probe method to discharges at atmospheric pressure makes it possible to measure only the potential of the plasma (at the point of inflection of the current on a logarithmic scale). The probe was of nichrome wire with a diameter of 0.12 mm, rotating at a speed of 3,000 rpm. At a given moment, the wire intersected the arc beam. All measurements were related to one particular phase. This method was used to determine distribution of the potential along the arc column. Both probe and spectral measurements point to the existence of a positive space charge at both electrodes, that is, to an increase in ion concentration. The magnitude of the cathode drop (18 v) agrees with data for a d-c arc. The magnitude of the anode drop (17 v) requires further explanation. The influence of current (up to 20 a) and electrode material on the diameter of the electron and ion beam was also studied. For this purpose, a potential, equal to that of the anode or cathode respectively, was applied to the rotating probe. For Pt, Pd, and Cu, the diameter of the electron cloud considerably exceeded that of the ion beam, whereas for Al and Zn, the difference in diameters was small. This result may be explained by a different value of electron diffusion in the radial direction, which is dependent both upon the radial distribution of plasma potential and on the concentration of charged particles in the arc column."

33. Electron Distribution in a Decaying Plasma

"On the Question of the Distribution of Electrons According to Speed in a Decaying Plasma," by A. M. Aleskovskiy, Uch. zap. Saratovsk. un-t (Scientific Notes. Saratov University), No 69, 1960, pp 271-274 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, item 7Zh352)

"In examining the question of the distribution of electrons according to speed in a decaying plasma, V. L. Granovskiy (Tr. QVEI [Works of the All-Union Electrical Engineering Institute], No 41, 1960) suggested, in particular, that the gradient of concentration of electrons is equal to zero. The correctness of this assumption is determined. The analysis,

which takes into account the gradient of concentration, leads to a Maxwellian distribution function, multiplied by a certain corrective factor, which determines the loss of high-speed electrons as a result of diffusion."

34. On the Theory of Localized Anode Oscillations

"On the Question of the Theory of Localized Anode Oscillations," by Yu. A. Pekar, Nauchn. tr. Tul'sk. gorn. in-ta (Scientific Works of the Tula Mining Institute), Collection No 3, 1961, pp 101-105 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, item 7Zh354)

"The author determines the effect of a nonuniform distribution of electrons on ion oscillations -- almost sinusoidal low-frequency oscillations with a frequency of 10^5 - 10^6 cycles, localized in the anode region. The system of one-dimensional hydrodynamic equations is solved by the method of successive approximations. Determination of the effect of electrons leads to the appearance of a new addend in the dispersion equation which reduces the frequency by a factor of more than 2 under certain conditions."

Information Theory

35. Noise-Immunity of PAM-FM-FM Radiotelemetry Systems

"Potential and Real Noise-Immunity of a PAM-FM Multichannel Radiotelemetry System Under Conditions of Weak Fluctuating Noise," by A. F. Fomin; Moscow, Radiotekhnika, Vol 17, No 8, Aug 62, pp 10-14

The potential noise-immunity of a PAM-FM-FM radiotelemetry system is determined and compared with that of PAM-FM and FM-FM systems. It is shown that a PAM-FM-FM system with additional subcarrier has poorer noise-immunity than PAM-FM and FM-FM systems and has no advantages over the latter systems. It is suggested that the PAM-FM-FM system may find application only in a radiotelemetry system with frequency division of channels for the purpose of increasing the number of measurable parameters through the use of secondary time division in one or several channels of the system.

Instruments and Equipment36. Device for Remote Measurement of Displacements

"Compensated Electric Instruments for Remote Measurement of Displacements," by M. I. Belyy; Moscow, Izmeritel'naya Tekhnika, No 8, Aug 62, pp 17-19

The author has developed an electric instrument which utilizes the principle of compensating two emf's to measure large displacements with an accuracy of 10 microns. Such an instrument can be used as a transducer in automatic control of displacement. The instrument is made of a master and a slave system. The magnetic ducts of each system are in the form of three rectangular rods made of laminated steel sheets. Ferro-magnetic spacers are placed at the ends of the rods to maintain the air gap between the rods constant. Both middle rods have identical single-layer windings. Each winding consists of two equal sections wound in opposition. These two sections form the excitation system of the instrument, to which ac voltage is applied. The ac current passing through the windings excites magnetic fluxes of equal magnitude, but opposite in direction. Thus the magnetic flux is equal to zero in the middle part of the rod, gradually increasing toward the ends of the core.

Traveling along the central rods of both systems are identical movable frames. The emf induced in each frame is determined by the magnitude of magnetic flux in the corresponding magnetic duct. The indicator reading is proportional to the displacement of the two frames with respect to each other.

In the case of automatic control, the master system is mechanically bonded to the object whose displacement must be measured.

The device is capable of measuring displacements over a wide range.

37. Slow Electron Diffraction

"Experimental Study of Slow-Electron Diffraction Methods," by A. A. Babad-Zakhryapin, N. S. Gorbunov, and V. I. Izvekov; Moscow, Uspekhi Fizicheskikh Nauk, No 4, Aug 62, pp 727-748

The fact that slow electrons (10-10³ ev) generally penetrate the surface on examined substances only to a depth of several atomic layers makes them especially useful in studying the structure of monoatomic surfaces. The problems that can be studied with the aid of slow-electron diffraction analysis are grain boundaries of atomically pure crystals, structure of surfaces with absorbed gases, and metal oxidation kinetics in its initial stages.

The device used in this investigation consisted of an electron gun, cylinders to control the intensity of the electron beam, collimator, electron collector, drum, crystal holder, gate, envelope of the diffraction chamber, and the heater. The diffraction chamber was filled with argon gas rarefied to 10^{-10} mm Hg. Most of the metal parts of the device were made of molybdenum.

A special case of slow-electron diffraction from the body-centered crystal lattice of a tungsten crystal was examined. This study has shown that the present state of slow-electron diffraction analysis has advanced sufficiently to permit the application of this method to the solution of specific practical problems related to the study of the surface structure of solid bodies. This method is especially effective in detecting gas absorption at the surface of various metals. However, such examinations are still restricted only to qualitative interpretations due to absence of an established theory on slow-electron diffraction.

38. New Soviet Instruments

"Two Instruments" Minsk, Sovetskaya Belorussiya, 15 Sep 62,

A short article reads as follows:

"Vitebsk, 14 September. (Belta). The students of the Electrical Communications Technical School have sent to the National Economy Achievement Exposition in Moscow two original instruments designed by them.

"The graduate Stepan Zaykovskiy has designed an automatic measuring device to test the malfunctioning of cable telephone lines. In case of deterioration in performance, a signal is immediately generated indicating the number of the line where trouble has occurred.

"The graduate Vladimir Kozovnikov, at the request of the 'KIM' knit-wear factory has designed and made a photoelectric counter which can automatically count finished production."

39. Wire-Transducer Flow-Rate Meter With High Sensitivity

"An Instrument for Measuring Speed Fluctuation by Means of a Wire Transducer," by M. A. Mikhalev, Novyye Metody Izmereniy i Pribory Dlya Gidravlicheskoy Issledovaniya (New Methods of Measuring and Instruments for Hydraulic Research), Moscow, Academy of Sciences USSR, 1961, pp 80-84 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-77y)

An instrument is described which measures speed fluctuations with greater sensitivity than others which use wire transducers. A rod with a small sphere at the end (in a liquid flow) is not rigidly fixed to the elastic plate with the wire transducers, but has a T-shape, the upper end of which is freely suspended. The protuberances of the t-shaped arm are freely connected to the axes of two bracing rods, the upper ends of which are firmly attached by two elastic fasteners to one side of the batteries. Four transducers are attached to the elastic arms. The wire transducers are connected by a bridge circuit. From the diagonals of the bridge, the voltage is amplified by a four-stage amplifier (based on tubes 6N2P). The tube 6Ye5 provides a coarse balance of the bridge. The detector is a phase-sensitive bridge made up of a semiconductor diode and series-connected resistances. The test bridge and phase-sensitive bridge are fed by an RC-generator (6Zh5P and 6Pl4P tubes). The fluctuations are recorded on the MPO-2 loop oscillograph.

The instrument is recommended for use in studying an arbitrary component of actual speed.

40. Reference Electrode Used With Langmuir Probe for De-ionizing Plasma Study

"The Use of the Langmuir Probe Method To Study a De-ionizing Plasma," by V. A. Ivanchenko, Izvestiya Nauchno-issledovatel'skogo Instituta Postoyannogo Toka (News of the Scientific-Research Institute of Direct Current), No 7, 1961, pp 5-13 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 6, Jun 62, 6 Zh 349)

Since, in the use of the Langmuir probe method of studying a de-ionizing plasma, it is necessary to account for the fact that the potential of such a plasma has a one-to-one relationship with the potential of all the positive electrodes introduced into it, it is not possible to obtain common probe characteristics for a single probe in such a case. It is shown theoretically that, if a reference electrode with a surface considerably greater than that of the probe is introduced into the plasma, the Langmuir method can be used. A diagram and description of an apparatus are given, as well as the results of experiments involving a periodic generation and de-ionization of a plasma; the surface of the reference electrode did not exceed the surface of the probe by more than 10^4 . The error obtained in five measurements was in good agreement with theory.

41. Weak Spectra Recorded at Krasnoyarsk Institute of Physics

"New Apparatus for Automatic Recording of Weak Optical Spectra," by V. P. Salmin, Nekotoryye Voprosy Emissionnoy i Molekulyarnoy Spektroskopii (Some Problems of Emission and

Molecular Spectroscopy -- a collection of articles), Krasnoyarsk, 1960, pp 121-215 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-88Ch)

A description is given of an electronic attachment to the ISP-51 spectrograph (or other designs which produce partial spectra) which affords the possibility of recording weak light flows. The instrument, developed at the Krasnoyarsk Institute of Physics, records the variable component of the light flow incident upon a photoelectric multiplier.

42. Recent Soviet Patents in the Field of Instrument Design

"Class 42. Measuring Instruments and Apparatus," Moscow, Byulleten' Izobreteniy, No 13, Jul 62, pp 32-45

Class 42b, 10. No 148527; by I. G. Grinman and A. P. Zenkov. Method for Contactless Measurement of Micro-Wire Diameter.

Class 42b, 12₀₂. No 148528; by P. V. Chernikov, V. N. Zhavoronkov, S. M. Novichkov, L. S. Zaytsev, Ya. A. Posashkov, and R. S. Kubryakov. Optical Device for the Contactless Setting to Desired Dimensions of Diamond or Hard-Alloy Cutting Tools.

Class 42c 23₅₀. No 148536; by Ye. S. Pertsovskiy, N. I. Lutkin, and Kh. I. Khiger. Device for Contactless Measurement of Loose Material Flow.

Class 42d, 10. No 148537; by E. F. Stepura and V. V. Semenov. Multiplying Device Built With a Single-State Magnetic Amplifier.

Class 42d, 10; No 148539; by Ya. S. Levenberg. Method of Multiplying Analog Values.

Class 42d, 10. No 148540; by Yu. G. Tamberg. Device for Simulating Functions.

Class 42d, 10. No 148541; Ye. I. Shushkov. Electronic Integrator.

Class 42g, 10₀₁. No 148546; V. M. Sasin. Magnetic Recording Head for Transverse-Line Recording on Magnetic Tape.

Class 42h, 34₁₁. No 148550; by R. Ya. Keymakh and V. I. Kudryavtsev. Polarized Interferometer-Refractometer.

Class 42i, 9₀₁. No 148551; by G. A. Boberskiy. Device for Measuring Plasma Temperature by the Method of Spectral Line Inversion.

Class 42s, No 148606; by P. V. Kobin. Acoustic Insulator.

Class 42s, No 148605; by I. U. Glushnev, A. M. Borok, and Yu. S. Bogdanov. Ultrasonic Pulse Generator.

Class 42s, No 146608; V. F. Popov. Ultrasonic Pulse Generator.

43. Electronic Logarithmic Converter Attachment for MF-4 Microphotometer

"Logarithmic Electronic Converter for the Microphotometer Type MF-4," by V. K. Latyshev and A. K. Felinger, Sbornik Trudov. Institute Metallovedeniya i Fiziki Metallov Tsentral'nogo Nauchno-issledovatel'nogo Instituta Chernoy Metallurgii (Collection of Works. Institute of Metals Science and the Physics of Metals, Central Scientific-Research Institute of Ferrous Metallurgy), No 6, 1959, pp 453-459 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-5-10u)

The institute has already turned over for use in industry an electronic attachment to the MF-4. It consists of a logarithmic converter, an amplifier, and a power source. The logarithmic converter is based on a single 6N8 triode, the grid circuit of which is used as a diode with exponential dependence of current on voltage, and the anode circuit is used as an amplifier. The logarithmic relationship between the grid current of the 6N8 and the plate current was determined for the grid current range of 0.10-10 microamperes at $V_a = 25$ volts and $U_1 = 3.5$ volts. The other half of the 6N8 is used as a multistage compensator. The results of photometer measurements are recorded by means of a balanced stage with another 6N8 tube, part of the cathode impedance of which is used to feed a single to the EPP-90 potentiometer.

Schematic diagrams are given.

Materials

44. Experiments With Carbide Cathodes of Thoriated Tungsten

"Tests of High-Power Carbide Cathodes Under Multiple Gas Outburst Conditions," by M. D. Gurevich and S. I. Zilitinkevich; Leningrad, Izvestiya Vysshikh Uchebnykh Zavedeniy -- Priborostroyeniye, Vol 5, No 4, 1962, pp 3-10

Results of experiments conducted in 1961 at the Leningrad Institute of Precision Mechanics and Optics on the operation of high-power carbide cathodes under conditions of multiple gas outbursts are examined in this article. The tests were made in experimental sealed diodes using parts from conventional high-power oscillator tubes. Gas outbursts, which

normally originate from within the electrode metal or from various design elements of the tubes and which affect the reliability of demountable tubes in particular, were simulated in these tests by the breaking of glass ampules filled with air under a pressure of 1-3 mm Hg.

The authors conclude that:

1. Thorium-carbide cathodes have good "vacuum vitality" and are capable of withstanding multiple gas outbursts.
2. Gas outbursts with a pressure $P \leq 10^{-3}$ mm Hg cause an emission loss at the cathode which may be restored spontaneously over a certain time interval or which may be accelerated by activating the cathode.
3. Where gas outbursts have a pressure $P > 10^{-3}$ mm Hg, the emissivity of the carbide cathode may be restored only by first heating the tube mount to a temperature of 450-500°C.
4. Successful application of carbide cathodes in demountable electron tubes requires the use of a thermal aging device.

45. Influence of Adsorbed Vapors in Mercuric Iodide Photoresistances

"The Influence of the Adsorption of Vapors of Certain Substances on the Static Characteristics of Mercuric Iodide Photoresistance," by I. F. Kopinets and D. V. Chepur, Doklady i Soobshcheniya Uzhgorodskogo Universiteta, Seriya Fizicheskko-Matematicheskikh Nauk (Reports and Communications of Uzhgorod University, Physical Mathematical Sciences Series), No 4, 1961, pp 54-55 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-3-57y)

In a study of the influence of adsorption of the vapors of several substances on the photoconductivity of mono- and polycrystalline specimens of HgI_2 , it was found that ether and ethyl alcohol considerably increased the photosensitivity. Vapors of isoamyl alcohol had little effect, and benzene vapors had practically no effect on the photosensitivity. The influence of the vapors is explained by the fact that adsorption considerably reduces the rate of surface recombination of the photocarriers, thereby increasing their lifetimes, which was confirmed by research on the kinetics of photoconductivity. The adsorption of the vapors also leads to an increase of dark conductivity in the specimens and to a change of the form of the spectral characteristics of photoconductivity.

46. Photoconductivity Kinetics of Mercuric Iodide Photoresistances

"Application of the N. A. Tolstoy-P. P. Feofilov Method to the Study of the Kinetics of Photoconductivity of Mercuric Iodide Photoresistances," by Yu. V. Popik and N. I. Dovgoshey, Doklady i Soobshcheniya Uzhgorodskogo Universiteta, Seriya Fizicheskko-Matematicheskikh Nauk, (Reports and Communications of Uzhgorod University, Physical-Mathematical Sciences Series), No 4, 1961 pp 56-57 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-3-57v)

The Tolstoy-Feofilov Tau-meter method is used in the study of kinetics of photoconductivity of HgI_2 specimens; the build-up and decay of the photocurrent during an irradiation of the specimens by square light pulses can be described by two exponential functions. The alternate rectification of two parts of the curve on an oscilloscope screen affords the possibility of determining the lifetimes of the photo-current carries. The meter employs a monochromator and a wide-band photocurrent-pulse amplifier.

47. Effect of Ultrasound on Magnetic Properties of Ferromagnetics

"The Dependence of the Magnetic Properties of Ferromagnetics on the Effect of Ultrasound at Various Temperatures," by V. S. Cherkashin; Moscow, Primeneniye Ul'traakustiki k Issledovaniyu Veshchestva (The Application of Ultra-acoustics to the Study of Matter -- a collection of articles), No 12, 1960, pp 135-139 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-5-34b)

A study was made of the dependence of the magnetizing properties of ferromagnetics with positive and negative magnetostrictions on the effect of ultrasound at various temperatures.

The experimental apparatus is described. A magnetostrictive oscillator (19.5 kilocycles) was excited a 300-watt power amplifier fed by a 3G-10 [or ZG-10] generator. A qualitative study of the hysteresis loop was made by oscilloscope; the quantitative study was made with an astatic magnetometer. The test specimens were rods of mickel, permalloy 65, and nickel-copper alloys containing 10 and 20 percent copper.

It was found that the effect of ultrasound on the ferromagnetics does not depend on the position of the specimen in relation to various standing wave components. It was also found that the effect of ultrasound does not depend on the sign of the magnetostriction.

48. Possibility of Obtaining P-N Junction by Alpha-Irradiation

"On the Possibility of Obtaining a P-N Junction by Irradiating Silicon With Alpha-Particles," by N. I. Golovina, Tr. Novocherk. politekhn. in-ta (Works of the Novocherkassk Polytechnic Institute), No 118, 1961, pp 65-67 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 7-4-81)

"The author notes the conditions necessary to obtain a junction in silicon with hole conductivity: (1) there must be a donor impurity excess in comparison with the acceptor impurity already found in the material; (2) the depth of penetration of the donor impurity must guarantee the electrical strength of the junction. When a-particles are used to irradiate Si, whose isotopic composition is Si²⁸ (92.18%), Si²⁹ (4.7%), and Si³⁰ (3.12%), the isotopes P³³, P³², and P³¹ will be formed. In order that these reactions be carried out, it is necessary to compute a-particle energy, which must be greater than the height of the potential barrier B. For the silicon isotope Si²⁸, B equals 7.5 mev. In addition, the energy of the a-particle must be sufficient to overcome a neutron binding energy in the nucleus equal to 8 mev. From this it follows that the energy of the a-particle, which may be obtained only in a cyclotron, should equal ~10 mev. The concentration of atoms P appearing in Si upon irradiation (with an initial acceptor concentration of 10¹⁵ 1/cm³) is found to be 10¹⁷ 1/cm³. From a calculation of the depth of penetration of an a-particle in Si, it becomes apparent that the depth of the resulting p-n junction will be 20 microns."

49. Adhesion of Current Carriers to Germanium Surface

"Adhesion of Unbalanced Current Carriers to Germanium Surface," by V. G. Litovchenko and V. I. Lyashenko, Semiconductor Institute Academy of Sciences SSR; Moscow, Fizika Tverdogo Tela, No 8, Aug 62, pp 1985-1993

Investigation at the Semiconductor Institute, Academy of Sciences Ukrainian SSR, has revealed the phenomenon of adhesion of unbalanced current carriers to the surface of germanium. This phenomenon is observed when the unbalanced current carriers are excited by the following means: visible light (adhesion of carrier in case of photoconductivity), pulsed transverse electric field, or injection of the carriers through a special rectifying contact.

The adhesion of current carriers was observed at relatively low levels of injection (about 10^{-1%}).

In this investigation, the kinetic methods were applied to study the relaxation of unbalanced current carriers. This phenomenon of adhesion was also observed in the silicon.

The authors thank K. D. Glinchuk and O. V. Snitko for their assistance.

Radar50. Feedback As Overshoot Control in Tracking Systems

"Some Methods of Increasing the Quality of Processes of Regulation and Control," by G. S. Pospelov, Primeneniye, Vychislitel'noy Tekhniki Dlya Avtomatizatsii Proizvodstva (The Use of Computer Engineering for the Automation of Production -- a collection of articles), Moscow, Mashgiz, 1961, pp 80-96 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-118Sh)

Those control processes are considered which employ the concepts of anthropoformia [human engineering] and cybernetics. The example of an automatic tracking system is used to demonstrate the possibility of excluding the effect of the input-signal filter on the dynamic properties of a system in which the input signal occurs after the error signal and is used to smooth the interference. A method is given of compensating the input signal delay introduced by such a filter. The example of a gyromagnetic compass and the measurement of the lateral deflection of an aircraft from the line of flight are used to indicate the possibility of using two sources of information to separate the real value of the signal. The discussion considers the compensation of a delay in measuring the output signal, when information is available on the derivatives of this signal, which itself has a slight delay. In this case, the derivative may contain rf-noise. By providing a feedback, on the basis of the original conditions, through a memory and computer, it is possible to eliminate or reduce the overshoot in both linear and nonlinear systems with limited coordinates.

51. Limits of Mechanical Phase Discriminators in Radar

"Inertial Phase Discriminators," by A. G. Gorinshteyn, Trudy Vsesoyuznogo Zaochnogo Energeticheskogo Instituta (Works of the All-Union Correspondence Power Engineering Institute), No 18, 1961, pp 61-76 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-2-37g)

An analysis is made of the operation of an inertial (mechanical) phase discriminator used in radar automatic target-tracking systems. The relationships required for computing the system parameters are established. It is shown that the mechanical phase discriminator has a greater voltage transmission factor than the electronic type. Because of its poorer noise stability and accuracy, however, the mechanical phase discriminator can be used only in a limited number of circuits in automation and electronics.

Wave Propagation and Antennas52. Natural Oscillations in a Trough Wave Guide

"Natural Oscillations in a Metal Trough With Laminated Filter," by R. P. Starovoytova and V. A. Sytnik, Tr. Sibirsk. fiz.-tekhn. in-ta pri Tomskom un-te (Works of the Siberian Physico-technical Institute Under Tomsk University), No 39, 1960, pp 66-71 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 7-7-173)

"An investigation is made of wave types in a rectangular, infinitely long metal trough with two dielectric plates parallel to the bottom of the trough. One plate lies on the bottom and the second is located a certain distance above the first. Characteristic equations are obtained for longitudinal magnetic waves (not having an electrical field component normal to the boundary layer of the media) and longitudinal electrical waves (not having an analogous magnetic field component). It is shown that two types of longitudinal magnetic waves may exist in the system."

53. Meteor Trail Data Used To Determine Antenna Directivity Patterns

"On the Possibility of Determining the Directivity Pattern of Radar Antennas According to Meteor Observation Data," by I. A. Deryugin and R. I. Moysya, Sb. rabot po Mezhdunar. geofiz. godu, Kiyevsk, un-t (Collection of Works on the International Geophysical Year. Kiev University), No 1, 1961, pp 37-43 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 21)

"It is shown that, through the use of a large amount of statistical material on radar observations of heavy meteor showers, it is possible to visualize the shape of the directivity pattern of an antenna in the vertical plane, even to determining the directions of maximum and minimum radiation and estimating the relative distribution of radiated power between the lobes. Such an investigation may be carried out only for sufficiently directive antennas without strong side and rear lobes in a wave-length range of 4 to 10 m (the 4 m range, where the normal reflection from the meteor trails is dominant, is most favorable). The method is based on the assumption that the height at which reflections occur from all meteor showers does not vary, which is in good agreement with known observation data. The proposed method was used to determine experimentally data on a director antenna with one reflector and seven directors. The measured values of directions of maximum radiation ($\theta_1^0 = 10^{\circ}10'$ and $\theta_2^0 = 27^{\circ}20'$) and minimum radiation ($\theta_3^0 = 18^{\circ}40'$) agreed well with computed values ($\theta_1^0 = 8^{\circ}30'$, $\theta_2^0 = 26^{\circ}10'$, and $\theta_3^0 = 17^{\circ}10'$).

54. Solution of the General Problem of Magnetic Antennas

"Investigation of the Performance of Magnetic Radiators,"
by M. V. Vershkov; Moscow, Radiotekhnika, Vol 17, No 8,
Aug 62, pp 15-21

A solution is derived for the general problem of excitation of a magnetic core of finite length by a wire loop. The problem involves determining, at any point in free space, the components of an electromagnetic field created by a magnetic core having the shape of an elongated spheroid surrounded at the middle by a wire loop through which is passed a high frequency current. On the basis of an analysis of the theoretical data obtained by the author, the following conclusions are made:

1. An electromagnetic field created by a magnetic antenna may be represented as the sum of an infinitely large number of odd spatial harmonics.

2. The directivity pattern of a magnetic antenna in the horizontal plane is determined by an angular spheroidal function of the first type. When the dimensions of the antenna are considerably less than the wave length, the directivity pattern remains the same as that of the wire loop.

3. The field intensity of a magnetic antenna is proportional to ω^2 and the radiation impedance is proportional to ω^4

4. The field intensity of a magnetic antenna is proportional to the first order of permeability of the core, and the radiation impedance is proportional to the second order.

The field intensity of a magnetic antenna is dependent upon the dielectric constant of the core material. Its influence is seen in the form of cavity resonances. When the dimensions of the antenna are considerably less than the wave length, the dielectric constant of the core material has no effect on field intensity.

Miscellaneous

55. New Radioelectronics Institute in Tomsk

"A Few Lines"; Moscow, Pravda, 8 Sep 62, p 4

A short notes reads:

"The Radioelectronics and Electronic Engineering Institute has been opened in Tomsk. Six hundred students are attending the following faculties: radio engineering, electronic engineering, and radio equipment."

II. ENGINEERING

Computers, Automatic Control Engineering

56. Reading Machine

"Interesting and Useful To Know", Moscow Ekonomicheskaya Gazeta, 8 Sep 62, p 19; Zaochnyye Ekonomicheskyy Kursy, No 7, p 1

In the Institute of Automatic and Telemechanics (Moscow), an electronic learning machine which recognizes shapes has been built. First of all, the machine was given 200 different outlines of figures to recognize, which it did. Out of 800 questions given it, the machine answered 796 correctly. A similar machine will be able to recognize drawings, technological charts, operating details of a conveyer, etc.

57. Ural-2 Computer Operating in Khabarovsk Institute

"Computing Center in Operation"; Moscow, Trud, 3 Aug 62

In the computing center attached to the Khabarovsk Institute for Railroad Transport Engineers, a general purpose computer Ural-2 was put into operation. Its installation and adjustment were done well by a group of young specialists of the institute under the supervision of Engr K. A. Chantsev. For verification of the capabilities of the electronic machine, a monitoring problem on calculation of the flight trajectory of an artificial earth satellite was proposed. The machine passed the "examination" brilliantly.

Now the computing center programmers are working on an assignment for obtaining data on the most rational utilization of the Khabarovskiy economic region.

58. New Computing Center in Vil'nyus

"Lithuanian Academy of Sciences Computing Center"; Vil'nyus,
Sovetskaya Litva 8 Aug 62

A computing center of the Lithuanian SSR Academy of Sciences began to operate in Vil'nyus. The first problems have been solved on the large BESM-2M computer installed here. Specifically, a detailed gas turbine configuration was computed. In 3 1/2 hours, the machine carried out 126 million arithmetical operations. To do this with calculators would take 70 operators 1,000 hours.

The new center will serve scientific-research and project designing organizations by solving problems of long-term planning and automation of production control.

The photo caption in the above source shows the BESM-2M control panel.

59. Announcement of Competitive Examinations for Positions With Belorussian Gosplan

"Announces Competitive Examinations"; Minsk, Sovetskaya Belorussiya, 18 Aug 62, p 4

"The computing center attached to Gosplan Belorussian SSR concentrating on national economic planning needs has announced competitive examinations for filling a variety of vacant positions as heads of laboratories, including operation of electronic computers (candidate of mathematical or engineering sciences) and mathematical programming (doctor or candidate of mathematical sciences), and as senior scientific associates, including economic cybernetics and mathematical programming (doctor or candidate of sciences depending on the speciality involved).

"In some cases, those selected by examination who have academic degrees will be provided with living quarters. The time of the examinations is 2 months from the date of publication of this announcement. Address applications and requests for information concerning the location of the examinations to: Gosplan BSSR, Government House, Minsk."

60. Soviet Advances in Automation

"Man's Electronic Adviser"; Moscow, Pravda, 8 Aug 62, p 3

Soviet scientists are working on the creation of information machines with a very large electronic memory. They will be able to automate operations for processing the results of scientific research, storage and analysis of statistical data, and searching for information on a given subject.

The director of the All-Union Institute of Scientific and Technical Information, Prof A. Mikhaylov, has told us about a chemical information and logical machine which is now being developed at the institute. Searching for and reading the required material presented to it will be done analogously to the action of the human memory-on the basis of the mental connection between individual concepts and words. If, for example, the concept "turbine" is called for, the machine will select all of the information associated with it. When the concept of "steam, 200,000 kilowatts" is added, the information is refined and made more definite.

Such an information machine will be able to give answers with tremendous speed to the most varied and complex problems. It will be able, for example, to indicate immediately what kind of metallic alloys have a given electrical resistance possessing the required toughness and temperature stability, the causes of and conditions for failure of reinforced concrete bridges, the effect of a given chemical compound on living organisms, etc.

61. Computer Weighting Devices With Discrete Handling of Variables

"Computer Weighting Devices With Discrete Handling of Variables," by R. S. Kravtsov, Nauchniye Zapiski. L'vovskiy Politeknicheskiiy Institut (Scientific Reports. The L'vov Polytechnic Institute), No 78, 1961, pp 61-135 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, Svodnyy Tom, No 6, Jun 62, 6-1-25)

Computer weighting devices are those devices which are designed for the solution of equations of the type $f(x) = 0$ with respect to the unknown x , using the method of implicit functions. The advantages of systems with discrete processing of the original unknowns are enumerated (increased accuracy, faster speed of operation, and greater number of uses).

62. Pneumatic Computer for Differential Equations Up to Ninth Order

"Methods of Designing and Ways of Using Direct-Action Pneumatic Computer Devices," by N. D. Lanin and V. I. Pashintseva, Pri-meniniye Vychislitel'noy Tekhniki Dlya Avtomatizatsii (The Use of Computer Engineering for Automation), Moscow 1961, pp 445-457 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 6, Jun 62, 6-1-130)

Those pneumatic computer types are considered here which operate on the principle of the compensation of forces, and descriptions are given of the basic subassemblies -- the integrating, differentiating, summing, and coefficient sections.

The integrating pneumatic section is designed as an aperiodic loop with feedback, is analogous to an electrical circuit, and is formed from a DC resistance choke connected in series with an AC pneumatic capacitor. The DC resistance is produced as a capillary with an opening of about 0.1 mm and length of 20-30 mm. The AC capacitor consists of a cylinder with a moving piston inside. The integrating section does not cause an inversion of sign of the input signal. The operating range corresponds to a change of pressure within the limits 0.25 to 2.75 kg/cm², the "zero" being 0.5 kg/cm². The differentiating section uses a loop with a pressure drop at the choke. The summing section uses the addition of forces caused by the input pressures in the membrane chambers. A description is given of a pneumatic computer based on these elements and intended for use in the study of high-frequency systems and processes; the maximum operating frequency is about one cycle per second.

The integrating time is unlimited; null-point drift is absent. The pneumatic computer affords the possibility of solving systems of differential equations up to and including the ninth order. The machine consists of 9 integrating sections, 18 coefficient sections, and a main summation section with 12 inputs. The computer is controlled by the opening or closing of valves. Problems can be solved with pneumatic computers both in natural and in variable time scales. The output signal, in the form of an air pressure, can be recorded on a pneumatic device or transferred to an electronic recorder by means of a pneumatic transducer. The computation error is not over 3%.

63. Air-Cooling Calculation of Gas Turbines With the Aid of Electric Analog

"Hydraulic Calculation of Air-Cooling System of a Multistage Gas Turbine With the Aid of Electric Analog," by I. T. Shevets, Ye. P. Dyban, and V. N. Klimenko, Heat Engineering Institute, Academy of Sciences Ukrainian SSR; Moscow, Teploenergetika, No 9, Sep 62, pp 14-17

The air-cooling system of a multistage gas turbine can be visualized as a ramified network of parallel and series-connected hydraulic resistances, each of different absolute value and cross section. The main difficulty in the design of an air cooling network is the determination of the total cross section of all its elements to ensure proper distribution of the cooling air. In testing the cooling system of a gas turbine, similar difficulties arise in solution of the inverse problem of determining the air consumption along individual ducts for given cross section of each passage.

Taking into account the above-mentioned considerations, the Heat Engineering Institute of the Academy of Sciences Ukrainian SSR has designed and built a relatively simple electric analog composed of an assembly of various linear electric resistors able to calculate air-cooling systems of multistage gas turbines. Calculations carried out with the aid of this method for several real gas turbines have shown that results obtained after the second approximation were only from 3% to 4% off the actual values, which might be considered as fully satisfactory for most practical purposes. Calculation time of air cooling for a two-stage rotor of a gas turbine with the aid of such an analog has been reduced about 10 times, while the calculation of cooling air consumption for a four-stage rotor was reduced almost 25 times.

64. Transducer for Instantaneous Speeds and Pressures

"Devices for Recording and Automatically Processing Results of Measurements of Instantaneous Speeds and Pressures," by B. M. Yegidis, from the collection Novyye metody izmereniy i pribory dlya gidravlich. issled. (New Measuring Methods and Instruments for Hydraulic Research), Moscow, Publishing House of the Academy of Sciences USSR, 1961, pp 122-127 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 7-2-73)

"The author describes the principles of operation of instruments, developed at the Institute of Hydrology and Hydraulic Engineering of the Academy of Sciences Ukrainian SSR, designed for computing the dispersion of the pulsation component of instantaneous speed, the integral law of distribution of instantaneous speed, and the moment of correlation of two speeds or pressures. A block diagram is given of the computer amplifier, which includes a pentode with a remote cutoff characteristic, used for squaring the quadratic scale of the transducer."

65. Automatic Coding of Signals

"Automatic Coding of Signals in Contactless Frequency-Varied Telemechanics," by B. K. Skirta, V. S. Romashkan, and S. I. Khitsenko, Institute of Automation, Gosplan, Ukrainian SSR; Kiev, Avtomatika i Priborostroyeniye, No 3, Jul-Sep 62, pp 12-15

A telemetering device for use at substations of power systems has been developed at the Institute of Automation, Gosplan, Ukrainian SSR. The principle of operation of the device consists in detection of object position change with the aid of a scaling circuit. The same scaling circuit is used to code the information on position change. The scaling circuit is triggered during the change of position of one of the objects, thus transmitting the coded signal to the dispatcher point. If a simultaneous change of position of several objects takes place, then the information is transmitted in predetermined sequence. The scaling circuit has two registers, each with eight triggers. Eight different frequencies are used, which make 56 two-position signals possible.

This automatic coding device was tested under laboratory conditions and was found to be quite reliable in operation even when the supply voltage varied up to 15% from normal.

66. Compensation for Gyroscope Drift

"Attaining Efficiency in Devices Compensating for Random Drift in a Free Gyroscope," by I. B. Chelpanov; Moscow, Avtomatika i Telemekhanika, No 8, Aug 62, pp 1078-1082

The free gyroscope is practically the only self-contained device able to fix direction in absolute space. Any gyroscope can perform this function for a limited time interval as determined by its natural time drift. Therefore, fundamental improvement in gyroscope technique is based on reduction of the natural time drift.

This work is concerned with the evaluation of means to improve the performance of a free gyroscope by introducing compensating devices, partially correcting the random drift of the gyroscope. In this work, it is assumed that such compensating devices do not depend on information from any other sources. The device utilizes direct measurements of the drift rate at the initial stage and forms a correction signal during the operation of the gyroscope as a self-contained unit, where the angular position of the gyroscope cannot be controlled.

67. Machine for Monitoring Oil-Refining Process

"Automaton -- Laboratory Assistant"; Leningrad, Leningradskaya Pravda, 14 Apr 62, p 4

The workers of the Institute of Semiconductors, jointly with the Kuybyshev Scientific-Research Institute of the Oil Industry, designed an "automatic laboratory assistant" which continuously monitors the oil-refining process.

The apparatus was tested at the Kuybyshev and Volgograd oil refineries and received high appraisal. At present, it is being demonstrated at the Exhibition of Achievements of the National Economy in Moscow. The Institute of Semiconductors is preparing technical documents for its series production.

68. Automatic Equipment for Maintaining Quasi-Stationary Heat Conditions

"Automatic Equipment for Maintaining Quasi-Stationary Heat Conditions," by V. V. Vlasov, Institute of Chemical Machine Building, Moscow; Minsk, Inzhenerno-Fizicheskiy Zhurnal, Vol 5 No 8, Aug 62, pp 90-92

For the determination of thermophysical coefficients under quasi-stationary heat conditions, it is very important to obtain exact linear heating over a wide range of temperatures.

In this report an automatic unit is described which makes it possible to obtain linear heating using programmed proportional integral-differential control.

69. Nomographic Method for Storing Functions of Several Variables in Machine Memory

"A Nomographic Method for Storing Functions of Many Variables in the Memory of a Machine," by A. N. Kazangapov; Alma-Ata, Izvestiya Akademii Nauk Kazakhskoy SSR, Seriya Matematiki i Mekhaniki, No 10 (14) 1962, pp 86-92

The problem consists of storing a table of a function of several variables in the memory of a machine. To conserve memory, the corresponding nomograph is used in place of the table of the function (which for a large number of unknown variables, would usually be very large). The problem is first considered for a function of two variables and then generalized for a large number of variables. A detailed flow chart of the program is included.

70. Multiplication of Multivalued Numbers in Automata

"Multiplication of Multivalued Numbers in Automata" (presented by Academician A. N. Kolmogorov 13 Feb 62), by A. Karatsuba and Yu. Ofman; Moscow, Doklady Akademii Nauk SSSR, Vol 145, No 2, 11 Jul 62, pp 293-294

The author considers the problem of finding the lower bound of an algorithm for discrete functions, of use in the study of binary automata. Two theorems relating to binary automata are proven.

71. Finite Automata

"Some Classes of Finite Automata," by V. G. Lazarev and Ye. I. Pyl'; Moscow Zhurnal Vybhislitel'noy Matematiki i Matematicheskoy Fiziki, Vol 2, No 4, Jul/Aug 62, pp 695-702

Several classes of finite automata, including a generalized class, are defined. Suggestions are made for shortening the number of their internal operations.

72. Complementary Binary-Decimal Codes With Negative Weights

"Binary-Decimal Codes With Two Negative Weights and Having the Property of Being Complementary," by D. A. Pospelov, Moscow Order of Lenin Power Engineering Institute; Leningrad Izvestiya Vysshikh Uchebnykh Zavedeniy. Priborostroyeniye Vol 5, No 3, 1962, pp 63-66

The paper investigates the question of the existence of binary-decimal codes having two negative weights and possessing the property of being complementary. It is proved that there exist only two groups of codes satisfying these requirements.

The paper was recommended by the chairs, Special Courses of Higher Mathematics and Computer Engineering.

73. Conditions for Stability of Automatic Control Systems

"A Sufficient Condition for the Stability of Nonlinear Automatic Control Systems," by K. Mansurov; Alma-Ata, Izvestiya Akademii Nauk Kazakhskoy SSR. Seriya Matematiki i Mekhaniki, No 10 (14), 1962, pp 56-59

A sufficient condition is given for the stability of an automatic control system in which the nonlinear function $\Phi(\sigma)$ satisfies the relation: $\Phi(\sigma) =$

$$\begin{cases} 1, & \sigma > 0 \\ 0, & \sigma = 0 \\ -1, & \sigma < 0 \end{cases} \quad \lim_{\sigma \rightarrow 0} \frac{\Phi(\sigma)}{\sigma} = 0.$$

74. Czechoslovaks Lay Groundwork for Machine Abstracting

"Factory for Information," by Engr Anton Chrenka and Engr Oldřich Vanek; Bratislava, Priroda a Spolocnost, No 18, Sep 62, pp 28-29

In connection with a general review of efforts at machine translation and eventual machine abstracting of texts, the article states that for almost a year the Division of Mathematics and Applied Linguistics of the Czechoslovak Academy of Sciences has been studying the frequency of occurrence of Czech words. This study includes technical texts. The article points out that the results of this linguistic research will serve as the basis for the first attempts at automatic translation and machine abstracting.

75. Slovak Academy of Sciences Establishes Computer Center

Prague, Obrana Lidu, 17 Jul 62, p 1

The Institute for Machines and Automation (Ustav stroju a automatizace) of the SAV (Slovak Academy of Sciences) in Bratislava recently opened the academy's first computer center. The ZRA-1 computer, which was put into operation, ranks fourth in Czechoslovakia in terms of performance. The center will serve the scientific requirements of the SAV, research institutes, and industrial enterprises. The computer can perform 600-800 operations per second. In 2 hours it can equal the efforts of 50 top mathematicians working 8 hours [daily] for 2 months.

A photograph in the source shows five men around a computer which is presumably the ZRA-1.

76. Review of Developments in Automatic Computers

"Automatic Computers," by Engr Jan Tuma; Prague, Vyroba a Skola, Vol 8, No 1, Sep 62, pp 38-43

The article describes principles involved in the operation of automatic computers, with a brief mention of various Czechoslovak computers. The article is accompanied by a number of photographs of various Czechoslovak and foreign computers and components thereof. (FOR OFFICIAL USE ONLY) (COPYRIGHT by the State Pedagogical Publishing House, Prague, 1962)

Materials77. Analyzer for Direct Investigation of Cavitation Processes

"A Method for Investigating Cavitation Ultrasonic Emissions Using the VNIIG - KA-2 Analyzer," by A. M. Chistyakov, from the collection Novyye metody izmereniy i pribory dlya gidravlich. issled. (New Measuring Methods and Instruments for Hydraulic Research); Moscow, Publishing House of the Academy of Sciences USSR, 1961, pp 162-168 (from Referativnyy Zhurnal -- Avtomatika i Radioelektronika, No 7, Jul 62, p 7-5-37)

"High-speed photography was used at the All-Union Scientific Research Institute of Hydraulic Engineering to study the physical nature of cavitation in a liquid and investigate the mechanism of cavitation destruction of materials. The use of motion-picture photography, having a speed of 4,000 frames per second, and observation of the area of cavitation destruction of the surface of a concrete sample verified the present views concerning the phenomenon of cavitation, according to which the cavitation area is considered a region occupied by a two-phase liquid, with flow in the region being terminated by a rapid compression motion at supersonic speeds. The location of this compression motion corresponds to the boundary of the cavitation region. A description is given of the KA-2 cavitation analyzer used to record and analyze a broad spectrum of ultrasound emissions directly from the cavitation analyzer is divided into five ranges (kc): 5.5 - 18; 17 - 50; 50 - 175; 165 - 580; and 450 - 1,600. The author gives a diagram of the analyzer and the method of calibrating it and describes the construction of the piezoelectric transducers, containing open barium titanate discs, and their calibration methods."

78. Utilization of Coal Ash In Cast Stone Production

"Utilization of Electric Station Ash in Cast Stone Production," by V. A. Dorofeyev and I. Ye. Lipovskiy; Moscow, Energetik, No 3, Aug 62, pp 12-14

The Donetsk stone casting plant has conducted research on utilizing the ash from thermal power plants for production of cast stone articles such as acid resistant pipes, various linings, balls for ball mills, etc.

The average composition of the ash was: 52-56% of SiO_2 , 21-26% of Al_2O_3 , 12-16% of $\text{FeO} + \text{Fe}_2\text{O}_3$, 3-4% of CaO and 2-3% of MgO . The charge fed to the melting furnace consisted of 80% ash, 20% dolomite and 3% calcium fluoride. The melting temperature of the charge was about 1400°C , and the duration of the melt was carried out at 900°C for about 20 min. To improve resistance to acid corrosion, up to 20% silica sand was added to the charge. The properties of the cast stone are as follows: specific weight - 3 gr/cm³, resistance to acids - about 98%, abrasion loss - about 0.015 gr/cm², permissible pressure in tubes up to 10 atm.

The cast stone made with ash was found to be almost identical in properties to that made with basalt rock.

Thin-walled metal tubes with a cast-stone lining proved to be highly resistant to chemical action of corrosive solutions.

Power Engineering

79. Steam-Gas Power Generating Installations

"What Is a Steam-Gas Installation"; Moscow, Ekonomicheskaya Gazeta, 11 Aug 62, p 10

A. Romanov, Chief Engineer for Leningrad State Power Plant No 1, describes the final preparations prior to putting into operation the first steam-gas power generating installation in the USSR.

The Central Boiler-Turbine Institute (TsKTI) imeni Polzunov in Leningrad and the Siberian Department, Academy of Sciences USSR in Novosibirsk have designed a steam-gas power installation in which both steam-turbine and gas-turbine cycles are combined. This steam-gas installation does not have any conventional steam boiler, but has a high-pressure steam-generator. Combustion of the fuel takes place at a constant pressure, and the products of combustion are admitted to the gas turbine, the generated steam to the steam turbine. In fact, two power generating bodies are formed simultaneously in the steam generator, one being the gas and the other steam. The efficiency of the installation might be as high as 45% if the temperature of gases

fed to gas turbine are as high as 750° C. The efficiency of the installation can be further increased by raising the temperature of the gases to 900° C. Since the steam generator occupies a relatively small space, it does not require a special building and can be accommodated in the machine room. Therefore, the size of the station and consequently its cost, are reduced up to 35%. The specific metal consumption for such a steam generator is only 0.8 kg against about 2.5 kg for conventional steam boilers.

It is expected that steam-gas power generating installations will save from 10 to 15% fuel, as compared to conventional steam power installations is oil or gas, although coal is not excluded.

The erection of this first steam-gas installation at the Leningrad State Electric Station No 1 has been delayed due to failure of the Baltiyskiy Plant imeni Ordzhonikidze to deliver the steam generators on time.

Miscellaneous80. New Soviet Inventions

"Scientific and Technical News"; Moscow, Fizika v Shkole, Jul/Aug 62, pp 16-18

The article contains several short reports:

"At the Machine Reliability and Breakdown Forecasting Laboratory of the Siberian Affiliate of the All-Union Scientific Research Institute for Mechanization of Agriculture, an interesting instrument for prevention of possible breakdown was invented. This instrument is in the form of a computer which analyses the operating conditions of the whole mechanism or its individual components. The nature of the needed repair can be determined with the aid of this device without dismantling the engine.

"The collective of Moscow Electrical Plant imeni V. V. Kuybyshev has developed powerful voltage-boosting transformers which regulate voltage even under a heavy load. These transformers were designed for a three-phase transformer bank of the Bratskaya Hydroelectric station. The capacity of the transformer is 750,000 kw at a voltage of 500/242 kv.

"Two experimental ac electric locomotives (the first in the Soviet Union), type 'N62' with silicon rectifiers were built jointly by the collective of the Scientific Research Institute for Electric Locomotive Building and the Novocherkassk Electric Locomotive Building Plant. The rating of this locomotive is 5,700 hp and it is now undergoing thorough testing.

"Very valuable and interesting investigations were carried out at the Institute of Metallurgy imeni A. A. Baykov in the Laboratory of the Doctor of Technical Sciences P. K. Oshchepkov. Here the processed part, which has to be coated by a thin layer of some material, is placed in the apparatus consisting of a huge cathode-ray tube. Voltage is applied to the tube after evacuating the envelope. Under the action of strong electric field a stream of electrons flows from the cathode to the target made of the coating material, atomizing the later and depositing it on the processed part. The thickness of deposited film can be controlled within the limits of 10^{-1} to 10^{-4} mm. Thus it becomes possible to deposit a thin layer of nickel, tungsten, molybdenum, copper, lead, glass, etc. It will be possible to make radio parts and other components with multiple coating.

81. Application of Gravitational Polarization Phenomenon

"A Method of Receiving and Exciting Gravitational Waves," by V. A. Bunin and R. I. Raykhlin, USSR Patent, Class 21 a⁴, 60, No 138279, 20.05.61 (from Referativnyy Zhurnal -- Avtomatika i Radicelektronika, No 7, Jul 62, p 7-7-22)

"The use of the gravitational polarization phenomenon, discovered by the Russian scientist R. Kolli in 1872, is proposed. In a vertical glass tube containing an AgNO₃ solution, heavy silver ions with a positive charge settle due to the influence of gravity. As a result, a difference in potential appears between the ends of the tube and prevents further precipitation of the ions. Gravitational wave generators and detectors based on the phenomenon of gravitational polarization of various solids are patented."

82. International System of Units Goes Into Full Effect in USSR on 1 Jan 1963

"SI--A New International System of Units," by G. B. Burdun, Member of the International Committee on Weights and Measures; Moscow, Nauka i Zhizn', May 62, pp 20-27

The article contains the following passages:

"The 11th General Conference on Weights and Measures, that convened in Paris in 1960, has ratified the International System of units (SI), which is based on six fundamental units: the meter, kilogram, second, ampere, degree Kelvin, and candle power.

"Thus, the era of the SI system has absorbed the metric system.

"The Soviet Union, recognizing the great importance of international measures, has fully accepted the new system of units and is carrying out a number of measures for its speedy and universal usage. The State standard (GOST) 9867-61 'International System of Units' (Mezhdunarodnaya sistema vedinit) was ratified in September 1961. The target date for its introduction is 1 January 1963.

"Although most of the units in the SI system are well known, the full transition to the new system will require careful and detailed preparation. It will be necessary to translate into new units all specifications, all published scientific-engineering and educational literature, and to acquaint with the new system of units a great number of persons engaged in national economy, teachers and students."

83. Development of Electrotechnology in USSR

"Wider Possibilities to the Electrontechnology," by
A. But and V. Levitov; Moscow, Kommunist, No 11, Jul 62,
pp 54-57

The term electron-technology [electrotechnology] is defined by the author as a series of processes, such as electroplating, electroseparation, electromixing, etc., where electric current acts directly on the processed material.

The article contains the following passages:

"Electrotechnology is rather widely applied at various enterprises of a number of sovnarkhozes (Moscow, Leningrad, Gor'kiy, Krasnodar), and a more extensive application of it is anticipated. However, to our regret, such expansion is hampered by insufficient information available on newly developed processes in the field of electrotechnology and by lack of centralized equipment production. Therefore, enterprises are often obliged to buy equipment abroad, or use improper domestic equipment. An insufficient number of available experts further hampers the situation.

"Taking into consideration the economic significance of electrotechnology, urgent measures are needed to eliminate the existing shortcomings that hamper its wider application.

"There is also an urgent need to organize the training of experts in the field of electrotechnology. The solution of this problem depends mainly on the Ministry of Higher and Secondary Special Education of USSR. It seems to be feasible to organize appropriate departments in a number of leading electrical engineering and technological institutes, and possibly, in some of the universities.

"It would be important to intensify the investigation of electrotechnology problems at special scientific-research organizations, to advance these problems to the rank of the most important, and to improve radically the supply of equipment as well as to provide for the demand in highly qualified personnel. Here, the participation of the State Committee of the Council of Ministers USSR will be needed to coordinate the scientific-research work. The Committee has already made some efforts in this direction. A commission of experts was called, which studied the present state and future prospects of electrotechnology development. The problem of electrotechnology was discussed at the Scientific Council for "Power Engineering and Electrification". The council drew a resolution that electrotechnology is an independent scientific field which, due to its importance to the national economy should be advanced to the forefront.

"The creation of a scientific base for electrotechnology requires establishment of a well equipped main scientific center with an ample productive capacity, It should not duplicate, but supplement and guide the work of special institutes, provide them with the solution of fundamental scientific problems, thus eliminating the duplication and primitiveness which is still found in some of these institutes.

"Both the Academy of Sciences USSR and the republic academies should contribute to the creation of a scientific foundation for electrotechnology."

84. East German Laser Commission Created

"Laser Commission Established"; BERLIN, Die Technik,
No 9, Sep 62, p 630

The Research Council of the GDR (Forschungsrat) has established a "Laser Commission" to coordinate and direct research work in the field of light amplification and light generation on the laser principle. The commission, which will consist of 15 scientists from academies and advanced schools, as well as personnel from industrial research facilities, is headed by Prof Dr K. Kuehne.

The immediate assignments of the commission consist of concentrating available development capacity with respect to a gas laser and a solid-body laser and to effect an extensive division of research tasks. The commission will initiate collaboration with Czechoslovakia and the USSR in this field. Subsequently, the commission will guide laser development to take advantage of existing possibilities and meet East German needs.

85. Czechoslovak Linguistics Laboratory Established

"Mechanization in Linguistics"; Prague, Hospodarske Noviny,
No 35, 31 Aug 62, p 2

The Institute for the Czech Language of the Czechoslovak Academy of Sciences has worked out a design for equipment for a mechanized laboratory. The laboratory will be equipped with data-processing machines and will serve linguistic purposes for Czechoslovakia in general.

Utilization of the machines for linguistics work is conditioned upon the machines' ability to express accurately the alphabet of the language which they are to serve. Equipment at the institute for the Czech Language is expected to involve punch-card machines which could

work with codes for Czech, Slovak, and Russian alphabets and perhaps for all the Slavic languages. This will permit close cooperation of Czech and Slovak linguists and Slavists linguists. It will also permit coordination of various associated tasks and prevent duplication, which is still a problem, and combination [centralization] of various documentation] of various documentation will be possible.

86. Czechoslovak Planning of Scientific Research

"Institute for Planning of Science"; Prague, Hospodarske Noviny, No 36, 7 Sep 62, p 2

The resolution of the Czechoslovak government on increasing the role of science and technology in development of productive forces of the national economy has been manifested in the new arrangement of planning of research work.

The Secretariat for the State Plan of Research, which has heretofore executed the jurisdiction of the CSAV (Czechoslovak Academy of Sciences) in the direction and coordination of research on scientific tasks of fundamental economic significance, was abolished. In addition to three complex social science, two natural science, and several technical science tasks, all complex tasks of the state plan of scientific research were transferred to the newly established State Commission for Development and Coordination of Science and Technology. Complex scientific research tasks, whose planning and coordination were left under the jurisdiction of the CSAV, were allocated among the newly established scientific collegia of the CSAV.

The CSAV will continue to provide scientific and methodological regulation of work of all scientific research facilities and advanced schools in the field of natural and social sciences and will prepare recommendations on important basic research plans whose fulfillment it will also control.

Thus, in the fields of natural and social sciences, in addition to its own facilities, the CSAV will regulate and influence the execution of basic research tasks in all other research facilities and will promote their development.

On the basis of the decision of the Presidium of the CSAV, theoretical activity and planning practice will be concentrated in the Institute for Planning of Science (Institut pro planovani vedy), which will evaluate results on theoretical studies and develop and refine these. The institute will be directly involved in activities of the scientific organs of the CSAV and will be directed by the Presidium of the CSAV.

87. Yugoslav Scientific and Technical Documentation Programs

"Specialized Centers for Technical and Scientific Documentation Being Established"; Belgrade, Privredni pregled,
8 Aug 62, p 4

The Institute for Mining of Yugoslavia in Belgrade and the Institute for the Food Industry of Yugoslavia in Novi Sad have begun organizing specialized centers for technical and scientific documentation. Preparations for setting up such a center are also being carried out by the Zenica Ironworks Institute, and possibilities are being considered for the formation of specialized centers for technical documentation under the Institute for Petroleum in Zagreb and the Institute for Textiles in Maribor, as well as in the electrical products industries, nonmetals industries, and other branches of the economy.

Several enterprises, such as the "Rade Koncar" in Zagreb, the "Sever" in Subotica, and the Belgrade Electric Enterprise, have already organized good documentation services. Immediately before the plans for the Belgrade port were drafted, the documentation on the technological solutions to problems of such a project was worked out in the Yugoslav Center for Technical and Scientific Documentation (Jugoslovenski centar za tehnicku i naucnu dokumentaciju). In this work, various current world concepts and their advantages and shortcomings were pointed out.

Enterprises which have a good documentation service regularly follow developments in world science and technology and thus are in a position to adapt their production to the most current methods.

Domestic development can also be followed through a well ordered and well managed documentation system. Observing domestic development often contributes to maximal use of domestic raw materials and of reproduction materials and contributes to more economical production.

By establishing specialized scientific and technical documentation centers in institutes, many shortcomings could be avoided. Producers would be acquainted with all new products, both domestic and foreign. They would know which processes to use in manufacturing various articles and what foreign equipment would incorporate the most modern technological advantages. The need for frequent trips abroad would be lessened, since many questions could be answered from the literature which individual centers would have at their disposal.

The Yugoslav Center for Technical and Scientific Documentation has several thousand foreign periodicals and various other documents at its disposal. By eventually decentralizing this service, even better and more complete use of technical and scientific documentation can be assured.

88. New Geological Map of Czechoslovakia

Advertisement; Prague, Sbornik Ceskoslovenske Spolecnosti Zemepisne, Vol 67, No 3, Aug 62

The Czechoslovak Central Institute of Geology and the "D. Stur" Geological Institute, in cooperation with Czechoslovak advanced schools and research agencies, have begun publication of a new geological map of Czechoslovakia in a scale of 1:200,000 and accompanying explanatory notes. This publication is the major project of the Second Five-Year Plan for these institutes. Vladimir Zoubek, Dr of Sciences, Corresponding Member of the Czechoslovak Academy of Sciences, and Laureate of the State Prize, carried out the major editorial work.

The map is published in 20-30 colors on 33 sheets, each measuring 68x92 centimeters. The price per sheet is 9.50 crowns. In 1962, the "Plazen" and "Nachod" sheets will be published. Publication of the remaining sheets will continue over the next 2 years. Each sheet has a corresponding volume of explanatory notes. The "Plazen" volume of explanatory notes comprises 214 pages and sells at 17.60 crowns; the "Nachod" volume comprises 185 pages and sells at 16.10 crowns.

The map is being published in a General Distribution and a Secret version. The Secret version may be obtained only through the Special Division, Central Geological Institute, Prague 1, Malostranske namesti 19. The General Distribution version may be obtained from the "Geofond" Sales Outlet for Geological Literature, Hradebni 9, Prague 1. (FOR OFFICIAL USE ONLY) (COPYRIGHT by the Publishing House of the the Czechoslovak Academy of Sciences, Prague, 1962)

89. Czechoslovak Geomorphological Expedition to Bulgaria

"Briefs From Home"; Prague, Rude Pravo, 5 Sep 62, p 2

A scientific expedition from the Cabinet for Geomorphology of the Czechoslovak Academy of Sciences in Brno departed on 4 September 1962 for a 35-day study trip in Bulgaria. The trip, which will include studies of some Bulgarian regions from all geographic standpoints, was undertaken upon the invitation from the Sofia State University.

90. Recent Soviet Conferences in Engineering, Geology, and Geography

The conferences listed below were reported or announced in recent issues of Soviet periodicals. Included in the listing are the date and location of the conference, sponsoring organizations, and source. Unless otherwise indicated, it is assumed that there was no non-Soviet participation in the conferences.

- a. Third Scientific-Technical Conference on Automatic Control and Methods of Electrical Measurements; 19-23 September 1961, Novosibirsk; sponsored by the Institute of Automatics and Electrometry of the Siberian Department of the Academy of Sciences USSR, and the Sovmarkhoz of the Novosibirsk Economic Rayon. (Izvestiya Vysshikh Uchebnykh Zavedeniy -- Priborostroyeniye, Vol 5, No 3, 1962, p 156)
- b. Conference on Problems of the Development, Utilization, and Investigation of Materials for Power Units of 300, 500, and 800 Megawatt Capacity; no date given, Leningrad; sponsored by the Central Boiler and Turbine Institute imeni I. I. Polzunov. (Energomashinostroyeniye, No 7, Jul 62, p 39)
- c. All-Union Scientific-Technical Conference on High-Power Turbogenerators; July 1962, Khar'kov. (Pravda Ukrainy, 31 Jul 62, p 3)
- d. Scientific-Technical Conference on Corrosion-Abrasive and Cavitation Resistance of Materials in Hydroturbines; no date given, Moscow; sponsored by the Central Scientific Research Institute of Technology and Machine Building, the Leningrad Metal Working Plant, and the Moscow and Leningrad Oblast Branches of the Scientific-Technical Society of the Machine-Building Industry; next conference to be held in 1964. (Energomashinostroyeniye, No 7, Jul 62, p 40)
- e. Eleventh Annual Conference on Structural Mechanics of Ships; April 1962, Leningrad; sponsored by the Section on Structural Mechanics and Ship Hull Construction of the Central Board of the Scientific-Technical Society of the Ship Building Industry. (Sudostroyeniye, No 8, Aug 62, p 60)
- f. Conference of the Section on "Perspective Types of Ocean and River Vessels, Marine Equipment, and Automation" of the State Committee for Coordination of Scientific Research Work; March 1962. (Sudostroyeniye, No 7, Jul 62, p 87)
- g. Scientific-Technical Conference on Automation of Marine Electrical Equipment; March 1962, Leningrad; sponsored by the Central Board of the Scientific-Technical Society of the Ship Building Industry, the Central Board of the Scientific-Technical Society of the Power Engineering Industry, and the Leningrad Branch of the Scientific-Technical Society of Water Transport. (Sudostroyeniye, No 7, Jul 62, p 85)

C-O-N-F-I-D-E-N-T-I-A-L

h. Conference on the Use of High-Speed Diesels in the National Economy; no date given, Leningrad; sponsored by the Central Board of the Scientific-Technical Society of the Ship Building Industry. (Sudostroyeniye, No 8, Aug 62, p 62)

i. Conference on the Problem of Mechanization and Automation of Ventilation for Coal and Ore Mining Shafts; January 1962; sponsored by the State Committee of the Council of Ministers Ukrainian SSR for Coordination of Scientific Research Work. (Ugol', No 9, Sep 62, p 59)

j. Conference on Problems of Improving Systems, Technology, and Mechanization of Processes in the Underground Processing of Thick Ore Deposits; March 1962, Moscow; sponsored by the Institute of Mining imeni Skochinskiy. (Mekhanizatsiya i Avtomatizatsiya Proizvodstva, No 6, Jun 62, p 56)

k. Seminar on Physical Properties of Rocks Under High Pressures; 27-29 March 1962; sponsored by the Scientific Council on the Complex Problem "Structure and Development of the Earth," and the Institute of Physics of the Earth imeni O. Yu. Shmidt of the Academy of Sciences USSR. (Vestnik Akademii Nauk SSSR, No 8, Aug 62, p 117)

l. Third Inter-Republic Conference on a Generalization of Theoretical and Work Experience in the Field of Soil Fastening and Compaction; April 1962, Kiev; sponsored by the Coordination Council of the Academy of Construction and Architecture of the Ukrainian SSR, the Scientific Research Institute of Structural Bases and Foundations, the Geology Department of Moscow State University, and the Ukrainian Board of the Scientific-Technical Society of the Construction Industry. (Osnovaniya, Fundamenty i Mekhanika Gruntov, No 4, 1962, p 26)

m. Second All-Union Tectonics Conference; last of August 1962, Dushanbe; sponsored by the Institutes of Geology of the Academy of Sciences USSR and the Academy of Sciences Tadzhik SSR; 15 years since the last conference. (Kommunist Tadzhikistana, 28 Aug 62, p 1)

n. Third All-Union Conference on Natural Laws Governing the Formation and Distribution of Endogenic Ore Deposits; 18-7 September 1962, Baku; sponsored by the Academy of Sciences USSR, the Academy of Sciences Azerbaydzhan SSR, the Ministry of Geology and Mineral Conservation USSR, and the Azerbaydzhan Republic Administration of Geology and Mineral Conservation. (Bakinskiy Rabochiy, 19 Sep 62, p 4)

o. First Conference of Young Geographers of Siberian Department of the Academy of Sciences USSR. (Izvestiya Sibirskogo Otdeleniya Akademii Nauk SSSR, No 6, 1962, p 115)

III. CONFERENCES

91. East German Conference on Radioactive Isotopes

"Fourth Isotope Conference of the Chamber of Technology";
Leipzig, Isotopentechnik, No 7, Jul 62, p 223

The previously announced conference on "Radioactive Isotopes and Industrial Measuring Techniques" will not be held in Dresden due to the anticipated large number of participants. It will instead be held in Goerlitz on 1-3 November 1962.

Nearly 50 lectures have already been announced, including 3 by persons from the Hungarian People's Republic. Additional lecture applications are expected from friendly foreign countries. Mrs Prof Dr Engr L. Herforth, Dr G. Vormum, and Dr G. Sitzlack are among those who have agreed to deliver lectures at the plenary session.

Conference programs may be obtained from the central administration of the Chamber of Technology, Technical Association for Power and Water Supply, Berlin W 8, Ebertstrasse 27.

92. Forthcoming Czech Geodetic Seminar and Conference

"Miscellaneous"; Prague, Geodeticky a Kartograficky Obzor,
No 8, Aug 62, p 160

The City Committee of the Specialized Group for Geodesy and Cartography (Odborna skupina geodezie a kartografie) in Prague has been charged by the committee of the national Specialized Group for Geodesy and Cartography with the conduct of a seminar on mechanization and automation of geodetic, cartographic, and photogrammetric work in Prague in March 1963 and with preparation for the Fourth National Geodetic Conference in 1963.

The Preparatory Committee has established two commissions -- an organization committee and a topic committee. The Organization Committee, headed by Engr B. Volfik of the Research Institute for Geodesy, Topography, and Cartography, will arrange seminars, conferences, and exhibitions, including social and economic matters, publication, and foreign participation. The Topic Commission, headed by Engr A. Trpka of the Central Administration for Geodesy and Cartography, will plan and arrange the make up of the seminar which is to evaluate the current state of mechanization and automation of geodesy, photogrammetry, and cartography in Czechoslovakia and abroad, study the possibilities of maximum mechanization and automation of all surveying facilities, and establish directions and goals for further development.

Enterprise branches of the Czechoslovak Scientific and Technical Society have been requested to report the names of members interested in working on a commission. Names are to be submitted by 5 September 1962. The preparatory committee expects suggestions from all work centers on the organization and content of the seminar. (FOR OFFICIAL USE ONLY) (COPYRIGHT by the State Publishing House for Technical Literature, Prague, 1962)

93. Forum of East German Lubrication Technicians

"Second Forum of Lubrication Technicians"; Berlin, Die Technik, No 9, Sep 62, p 657

The technical committee "Mineral Oils and Lubrication Technology" and the enterprises section of the Chamber of Technology will hold a forum on 14-15 November 1962 which will begin at 1000 hours at the Culture Palace of the "Otto Grotewohl" People-Owned Combine in Boehlen. The following lectures will be delivered:

Prietsch, chemical engineer: "Chemical-Physical and Mechanical-Dynamic Research Methods Concerning Lubricants and Their Practical Significance."

Keil, graduate chemist: "The Status of Standardization and Development in the Field of Lubricants in the GDR."

Schmidt, graduate engineer: "Studies Concerning the Production of a Variety of Models of Lubricators and Grease Nipples for the Chemical Industry."

Gedecke: "Cables and Cable Lubricants."

Eifler, graduate chemist; and Koenig and Taeucher, chemical engineers: "The Turbine Oil Supply."

Tscherner, graduate engineer: "The Refrigerator Oil Situation."

Engineer Schrufer: "Lubrication of Wheel Flanges of Wheel Sets."

Engineer Schoenersted: "Transmission Lubrication."

Applications are to be sent to the Chamber of Technology, Enterprise Section, "Otto Grotewohl" People-Owned Combine, Boehlen, Kreis Borna, before 1 October 1962.

94. Conference on Cavitation- and Corrosion-Abrasive Destruction

"Scientific-Technical Conference on Corrosion-Abrasive and Cavitation Resistance of Materials in Hydroturbines," by N. S. Kuznetsov; Leningrad, Energomashinostroyeniye, No 7, July 62, p 40

The subject conference was held in Moscow [no date given] and was sponsored by the Central Scientific Research Institute of Technology and Machine Building, the Leningrad Metal Working Plant imeni 22d Congress of the CPSU, and the Moscow and Leningrad Oblast Branches of the Scientific-Technical Society of the Machine Building Industry. The conference resolved to call the next regular conference on the control of cavitation and corrosion-abrasive destruction in 1964.

95. Conference on Automatic Control and Electrical Measurements

"Conference on Automatic Control and Methods of Electrical Measurements," by S. T. Vas'kov; Leningrad, Izvestiya Vysshikh Uchebnykh Zavedeniy -- Priborostroyeniye, Vol 5, No 3, 1962, pp 156-157

This report on the proceedings of the Third Scientific-Technical Conference on Automatic Control and Methods of Electrical Measurements, held on 19-23 September 1961 in Novosibirsk and organized by the Institute of Automatics and Electrometry of the Siberian Department of the Academy of Sciences USSR and the Sovmarkhoz of the Novosibirsk Economic Rayon, notes that the next (Fourth) Conference on Automatic Control and Methods of Electrical Measurements will be held in the autumn of 1962 in Novosibirsk.

96. Czechoslovak Geodetic, Cartographic, and Photogrammetric Seminar and National Geodetic Conference

"Miscellaneous"; Prague, Geodeticky a Kartograficky Obzor, No 8, Aug 62, p 160

The City Committee of the Specialized Group for Geodesy and Cartography (Odborna skupina geodezie a kartografie) in Prague has been charged by the committee of the national Specialized Group for Geodesy and Cartography with the conduct of a seminar on mechanization and automation of geodetic, cartographic, and photogrammetric work in Prague in March 1963 and with preparations for the Fourth National Geodetic Conference in 1963.

The Preparatory Committee has established two commissions: an organizational committee and a topic committee. The Organizational Committee, headed by Engr B. Volfik of the Research Institute for Geodesy, Topography, and Cartography, will arrange seminars, conferences, and exhibitions, including matters of social, economic, publication, and foreign participation. The Topic Commission, headed by Engr A. Trpka of the Central Administration for Geodesy and Cartography, will plan and arrange the make up of the seminar which is to evaluate the current state of mechanization and automation of geodesy, photogrammetry and cartography in Czechoslovakia and abroad, to study possibilities of maximum mechanization and automation of all surveying facilities, and to establish the directions, and goals for further development.

Enterprise branches of the Czechoslovak Scientific and Technical Society have been requested to report the names of members having an interest in working on some commission. The names are to be submitted by 5 September 1962. The Preparatory Committee expects suggestions from all work centers on the organization and content to the seminar. (FDR OFFICIAL USE ONLY)
(COPYRIGHT by the State Publishing House for Technical Literature, Prague, 1962)

97. East German Miners and Metallurgists Meet

Berlin, Kernenergie, No 7, Jul 62, p 576

The annual meeting of the Society of German Miners and Metallurgists will be held in Leipzig during 8-10 November 1962.

* * *

7 September 2004

Ms. Roberta Schoen
Deputy Director for Operations
Defense Technical Information Center
7725 John J. Kingman Road
Suite 0944
Ft. Belvoir, VA 22060

Dear Ms. Schoen:

In February of this year, DTIC provided the CIA Declassification Center with a referral list of CIA documents held in the DTIC library. This referral was a follow on to the list of National Intelligence Surveys provided earlier in the year.

We have completed a declassification review of the "Non-NIS" referral list and include the results of that review as Enclosure 1. Of the 220 documents identified in our declassification database, only three are classified. These three are in the Release in Part category and may be released to the public once specified portions of the documents are removed. Sanitization instructions for these documents are included with Enclosure 1.

In addition to the documents addressed in Enclosure 1, 14 other documents were unable to be identified. DTIC then provided the CDC with hard copies of these documents in April 2004 for declassification review. The results of this review are provided as Enclosure 2.

We at CIA greatly appreciate your cooperation in this matter. Should you have any questions concerning this letter and for coordination of any further developments, please contact Donald Black of this office at (703) 613-1415.

Sincerely,



Sergio N. Alcivar
Chief, CIA Declassification Center,
Declassification Review and Referral
Branch

Enclosures:

1. Declassification Review of CIA Documents at DTIC (with sanitization instructions for 3 documents)
2. Declassification Status of CIA Documents (hard copy) Referred by DTIC (with review processing sheets for each document)



Processing of OGA-Held CIA Documents

The following CIA documents located at DTIC were reviewed by CIA and declassification guidance has been provided.

| OGA Doc ID | Job Num | Box | Fldr | Doc | Doc ID | Document Title | Pub Date | Pages | Decision | Proc Date |
|------------|-----------|-----|------|-----|--------|---|------------|-------|----------------------|-----------|
| AD0343932 | 78-03117A | 213 | 1 | 18 | 5117 | Scientific Information Report Chinese Science (34) | 10/22/1963 | 89 | Approved For Release | 3/29/2004 |
| AD03444702 | 78-03117A | 214 | 1 | 21 | 5149 | Scientific Information Report Chinese Science (35) | 11/4/1963 | 133 | Approved For Release | 3/29/2004 |
| AD0344965 | 78-03117A | 215 | 1 | 4 | 5163 | Scientific Information Report Chinese Science (36) | 11/7/1963 | 133 | Approved For Release | 3/29/2004 |
| AD0345229 | 78-03117A | 215 | 1 | 23 | 5182 | Scientific Information Report Chinese Science (37) | 11/18/1963 | 179 | Approved For Release | 3/29/2004 |
| AD0345750 | 78-03117A | 216 | 1 | 20 | 5209 | Scientific Information Report Chinese Science (38) | 12/11/1963 | 174 | Approved For Release | 3/29/2004 |
| AD0344419 | 78-03117A | 217 | 1 | 20 | 5241 | Scientific Information Report Chinese Science (39) | 12/27/1963 | 75 | Approved For Release | 3/29/2004 |
| AD0346493 | 78-03117A | 218 | 1 | 21 | 5277 | Scientific Information Report Chinese Science (40) | 1/10/1964 | 115 | Approved For Release | 3/29/2004 |
| AD0346725 | 78-03117A | 219 | 1 | 27 | 5320 | Scientific Information Report Chinese Science (41) | 1/27/1964 | 78 | Approved For Release | 3/29/2004 |
| AD0347051 | 78-03117A | 220 | 1 | 25 | 5359 | Scientific Information Report Chinese Science (42) | 2/6/1964 | 78 | Approved For Release | 3/29/2004 |
| AD0347849 | 78-03117A | 221 | 1 | 39 | 5407 | Scientific Information Report Chinese Science (43) | 3/2/1964 | 174 | Approved For Release | 3/29/2004 |
| AD0347929 | 78-03117A | 222 | 1 | 25 | 5438 | Scientific Information Report Chinese Science (44) | 3/5/1964 | 104 | Approved For Release | 3/29/2004 |
| AD0348352 | 78-03117A | 223 | 1 | 20 | 5479 | Scientific Information Report Chinese Science (45) | 3/20/1964 | 117 | Approved For Release | 3/29/2004 |
| AD0349491 | 78-03117A | 225 | 1 | 18 | 5560 | Scientific Information Report Chinese Science (46) | 4/24/1964 | 118 | Approved For Release | 3/29/2004 |
| AD0349657 | 78-03117A | 225 | 1 | 34 | 5581 | Scientific Information Report Chinese Science (47) | 5/4/1964 | 98 | Approved For Release | 3/29/2004 |
| AD0332751 | 78-03117A | 183 | 1 | 29 | 3940 | Scientific Information Report Electronics And Engineering (22) | 10/19/1962 | 68 | Approved For Release | 3/29/2004 |
| AD0333146 | 78-03117A | 186 | 1 | 20 | 4041 | Scientific Information Report Electronics And Engineering (23) | 11/23/1962 | 73 | Approved For Release | 3/29/2004 |
| AD0334103 | 78-03117A | 188 | 1 | 37 | 4136 | Scientific Information Report Electronics And Engineering (24) | 12/20/1962 | 62 | Approved For Release | 3/29/2004 |
| AD0334236 | 78-03117A | 190 | 1 | 40 | 4217 | Scientific Information Report Electronics And Engineering (25) | 1/22/1963 | 48 | Approved For Release | 3/29/2004 |
| AD0334769 | 78-03117A | 193 | 1 | 39 | 4339 | Scientific Information Report Electronics And Engineering (26) | 2/28/1963 | 68 | Approved For Release | 3/29/2004 |
| AD0335480 | 78-03117A | 196 | 1 | 17 | 4436 | Scientific Information Report Electronics And Engineering (27) | 3/21/1963 | 95 | Approved For Release | 3/29/2004 |
| AD0336306 | 78-03117A | 199 | 1 | 2 | 4538 | Scientific Information Report Electronics And Engineering (28) | 4/25/1963 | 69 | Approved For Release | 3/29/2004 |
| AD0332433 | 78-03117A | 183 | 1 | 35 | 3946 | Scientific Information Report Organization And Administration Of Soviet Science (5) | 10/22/1962 | 60 | Approved For Release | 3/29/2004 |