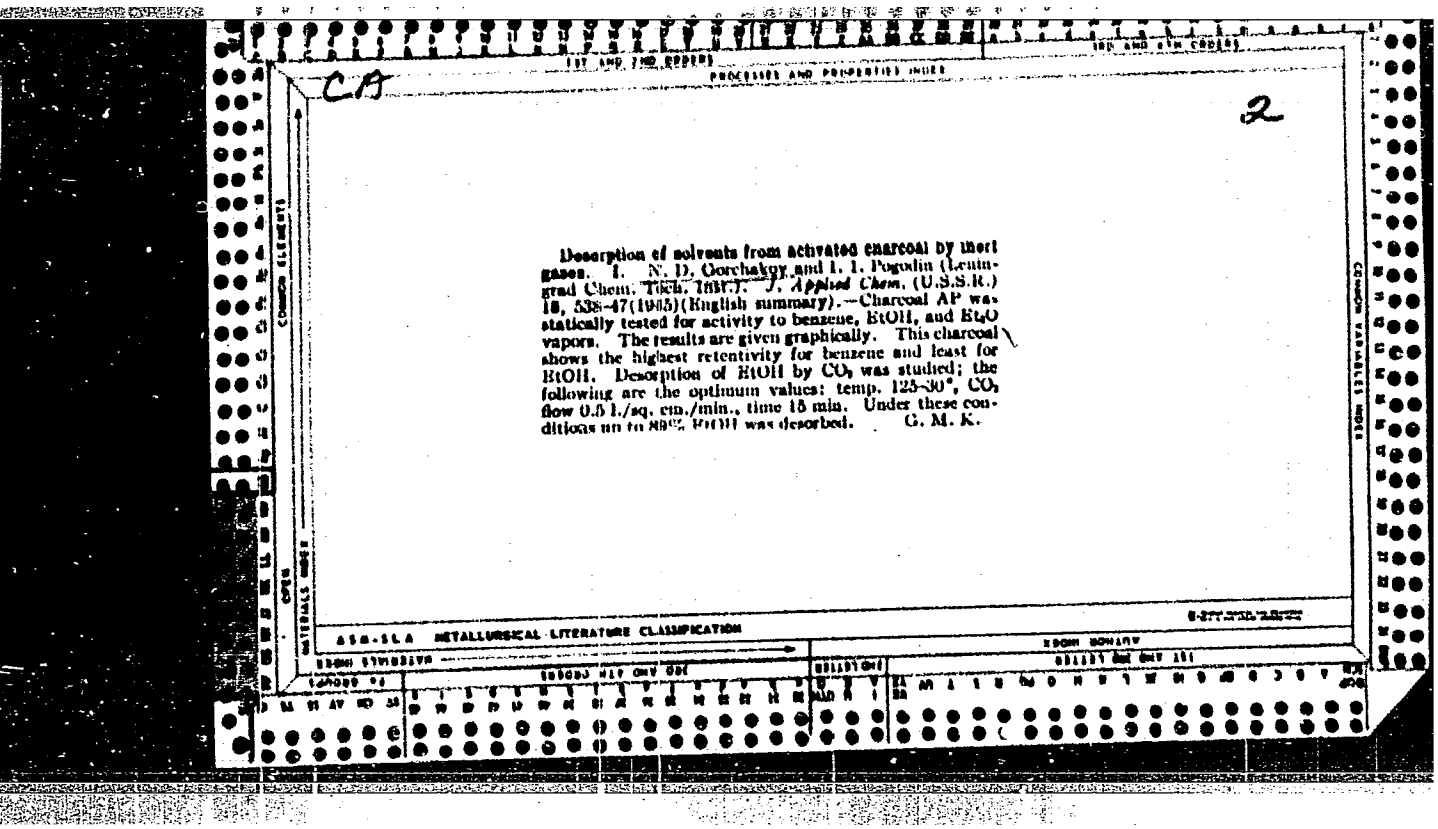
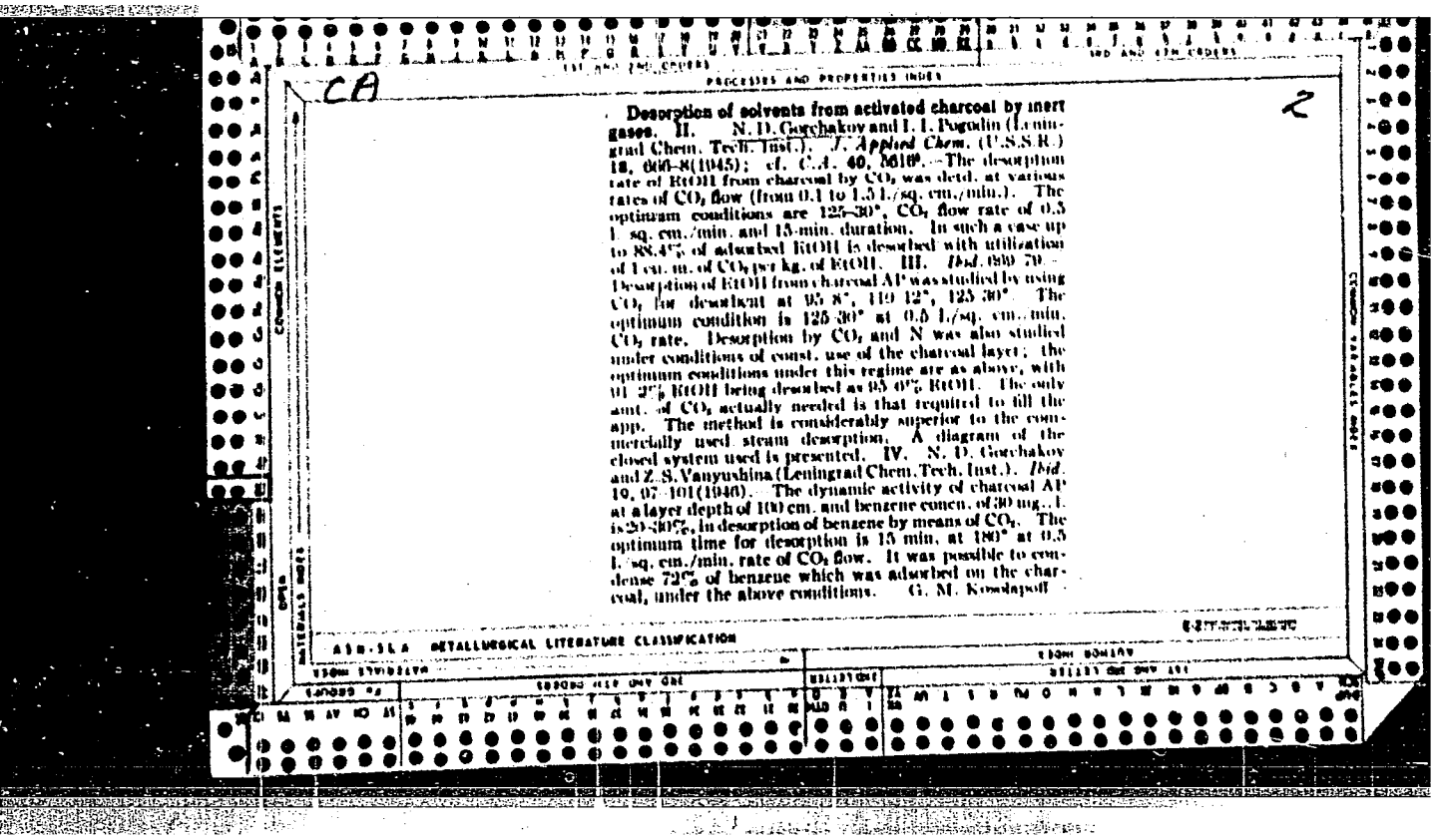


CA

2

Desorption of solvents from activated charcoal by inert gases. I. N. D. Gorchakov and I. I. Pogodin (Leningrad Chem. Tech. Inst.). *J. Applied Chem.* (U.S.S.R.) 18, 538–47(1945)(English summary).—Charcoal AP was statically tested for activity to benzene, EtOH, and Et_2O vapors. The results are given graphically. This charcoal shows the highest retentivity for benzene and least for EtOH. Desorption of EtOH by CO_2 was studied; the following are the optimum values: temp. 125–30°, CO_2 flow 0.5 l./sq. cm./min., time 15 min. Under these conditions up to 80% EtOH was desorbed. G. M. K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



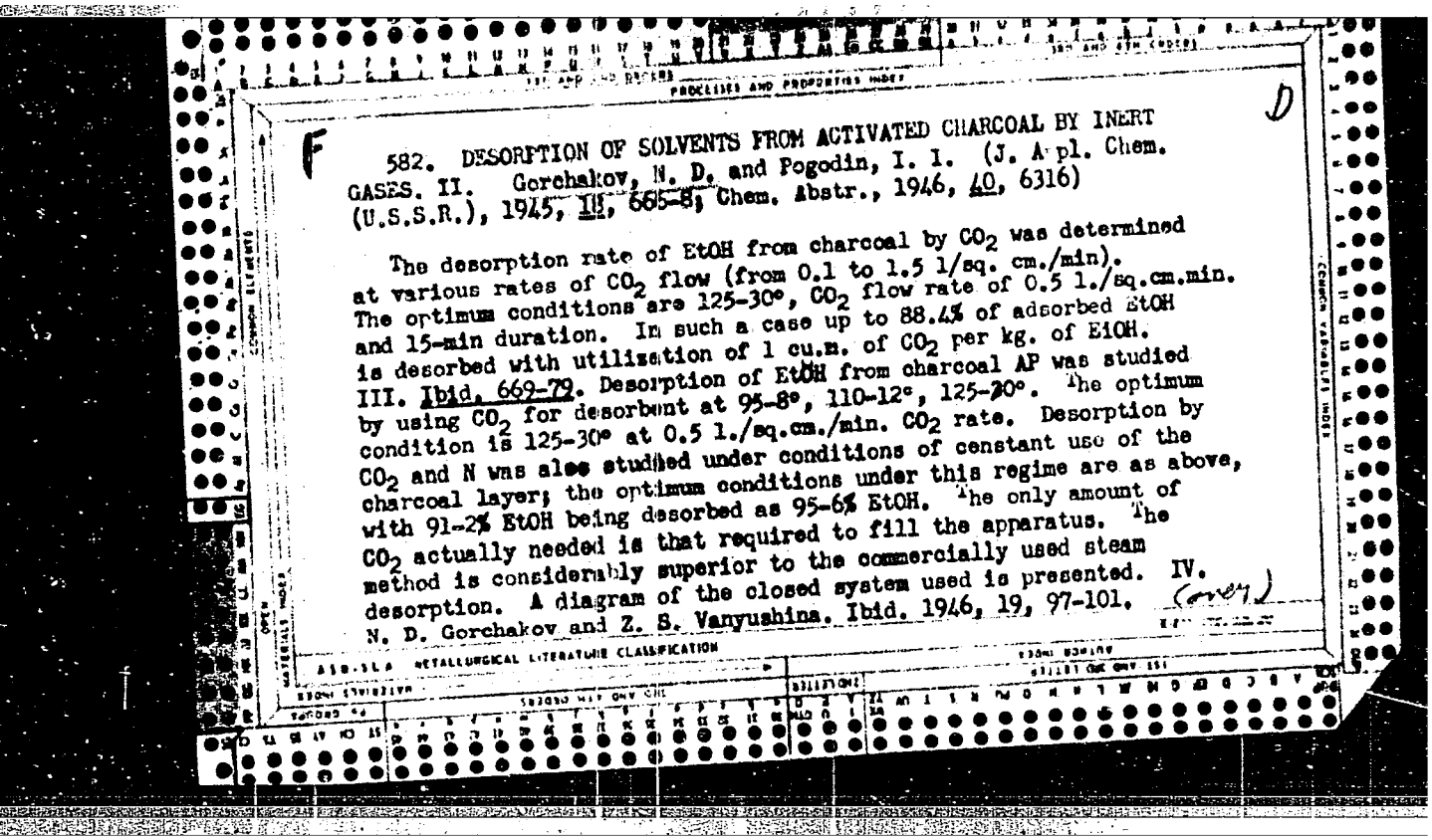
CA

PROCESSES AND PROPERTIES INDEX

2

Desorption of solvents from activated charcoal by inert gases. II. N. D. Gorchakov and I. I. Pogodin (Leningrad Chem. Tech. Inst.). *J. Applied Chem.* (U.S.S.R.) **18**, 606–8(1945); cf. C.A. **40**, 3618*.—The desorption rate of EtOH from charcoal by CO_2 was detd. at various rates of CO_2 flow (from 0.1 to 1.5 l./sq. cm./min.). The optimum conditions are 125–30°, CO_2 flow rate of 0.5 l. sq. cm./min. and 15-min. duration. In such a case up to 88.4% of adsorbed EtOH is desorbed with utilization of 1 cu. m. of CO_2 per kg. of EtOH. III. *Ibid.* 689–70.—Desorption of EtOH from charcoal AP was studied by using CO_2 for desiccant at 95.8°, 119.12°, 125.30°. The optimum condition is 125.30° at 0.5 l./sq. cm./min. CO_2 rate. Desorption by CO_2 and N was also studied under conditions of const. use of the charcoal layer; the optimum conditions under this regime are as above, with 91.2% EtOH being desorbed as 95.0% EtOH. The only amt. of CO_2 actually needed is that required to fill the app. The method is considerably superior to the commercially used steam desorption. A diagram of the closed system used is presented. IV. N. D. Gorchakov and Z. S. Vanyushina (Leningrad Chem. Tech. Inst.). *Ibid.* 10, 97–101(1946). The dynamic activity of charcoal AP at a layer depth of 100 cm. and benzene concn. of 30 mg./l. is 20–30%, in desorption of benzene by means of CO_2. The optimum time for desorption is 15 min. at 180° at 0.5 l./sq. cm./min. rate of CO_2 flow. It was possible to condense 72% of benzene which was adsorbed on the charcoal, under the above conditions. G. M. Kondakoff

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



582. DESORPTION OF SOLVENTS FROM ACTIVATED CHARCOAL BY INERT GASES. II. Gorchakov, N. D. and Pogodin, I. I. (J. Appl. Chem. (U.S.S.R.), 1945, 18, 665-8; Chem. Abstr., 1946, 40, 6316)

The desorption rate of EtOH from charcoal by CO_2 was determined at various rates of CO_2 flow (from 0.1 to 1.5 l/sq. cm./min). The optimum conditions are 125-30°, CO_2 flow rate of 0.5 l./sq.cm.min. and 15-min duration. In such a case up to 88.4% of adsorbed EtOH is desorbed with utilization of 1 cu.m. of CO_2 per kg. of EtOH. III. Ibid, 669-72. Desorption of EtOH from charcoal AP was studied by using CO_2 for desorbent at 95-8°, 110-12°, 125-30°. The optimum condition is 125-30° at 0.5 l./sq.cm./min. CO_2 rate. Desorption by CO_2 and N was also studied under conditions of constant use of the charcoal layer; the optimum conditions under this regime are as above, with 91-2% EtOH being desorbed as 95-6% EtOH. The only amount of CO_2 actually needed is that required to fill the apparatus. The method is considerably superior to the commercially used steam desorption. A diagram of the closed system used is presented. IV. N. D. Gorchakov and Z. S. Vanyushina. Ibid. 1946, 19, 97-101.

The dynamic activity of charcoal AP at a layer depth of 100 cm. and benzene concentration of 30 mg./l. is 20-30%, in desorption of benzene by means of CO_2. The optimum time for desorption is 15 min. at 180° at 0.5 l./sq.cm./min. rate of CO_2 flow. It was possible to condense 72% of benzene which was adsorbed on the charcoal, under the above conditions.

GORCHAKOV, N.D.; POGODIN, I.I.

Desorption of solvents from activated charcoal by inert gases.
Zhur. prikl. khim. 31 no.1:60-65 Ja '58. (MIRA 11:4)

1.Laboratoriya sorbtsionnoy tekhniki Leningradskogo tekhnologicheskogo instituta im. Lensoveta.
(Carbon, Activated) (Desorption)

GORCHAKOV, N. G.

Gorchakov, N. G. - "Torsional oscillations of the linear branched systems," Sbornik trudov (Akad. nauk Ukr. SSR, Laboratoriya problem bystrokhodnykh mashin i mekhanizmov), Issue 1, 1949, p. 5-19

SO: U-4355, 14 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 15, 1949)

GORCHAKOV, N.G.

SOV/124-58-10-11480

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 10, p 111 (USSR)

AUTHOR: Gorchakov [Horchakov, ·.H.]

TITLE: On the Electrical Analog Simulation of Forced Oscillations in an Elastic System (Ob elektromodelirovanii vynuzhdennykh kolebaniy uprugoy sistemy) in Ukrainian

PERIODICAL: Nauk. shchorichnyk. Mekhan.-matem. fak. Kyyivs'k. un-tu, 1956. Kyyiv, 1957, pp 550-552

ABSTRACT: Bibliographic entry

Card 1/1

GORCHAKOV, N.G. [Horchakov, M.H.] (Kiiv)

Applying electric analogy methods to vibrations of elastic systems with nonlinear damping [with summary in English]. Prikl. mekh. 4 no. 2:205-210 '58. (MIRA 11:8)

1. Kiivs'kiy derzhavniy universitet.
(Vibration--Electromechanical analogies)

GORCHAKOV, Ovidiy Aleksandrovich; VOSKRESENSKAYA, Ye., red.

[Visiting Uncle Sam; a journalist's report] V gostiakh u diadi Sema; reportazh. Moskva, Molodaia gvardiia, 1965. 221 p. (MIRA 18:3)

KIYENYA, I.M., kand. tekhn. nauk, GORCHAKOVA, O.D., red.

[Means for increasing the load carrying capacity of mercury rectifiers; lecture in the course "Ionic and electronic converters" for students of the fourth year in "Electrification of railroad transportation"] Puti povysheniia nagruzochnoi sposobnosti rtutnykh ventilei; lektsiia po distsipline "Ionnye i elektronnye preobrazovateli" dlia studentov IV kursa spetsial'nosti "Elektrifikatsiia zheleznodorozhnogo transporta." Moskva, VZIIT, 1964. 14 p. (MIRA 18:4)

GORCHAKOV, R. S.

USSR / General Problems - Methodology. History. Scien- ..-1
tific Institutions & Conferences. Teaching. Problems
of Bibliography and Scientific Documentation.

Abs Jour : Referat Zhur - Khimiya, No 6, 25 March 1957, 18018

Author : Gorchakov, R.S.

Inst :

Title : D. I. Mendeleyev on Industrial Development of Ural

Orig Pub : Avtoref. diss kand. econ. n. LGU, L., 1956,

Abstract : No abstract.

Card 1/1

GORCHAKOV, R.S.

D.I. Mendeleev on the prospects of the development of ferrous metallurgy in the Ural region. Vest. LGU 12 no.5:17-27 '57. (MLRA 10:6)
(Mendeleev, Dmitrii Ivanovich, 1834-1907)
(Ural Mountain region--Metallurgy)

GORCHAKOV, S.N.; GRAM, I.I., starshiy inzhener; KONDRAT'YEV, M.S., inzhener-mekhanik; IVANOVSKIY, N.F.; KOVALEV, M.A., starshiy energetik tresta.

Improving the use and repair of building machinery. Strei.prom.34 no.6: 39-40 Je '56. (MLRA 9:9)

1.Glavnyy mekhanik tresta Zaporozhstroy (for Gorchakov).2.Otdel glavnogo mekhanika tresta Vostokneftestroy (for Kondrat'yev).3.Glavnyy mekhanik tresta Stal'montazh-5 Minstroya SSSR (for Ivanovskiy).
(Building machinery)

GORCHAKOV, Svyatoslav Petrovich; KOBZEV, Nikolay Andreyevich; ISTOMIN, S.N., otv. red.; SILINA, L.A., red. izd-va; MINSKER, L.I., tekhn. red.; LOMILINA, L.N., tekhn.red.

[Guide for the track maintenance worker] Spravochnoe posobie putevogo rabochego. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1961. 62 p. (MIRA 15:2)
(Railroads--Track)

GORCHAKOV, V.

AID - P-175

Subject : USSR/Aeronautics

Card : 1/1

Author : Gorchakov, V., Lt. Col.

Title : Calculation of the Aerodynamic Correction in a Speedometer

Periodical : Air Force Herald, 1, 48 - 50, Ja 1954

Abstract : A method of eliminating some errors in the correction of the aerodynamic speedometers is discussed. Diagram, tables.

Institution : None

Submitted : No date

GORCHAKOV, V.

AID P - 769

Subject : USSR/Aeronautics

Card 1/1 Pub. 135 - 15/15

Author : Gorchakov, V., Lt. Col.

Title : Degree of accuracy of calculations on slide rules NL-7 and NL-8

Periodical : Vest. vozd. flota, 11, 92-96, N 1954

Abstract : This article is an answer to a reader's question about the use of slide rules NL-7 and NL-8. The author gives the required information on the calculation of the altitude and velocity.

Institution : None

Submitted : No date

OLENEV, Nikolay Mikhaylovich; GORCHAKOV, V.A., nauchn. red.; RUSAKOVA, L.Ya., ved. red.

[Storage of petroleum and petroleum products] Khranenie nefti i nefteproduktov. Izd.3., perer. i dop. Leningrad, Nedra, 1964. 428 p. (MIRA 17:6)

GORCHAKOV, V. A.

"Changes in the Titer of the Complement of Immunophagocytic Indicators and White Blood Cells During Acute and Chronic Tonsillitis." Cand Med Sci, Turkmen Medical Inst imeni I. V. Stalin, Acad Sci Turkmen SSR, Ashkhabad, 1955. (KL, No 10, Mar 55)

SO: Sum. No. 670, 29 Sep 55--Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (15)

GORCHAKOV, V.A.

Microflora of tonsils in patients with acute and chronic tonsillitis in Turkmenistan. Izv.AN Turk.SSR no.4:76-81 '55. (MLRA 9:5)

1. Turkmenskiy gosudarstvennyy meditsinskiy institut imeni I.V. Stalina.

(TURKMENISTAN--TONSILS--BACTERIOLOGY)

GORCHAKOV, V. A.

V-3

USSR/Human and Animal Physiology - Blood.

Abs Jour : Ref Zhur - Biol., No 2, 1958, 8470

Author : V.A. Gorchakov

Inst : Turkmenistan State Medical Institute

Title : The State of the White Blood Fraction and the Sedimentation Rates of the Erythrocytes in Acute and Chronic Tonsillitis

Orig Pub : Tr. Turkm. Gos. Med. In-ta, 1955, 5--6, 122-128

Abstract : Of 40 patients with acute tonsillitis mild leukocytosis was detected among 50%, nuclear displacement to the left among 77.5%, eosinopenia among 77.5% and increased sedimentation rate of erythrocytes among 70%. By the time of clinical recovery normalization of the blood had taken place in the majority of the patients with angina; the sedimentation rate had returned to normal in 57.5%. No relationship was noted between the blood chart and the complement

G Card 1/2

GORCHAKOV, V.A

GORCHAKOV, V.A.; KHYDYROV, B.Kh.

Professor Ivan Vasil'evich Korsakov; on his 60th birthday. Vest. oto-rin. 19 no.6:103 N-D '57 (MIRA 11:3)
(KORSAKOV, IVAN VASIL'EVICH, 1897-)

GORCHAKOV, V.A., kand.med.nauk

Early symptom of the transition from acute to chronic tonsillitis. Zdrav.Turk. 2 no.1:27-31 Ja-F '58. (MIRA 12:6)

1. Iz kafedry otolaringologicheskikh bolezney (byvshiy zav. - prof. I.V.Korsakov, nauchnyy rukovoditel' - prof. V.A.Yusin) Turkmenskogo gosudarstvennogo meditsinskogo instituta im. I.V.Stalina.

(TONSILS--DISEASES)

GORCHAKOV, V.A., KUPRIYANOV, S.N.

Methods for increasing the effectiveness of treatment in intracranial complications of suppurative otitis. Zdrav. Turk. 3 no.2:16-19 Mr-Ap '59. (MIRA 12:8)

1. Iz kliniki laringologicheskikh bolezney Turkmenskogo gosudarstvennogo meditsinskogo instituta im. I.V.Stalina.
(EAR--DISEASES)

GORCHAKOV, V.A., kand.med.nauk

State of antistreptolysin-O in the blood of patients with chronic tonsillitis and rheumatic fever. Zhur.ush., nos.i gor.bol.22 no.6: N-D'62. (MIRA 16:7)

1. Iz Ukrainskogo nauchno-issledovatel'skogo instituta klinicheskoy meditsiny imeni akademika N.D.Strazhesko (dir.- zasluzhennyy deyatel' nauki prof. A.L.Mikhnev).
(TONSILS—DISEASES) (RHEUMATIC FEVER)
(HEMOLYSIS AND HEMOLYSINS)

BATYUK,I.F.,kand.med.nauk; GORCHAKOV, V.A.,kand.med.nauk; SAMORUKOVA,S.V.

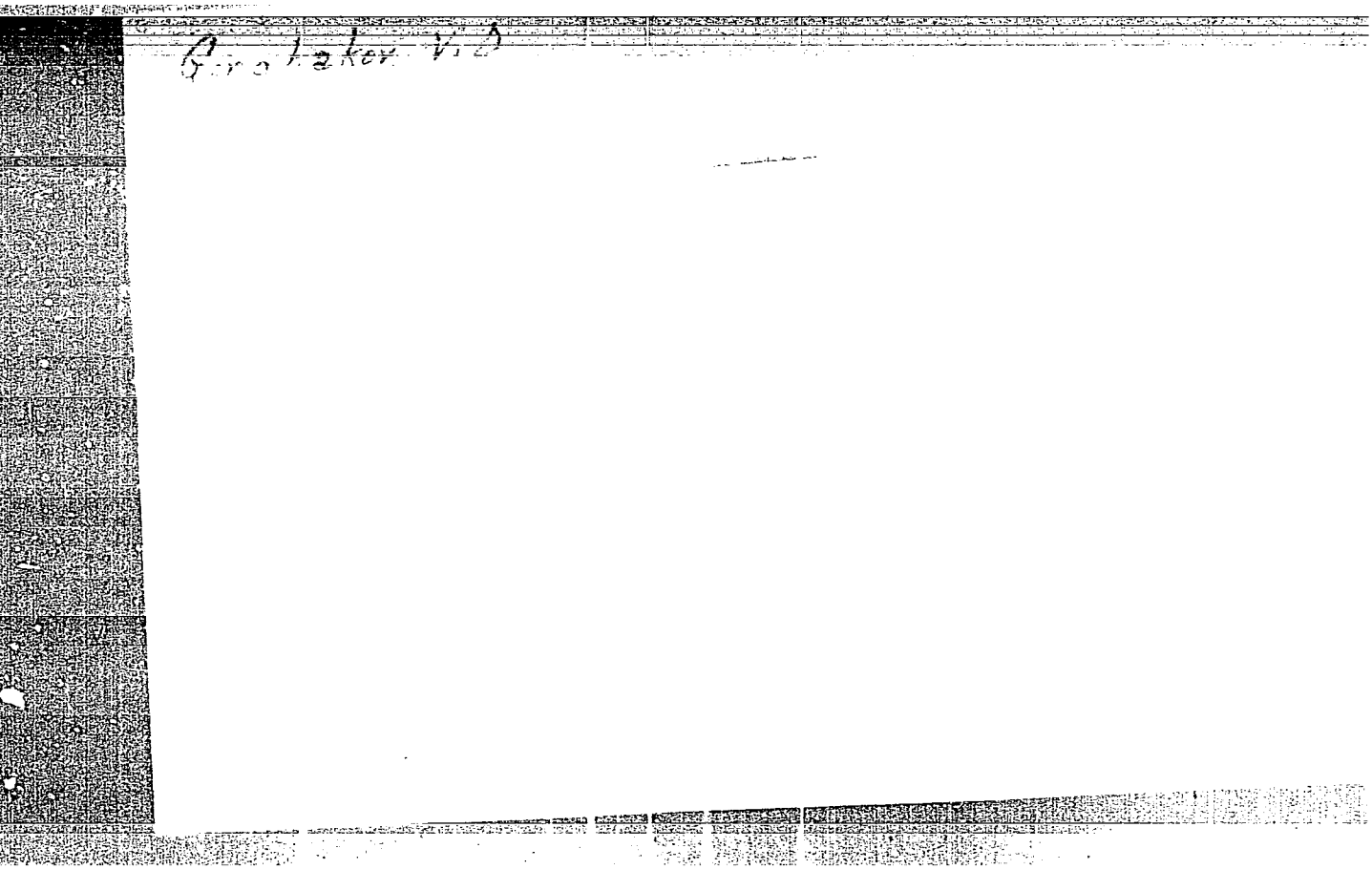
Data on the study of the antigenic properties of tonsils. Zhur.ush., nos. i gorl. bol.23 no.3:69-73 My-Je'63. (MIRA 16:7)

1. Iz laboratorii immunologii (zav.- kand.med.nauk I.F.Batyuk) i otolaringologicheskogo otdeleniya (zav.-kand.med.nauk V.A. Gorchakov) Ukrainskogo nauchno-issledovatel'skogo instituta klinicheskoy meditsiny imeni akademika N.D.Strazhesko (dir.-zasl. deyatel' nauki prof.A.L.Mikhnev).
(TONSILS—DISEASES)
(ANTIGENS AND ANTIBODIES)

GORCHAKOV, V.A., kand.med. nauk; KUPRIYANOV, S.N.; GASPAROVA,D.N.

Foreign bodies of the larynx, trachea, and bronchi according to materials of the clinic of the Turkmenistan Medical Institute for the last tehn years. Zhur. ush., nos. i gorl. bol. 23 no.5:67 S-O'63 (MIRA 17:3)

1. Iz kafedry otorinolaringologicheskikh zabolevaniy (zav. - dotsent B.Kh. Ibragimov) Turkmenskogo meditsinskogo instituta.



GORCHAKOV, V.G., veterinarnyy vrach (Moskovskaya oblast', Ukhtomskiy rayon)

Stored blood as a means of controlling bronchopneumonia in young pigs and as a growth stimulant. Veterinariia 31 no.11:49-52 N '54. (MLRA 7:11)

(BLOOD AS FOOD OR MEDICINE)(SWINE--DISEASES)(PNEUMONIA)

GORCHAKOV, V.N.

Asymptotic properties of the spectral function of hypoelliptic operators. Dokl. AN SSSR 160 no.4:746-749 F '65.
(MIRA 18:2)

1. Kiyevskiy inzhenerno-stroitel'nyy institut. Submitted July 23, 1964.

GORCHAKOV, V.N.

Asymptotic behavior of the spectral function of a class of hypoelliptic operators. Dokl. AN SSSR 152 no.3:519-522 S '63. (MIRA 16:12)

1. Kiyevskiy inzhenerno-stroitel'nyy institut. Predstavleno akademikom S.L.Sobolevym.

GORCHAKOV, V.V.

Characteristics of action currents of the conducting system of the pumpkin stem. Trudy MOIP. Otd. biol. 9:155-158 '64.
(MIRA 18:1)

1. Moskovskaya sel'skokhozyaystvennaya akademiya imeni K.A. Timiryazeva.

112-57-7-14579D

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1957, Nr 7, p 119 (USSR)

AUTHOR: Gorchakov, Ye. V.

TITLE: Investigation of Operational Reliability of the Regenerative Breaking System on Series VL-22^{m} Electric Locomotives (Issledovaniye nadezhnosti raboty sistem rekuperativnogo tormozheniya na elektrovozakh serii VL-22^{m})

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Candidate of Technical Sciences, presented to Mosk. in-t inzh. zh.-d. transp. (Moscow Institute of Railroad Transportation Engineers), Moscow, 1956.

ASSOCIATION: Mosk. in-t inzh. zh.-d. transp. (Moscow Institute of Railroad Transportation Engineers)

Card 1/1

SHLYAKHTO, P., kandidat tekhnicheskikh nauk; ISAYEV, I., kandidat tekhnicheskikh nauk; GORCHAKOV, Ye.V., inzhener.

Resistance to movement of the VL22^{m} electric locomotive equipped with roller axle boxes. Tekh.zhel.dor. 15 no.1:20-22 Ja-F '56. (MLRA 9:5)

(Electric locomotives)

SOV/112-59-3-5092

32(3)

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 3, p 112 (USSR)

AUTHOR: Gorchakov, Ye. V., and Dashkevich, A. B.

TITLE: Regenerative Braking Is an Important Source for Stepping-Up the Efficiency of Electric Traction (Rekuperativnoye tormozheniye — vazhnyy rezerv povysheniya effektivnosti elektricheskoy tyagi)

PERIODICAL: Elektr. i teplovozn. tyaga, 1957, Nr 12, pp 19-20

ABSTRACT: On the basis of operating experience at the electrified railroad section Kropachevo-Chelyabinsk, South Ural Railroads, the engineering and economic effectiveness of the regenerative braking is discussed. Energy returned by regenerative braking of a VL-22^{m} electric locomotive amounts to 3.1-3.54 whr/ton-km for loaded trains and 1.68 whr/ton-km for empty trains. Heavy grades on this line amount to 30% in the even direction and 21.7% in the odd direction of the total line length. With the existing freight traffic, full utilization of regenerative braking on all locomotives could return to the network 80,000,000 kw-hr of energy or more; in addition, operating expenses could be

Card 1/2

32(3)

Regenerative Braking Is an Important Source for Stepping-Up the Efficiency of . . . .

cut by 8,700,000 rubles per year. Metal of brake shoes saved per each 100 kw-hr of the returned energy: for 2 trains of a ring route, 2,040 ton each — 4.77 kg; for a 1,600-ton train — 4.72 kg; for an empty 1,000-ton train — 4.5 kg. If all locomotives serving this section are equipped with regenerative braking, the saved brake-shoe metal will amount to 3,750 tons per year or more. Thus, shoe-wear reduction on the line section in question would result in reducing annual operating expenses by about 4,000,000 rubles. It should be noted that under more favorable traffic conditions and with a higher engineman qualification, still higher savings in annual operating expenses from adoption of regenerative braking are possible, and that the average speed of trains on downgrades can be increased by 3-5%. Organizational and engineering steps necessary for a wide regenerative-braking adoption program are listed.

K.V.A.

Card 2/2

GORCHAKOV, Ye. V.

SHLYAKHTO, P.N., kandidat tekhnicheskikh nauk; GORCHAKOV, Ye.V., kandidat tekhnicheskikh nauk; GORNOV, O.F., kandidat tekhnicheskikh nauk.

Power recuperation on electric railroads. Zhel.dor.transp.39 no.2:17-22 F '57. (MLRA 10:3)

(Electric railroads)

ZADNEPROVSKIY, A.Ya., kand.tekhn.nauk; GORCHAKOV, Ye.V., kand.tekhn.nauk

Investigating the utilization of recuperative braking on electric locomotives. Vest. TSNII MPS [17] no.3:58 My '58. (MIRA 11:6)

1.Nachal'nik Nauchno-issledovatel'skogo sektora Moskovskogo instituta inzhenerov zheleznodorozhnogo transporta im. I.V. Stalina (for Zadneprovskiy).
(Electric locomotives--Brakes--Testing)

GORCHAKOV, Ye.V., kand. tekhn. nauk.

Improving protection of electric locomotive power circuits using regenerative retardation. Trudy MIIT no.103:123-132 '58. (MIRA 11:12)

(Electric railway meters)

GORCHAKOV, Ye.V., kand.tekhn.nauk

Reasons for appearance of ciruclar fire on engine collectors when wheels are skidding. Elek.i tepl.tiaga 3 no.8:37-39 Ag '59. (MIRA 12:12)

(Diesel locomotives)

8 (6), 12 (3)

AUTHORS: Isayev, I. P., Doctor of Technical Sciences, Gorchakov, Ye. V., Candidate of Technical Sciences; Moscow

SOV/105-59-6-12/28

TITLE: On Instabilities in the Temperature Rise in Electric Locomotive Traction Motors (O nestabil'nosti temperatury nagreva tyagovykh dvigateley elektrovozov)

PERIODICAL: Elektrichestvo, 1959, Nr 6, pp 54-59 (USSR)

ABSTRACT: In order to evaluate the tractive properties of electric locomotives it is not sufficient to know the causes for the unequal heating of traction motors, a knowledge of the influence of each of these causes is also necessary. If this problem is to be solved it is expedient to use the method presented herein. It is based upon the principle of probability and upon the theory of mathematical statistics (Refs 1, 2, 3, 4, 5, 6). The nature of the method is exposed. This is a presentation of the results of the investigations of the traction motors DPE-400A and NB-406A. The results obtained either by theoretical deductions according to the method in question or by experiments show that the unequal heating of the traction motors of electric locomotives is

On Instabilities in the Temperature Rise in Electric Locomotive Traction Motors

caused mainly by three circumstances: a divergence of the speed characteristics, of the thermal behavior owing to technological tolerances in production, and the differences in the wheel diameters of the locomotives. A comparison of these three main causes showed that the greatest influence is exerted by the first cause. This investigation led to the following recommendations: 1) Measures must be taken in the production of motors for stabilizing the iron losses. 2) It is considered necessary to test the speed characteristic at least in two points, not only in one, at rated load and at a load greater than the rated load, which must be determined according to the operational conditions for the electric locomotive. This measure is caused by the necessity of having a minimum of divergence even in the range of great loads. 3) It is considered expedient to standardize the rated values and the deviation of the thermal data (the stabilized rated excess temperature τ_∞ of the motor winding and the rated time constant T of the winding). 4) During the mounting of the motors the armatures and the frame must be chosen in

On Instabilities in the Temperature Rise in Electric Locomotive Traction Motors

such a way as to minimize the difference in the speed characteristics to a limit of ±1 - 2 %. The calculations showed that by careful selection of armature and frame of motors DPE-400A the prime cost of the electric locomotive rises by 18000 to 24000 roubles, whereas the cost saving during operation amounts to hundred thousands of roubles. 5) The diameters of wheel sets in operational practice are to be chosen so as to ensure that the relative deviation of the diameter of a wheel set is equal and of opposite sign to the relative deviation of the speed of the traction motor of the same wheel. There are 5 figures, 5 tables, and 6 references, 4 of which are Soviet.

SUBMITTED: February 21, 1959

Card 3/3

GORCHAKOV, Ye.V., kand.tekhn.nauk; ZAKHARCHENKO, D.D., kand.tekhn.nauk

Improving the operational and traction testing of new locomotives. (MIRA 13:7)
Zhel.dor.transp. 42 no.6:73 Je '60.
(Locomotives--Testing)

GORCHAKOV, Ye.V., kand.tekhn.nauk; MAKSIMOV, N.V., kand.tekhn.nauk; CHEREPASHENETS, R.G.

Reducing electric power consumption for train traction. Zhel.dor.transp. 46 no.12:31-34 D '64. (MIRA 19:1)

1. Glavnyy inzhener lokomotivnoy sluzhby Moskovskoy zheleznoy dorogi (for Cherepashenets).

L 04703-67 JKT

ACC NR: AP6030010 SOURCE CODE: UR/0020/66/169/005/1044/1047

AUTHOR: Vernov, S. N. (Corresponding member AN SSSR); Vakulov, P. V.; Gorchakov, Ye. V.; Logachev, Yu. I.; Lyubimov, G. P.; Nikolayev, A. G.; Pereslegina, N. V.

ORG:

TITLE: Measurement of intensity of penetrating radiation on the Moon's surface [Paper presented at the Seventh COSPAR Meeting held in Vienna in May 1966]

SOURCE: AN SSSR. Doklady, v. 169, no. 5, 1966, 1044-1047

TOPIC TAGS: moon, radiation intensity, lunar probe, radiation measurement/ Luna-9 lunar probe

ABSTRACT: The lunar probe "Luna-9" launched by the Soviet Union on 30 January 1966 made a soft landing on the Moon on 3 February at 24 hr, 45 min, 30 sec (Moscow time); it was equipped with an instrument containing a 6 x 10-mm discharge counter to measure the intensity of radiation. The minimum shielding of the counter mounted inside the probe near its jacket was ~1 gm/cm^2.

The instrument was switched on immediately after "Luna-9" was put into orbit and was kept in operation until the probe stopped functioning. The data on the intensity detected with the gas counter averaged over 14 time intervals are shown in Fig. 1. The first five time intervals are those for the flight from the Earth to the

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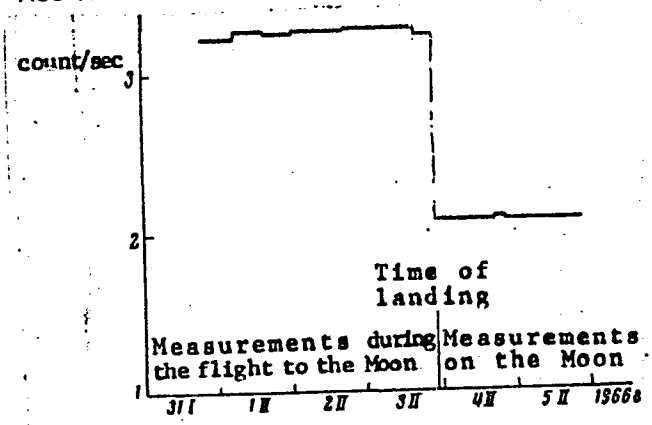

Fig. 1. The mean-count rate of "Luna-9" discharge counter

Moon. The next (sixth) interval is that for the flight near the Moon (beginning with at a distance of ~50,000 km from the Moon), the landing, and the first 5 minutes on the Moon's surface. The subsequent eight intervals are related to operations on the Moon's surface. Table 1 shows the accurate values of the time intervals and the mean-count rates recorded in these intervals. The basic errors in determining the count rate are statistical.

The data in Table 1 show that the mean-count rate recorded on the Moon's surface was about 63% of the count rate of the same counter in free space. In other words, if only primary cosmic rays had been detected, the counter on the Moon's surface would have counted not quite half as much as during the flight in free space. The detected excessive radiation

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ACC NR: AP6030010

Table 1.

	Interval boundaries	Averaging interval	Mean-count rate	Note
31 Jan 1966	18 h 38 min 40 sec	10 h 12 min 30 sec	3.229±0.010	During the flight
1 Feb 1966	04 h 51 min 10 sec	10 h 54 min 20 sec	3.277±0.010	"
	15 h 45 min 30 sec			
	23 h 01 min 45 sec	07 h 16 min 15 sec	3.267±0.011	"
2 Feb 1966	16 h 29 min 00 sec	17 h 27 min 15 sec	3.278±0.007	"
3 Feb 1966	15 h 34 min 15 sec	23 h 05 min 15 sec	3.286±0.006	"
	21 h 50 min 00 sec	06 h 15 min 45 sec	3.245±0.012	Near the Moon and on the Moon
4 Feb 1966	00 h 06 min 54 sec	02 h 16 min 54 sec	2.065±0.016	On the Moon
	06 h 35 min 04 sec	06 h 28 min 10 sec	2.069±0.010	"
	17 h 02 min 00 sec	10 h 26 min 56 sec	2.074±0.008	"
	19 h 52 min 30 sec	02 h 50 min 30 sec	2.077±0.014	"
5 Feb 1966	04 h 00 min 40 sec	08 h 08 min 10 sec	2.058±0.009	"
	19 h 01 min 40 sec	15 h 01 min 00 sec	2.055±0.006	"
	20 h 37 min 30 sec	01 h 35 min 50 sec	2.059±0.020	"
	22 h 42 min 20 sec	02 h 04 min 50 sec	2.059±0.017	"

The mean-count rate during the flight is 3.272±0.004
The mean-count rate on the Moon is 2.064±0.004

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is 0.43 count/sec or ∿26% of half the cosmic-ray intensity. This excessive radiation may be due to the radioactivity of the Moon's surface and to the secondary cosmic radiation produced by the primary cosmic radiation in the matter on the Moon's surface region closest to the station (cosmic-ray albedo).

Until now, no experimental data have been available on the radioactivity of the Moon's surface. The "Luna-9" measurements make it possible to evaluate the radioactivity of the Moon's surface in the landing area near the Ocean of Storms. Assuming that the total detected additional radiation is due to the radioactive gamma radiation from the Moon's surface, the radioactivity of the Moon's surface may be ∿20 times greater than that of the Earth's surface (the count rate of "Luna-9" from the natural radioactivity on Earth was 0.02 count/sec). However, the radioactivity on the Moon's surface has been evidently overestimated, because the effect of multiplication of the primary cosmic radiation producing the cosmic-ray albedo particle fluxes may explain the major part or even all of the additional radiation detected. Using the data from an earlier Soviet paper, it can be shown that the albedo particle flux is 20% of the total cosmic-ray flux or 40% of half the cosmic-ray flux. Additional considerations show that at least in the region of the "Luna-9" landing, cosmic rays will be the main source

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000516120009-7"

of radiation hazard and that the radioactivity on the surface of the Moon is close to the radioactivity on the surface of the Earth.

It was shown during the flight of the second Soviet space probe in September 1959 that at the distances greater than 1000 km from the Moon's surface, the intensity of the radiation trapped by a possible lunar magnetic field does not exceed 10% of the cosmic-ray intensity. The "Luna-9" data make it possible to evaluate the fluxes of the trapped radiation at distances less than 1000 km from the Moon's surface.

The mean-count rate just before and during the first minutes after the landing was 3.25 ± 0.012 count/sec (see Table 1). If this count rate is corrected for the geometric shielding of the counter by the Moon during the approach of the station to the Moon and during the period of radiation detection on the Moon's surface (this correction is about 1%), the resulting count rate is 3.28 count/sec. This practically coincides with previous measurements. The time required for the "Luna-9" to cover the last 1000 km to the Moon's surface was $\sim 2\%$ of the time measured in the given interval. At the measuring accuracy mentioned above, an increase of 50% in the count rate during this time interval would be noticeable.

3

Thus the upper limit for the possible radiation flux penetrating the "Luna-9" jacket and trapped by the hypothetical magnetic field of the Moon at the altitudes below 1000 km from the Moon's surface is not more than half the primary cosmic-radiation flux. The variation which would decrease the intensity of cosmic rays might somewhat change the evaluation of the upper limit of the hypothetical trapped radiation near the Moon, but the main conclusions that the Moon has no radiation belts and consequently no marked magnetic field remain unchanged.

Fig. 2 shows the mean-count rates in free space and on the Moon's surface. The intensity in the transition interval has been corrected for the geometric shielding by the Moon.

It can be seen from Fig. 2 that the cosmic-ray intensity undergoes slow gradual changes (solid curve) similar to those recorded during the flight of "Luna-4." This makes it possible to assume that during the period of the station's approach to the Moon, no appreciable variation in cosmic-ray intensity occurred. Neither the available neutron-monitor data nor the stratospheric data of A. N. Charakhchyan and T. N. Charakhchyan (unpublished) revealed any considerable decrease in the cosmic-ray intensity.

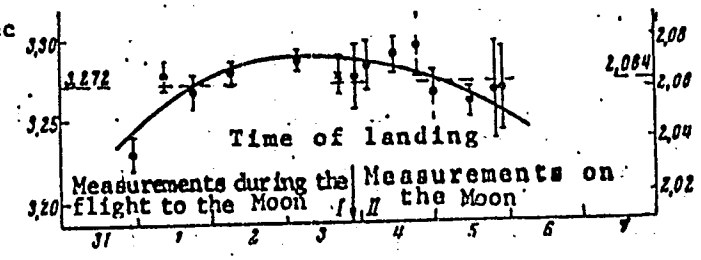

Fig. 2. The count rates of the discharge counter during the "Luna-9" flight in free space and on the Moon's surface. The mean-count rate on the Moon's surface has been reduced to the mean-count rate during the flight, and the scale has been changed in proportion to the mean-count rates during the flight and on the Moon's surface.

The absolute flux of the cosmic-ray particles detected by "Luna-9" was equal to 5.35 ± 0.5 cm^{-2} sec^{-1}. The great error in the determination of the absolute fluxes is due to the 10% uncertainty in the operational dimensions of the counter. Analogous measurements from "Luna-7" and "Luna-8" stations performed on 4—6 October and 3—6 December 1965 have shown the particle fluxes to be 5.4 and 5.9 cm^2 sec, respectively. The cosmic-ray intensity in February 1966 decreased compared to December 1965. This

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ACC NR: AP6030010

is likely to be associated with the beginning of a new cycle of solar activity.

Thus the cosmic-ray intensity maximum occurs during the period December 1965—January 1966, and the lag in the cosmic-ray intensity maximum behind the solar maximum detected for the protons of energies higher than 30 Mev is about 1.5 years. This conclusion is also confirmed by the data of the "Zond-3," "Venus-2," and "Venus-3" space probes.

[FSB: v. 2, no. 10]

SUB CODE: 22 / SUBM DATE: 11May66 / ORIG REF: 003 / OTH REF: 001

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Card 8/8

VERNOV, S.N.; VAKULOV [redacted] V.; GORCHAKOV, Ye.V.; LOGACHEV, Yu.I.; CHUDAKOV, A.Ye.

Studying the soft component of cosmic rays beyond the atmosphere limit. Isk.sput.Zem. no.2:61-69 '58. (MIRA 12:5)
(Cosmic rays) (Artificial satellites)

GORCHAKOV, YE. V.

SOV/26-59-8-20/51

29(2,5), 3(6)

AUTHOR: Chudakov, A.Ye., Candidate of Physical and Mathematical Sciences and Gorchakov, Ye.V.

TITLE: Terrestrial Corpuscular Radiation

PERIODICAL: Priroda, 1959, Nr 8, pp 86-89 (USSR)

ABSTRACT: The launching of artificial earth satellites and cosmic rockets into space has opened entirely new possibilities of space investigation. An unexpected result is the discovery of the two zones of high intensively charged particles at a distance of several ten thousand kilometers from the earth' s surface (see diagram). The authors report that the newly discovered zones of high intensity undoubtedly represent sources of the charged particles that have been captured by the earth's magnetic fields. The fact of localization of these sources inside a space limited from all sides gives evidence of that. According to S.N. Vernov, this phenomenon is called terrestrial corpuscular radiation.

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SOV/26-59-8-20/51

Terrestrial Corpuscular Radiation

The first information upon the existence of two zones were obtained from the third Soviet sputnik. Simultaneously, the instruments of the sputnik recorded a systematic increase of ionization during its flight near the equatorial zones. Graph 1 (Figure 2) demonstrates the records of readings taken from a scintillating counter on board the diesel electric ship "Ob'" in the South American region on 12 June 1958. The article also mentions the name of A.I. Lebedinskiy. There are 2 graphs and 1 diagram.

ASSOCIATION: Fizicheskiy institut im.P.N. Lebedeva Akademii nauk SSSR/ Moskva (Physical Institute imeni P.N. Lebedev AS USSR/Moscow); Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov) (Gorchakov for both institutions).

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21(0)

AUTHORS: Vernov, S. N., Gorchakov, Ye. V., Ivanenko, I. P., Khristiansen, G. B.

SOV/56-36-4-39/70

TITLE: On the Development of the Nuclear- Active Components in Extensive Atmospheric Showers (O razvitii yaderno-aktivnoy komponenty shirokikh atmosfernykh livney)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1233-1239 (USSR)

ABSTRACT: Already Guzhavin, Guzhavina and Zatsepin (Ref 1) calculated the height dependence of high-energy nuclear-active particles and the number of high-energy μ-mesons at sea level, as well as the height-dependence of the nuclear-active and of the soft component of extensive air showers. The elementary act was calculated according to Landau (Ref 2) and Vernov (Ref 3). For all energies the collision cross sections were calculated, and for the free path in air the value $\lambda_0 = 65 \div 70$ g/cm^2 was obtained. The results of calculations depend in a high degree on λ_0; however,

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On the Development of the Nuclear- Active Components in Extensive Atmospheric Showers SOV/56-36-4-39/70

λ_o is at energies of $\approx 10^{10}$ ev not known from experiments. Therefore, the authors of this paper calculated different characteristics for the nuclear-active (n.a.) component of extensive air showers (e.a.sh.), in which λ_o is determined by the type of the elementary act and the experimental range of the absorption of n.a. particles ($E \approx 10^{12}$ ev). By making simple assumptions concerning the nature of the elementary act the spectrum of the n.a. particles in e. a. sh. was computed, and likewise the ranges for the absorption of n.a. particles and the energy fluxes in the showers. Also the probability for the observation of one or two high-energy n.a. particles in a given altitude is estimated. The main aim of this paper was to find characteristics of the e. a. sh. for various parameters of the elementary act and λ_o, which are sensitive to the nature of interation. It was found that besides the e.a.sh. characteristics, which depend only weakly on the nature of the elementary particle, there exist also such as are highly dependent. An exact experimental investigation of the latter may lead to important results concerning the elementary act.

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On the Development of the Nuclear- Active Components in Extensive Atmospheric Showers

SOV/56-36-4-39/70

There are 2 figures and 11 references, 9 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: October 16, 1958

Card 3/3

VERNOV, S. N., GORCHAKOV, Ye. V., LOGACHEV, Yu. I., NESTEROV, V. E., PISARENKO, N. F., SAVENKO, I. A. and SHAVRIN, P. I.

"Investigations of Radiation During Flights of Satellites, Space Vehicles and Rockets"

Report presented at the International Conference on Cosmic Rays and Earth Storm, 4-15 Sep 61, Kyoto, Japan.

3.9420 (1049, 1482)
17.2400

26818
S/560/61/000/008/007/010
E032/E514

AUTHOR: Gorchakov, Ye. V.

TITLE: On the spatial disposition of the outer radiation belt and the auroral zone

PERIODICAL: Akademiya nauk SSSR, Iskusstvennyye sputniki zemli, 1961, No.8, pp.81-83

TEXT: Satellite data (S. N. Vernov, A. Ye. Chudakov, P. V. Vakulov, Ye. V. Gorchakov and Yu. I. Logachev, Ref.1: Iskusstvennyye sputniki Zemli, No.2, izd-vo AN SSSR, 1958, p.61) indicate the presence of an outer radiation belt at about 300-600 km above the northern hemisphere and about 1500 km above the southern hemisphere. Fig.1 shows the boundary of the outer radiation belt on the low altitude side in the northern hemisphere. The dashed curve represents one of the isochasms, the continuous curve represents the geomagnetic parallel and the cross indicates the position of the geomagnetic pole. The boundary is indicated by the points with errors. These were obtained by averaging the results obtained for about 20 transits of the satellite between May 15 and June 17, 1958. The points

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without errors were obtained from averages over a small number of transits (1 to 3 cases). It is clear from Fig.1 that the contours of the outer radiation belt agree better with the isochasms than with the geomagnetic parallels. Fig.2 shows, in geomagnetic coordinates, the points of intersection of the dipole field lines of force with the Earth's surface at which the satellite recorded the maximum intensity. ● - indicates the position of the geographical pole. Fig.2 refers to the southern hemisphere. The dashed curve shows the points of intersection of real magnetic lines of force with the Earth's surface, which in the case of a dipole field would have a geomagnetic latitude of 55 deg. The present author suggests that this curve represents the position of the outer belt better than the geomagnetic parallels. Acknowledgments are expressed to G. A. Bazilevskiy and M. V. Ternovskiy for assistance in the evaluation of experimental data. There are 2 figures and 6 references: 4 Soviet and 2 non-Soviet. The English-language reference is as follows: E.Westein, L.Laport, G.Lange, W. Scott. Carnegie Inst. of Washington, publ. 580, 1947.

SUBMITTED: August 2, 1960

Card 2/4

3,2420 (1049, 1482)
17.2450

26819
S/560/61/000/008/008/010
E032/E514

AUTHORS: Gorchakov, Ye. V. and Vazilevskaya, G. A.

TITLE: Measurement of the intensity of charged particles after the chromospheric flare of July 7, 1958

PERIODICAL: Akademiya nauk SSSR, Iskusstvennyye sputniki zemli, 1961, No.8, pp.84-86

TEXT: The flare of July 7, 1958 was of importance 3^+ and occurred between 00 h 58 m and 04 h 14 m U.T. (Ref.1: Solnechnyye dannyye 1958, No.7, izd-vo AN SSSR, 1958). The present authors have used the data obtained with the third Soviet artificial Earth satellite to determine the changes in the intensity of the corpuscular radiation in the region of the outer radiation belt. The detector employed was described by S. N. Vernov, P. V. Vakulov, Ye. V. Gorchakov, Yu. I. Logachev and A. Ye. Chudakov (Ref.2: Iskusstvennyye sputniki Zemli, No.2, izd-vo AN SSSR, 1958, p.61) and was in the form of a cylindrical sodium iodide crystal (diameter 39.5 mm, length 40 mm). The crystal was surrounded by an aluminium screen of 1 g/cm^2. It was found that a strong increase in the intensity began roughly 16 hours after the

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termination of the flare but only a few hours prior to the onset of the magnetic storm. Fig.1 shows the absolute increase in the ionization in the crystal (ΔJ, eV/sec) deduced from the measurements for July 7-9, 1958. The arrows indicate the lower limits of the absolute increase in the ionization. Analysis of the operation of the counter has shown that the increase in the ionization at these points cannot exceed 10^{13} eV. In Fig.1 the vertical axis gives the logarithm of the difference between the observed and the average value of the ionization and the time is plotted along the horizontal axis. The shaded region in the left-hand corner indicates the duration of the chromospheric flare and the arrows on the axis show the beginning and end of the magnetic storm. A. N. Charakhch'yan, V. F. Tulinov, T. N. Charakhch'yan (Ref.3: ZhETF, 39, 249, 1960) have shown that the increase in the intensity of cosmic radiation which they detected in the stratosphere on July 8, 1958 at 08 h was due to protons in a corpuscular solar stream. The present authors have used the data reported in Ref.3 to calculate the corresponding increase in the ionization which one would have expected to obtain

with the sodium iodide crystal. It turns out that the resulting number is lower by a factor of 1000 than the ionization actually recorded with the counter mounted on the satellite. The present authors show that the difference between the present results and those of A. N. Charakhch'yan et al. (Ref.3) may possibly be due to multiply charged particles, although they also show that the data now reported is not inconsistent with 100 MeV protons being responsible for the additional ionization. Acknowledgments are expressed to S. N. Vernov, A. Ye. Chudakov and A. N. Charakhch'yan for interest and discussions. There are 1 figure and 3 Soviet references.

SUBMITTED: August 2, 1960

32715
S/560/61/000/009/005/009
D045/D114

3.2420 (1049, 1395, 1482)

AUTHOR: Gorchakov, Ye. V.

TITLE: The location of the inner radiation belt and the Earth's magnetic field

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. No. 9, Moscow, 1961, 62-65

TEXT: The location of the inner radiation belt and the Earth's magnetic field are studied, reference being made to calculations made on board the third artificial Earth satellite. This satellite was equipped with a scintillation counter, the flip-flop system of which was connected to a memory device. While the satellite was flying outside the radiation belts, the counter registered an intensity of about 500 pulses/sec^{-1}. At such an intensity, the memory device could be fully used for investigating radiation outside the belts and for determining the boundaries of these belts. Fig. 1 indicates how the readings of this device were deciphered. The counting rate, calculated under the assumption that the actual rate is less than 436 pulses/sec^{-1}, is marked by dots. For comparing the information obtained from

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The location of the ...

the memory device and the "Mayak" radio transmitter, the counting rates, calculated from an analysis of the signals sent by the "Mayak" in 2.5 min intervals, are plotted in fig. 1 as triangles. Changes in the counting rate between (a) 15h 50 m and 16h 05m and (b) 15 h 35 m and 16 h 15 m are connected with the crossing of the satellite through (a) the boundary of the outer radiation belt from the low latitudes in the northern hemisphere and (b) through the boundaries of the inner belt. By analyzing various recordings similar to that shown in fig. 1, the points where the satellite crosses the border of the inner belt can be traced over a large range of longitudes. Fig. 2 shows the geographical positions of the satellite when the counter registered an intensity 350 pulses/sec^{-1} greater than that in the space between the radiation belts. The dependence of the position of the inner belt on longitude can be explained by the fact that this belt consists of particles trapped in the Earth's magnetic field, which itself is the field of an offcenter dipole. For determining the values of the shift of the dipole, the points where the satellite crossed the boundary of the internal belt were plotted in geomagnetic coordinates (fig. 3). It can be seen from fig. 3 that, in case (a), the lower boundary of the belt crosses the geomagnetic

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The location of the ...

equator at a geomagnetic longitude of 50° (geographic longitude (λ_1) = 20°W, flying height (h_1) = 670 km), and, in case (б), it crosses at a geomagnetic longitude of nearly 150° (geographical longitude (λ_2) = 80°E, flying height (h_2) = 1240 km). Considering that a circle, the center of which coincides with the center of the off-center dipole, is the boundary of the inner belt in the plane of the geomagnetic equator, ξ - the size of the shift of the dipole from the Earth's center (ξ) can be calculated as follows:

$$\xi = \frac{1}{2} \frac{(R + h_2)^2 - (R + h_1)^2}{(R + h_2)(\cos\lambda_2\cos\lambda_0 + \sin\lambda_2\sin\lambda_0) - (R + h_1)(\cos\lambda_1\cos\lambda_0 + \sin\lambda_1\sin\lambda_0)},$$

where R = the radius of the Earth. At R = 6400 km, h_1 = 670 km, h_2 = 1240 km, $\lambda_0 = 150^\circ$, $\lambda_1 = -20^\circ$, $\lambda_2 = 80^\circ$, ξ = 450 km. This result agrees with that obtained by analyzing magnetic data (Ref. 3: F. S. Jory, Phys. Rev., 102, 1167, 1956; Ref. 4: Geomagnetismus und Aeronomie. Berlin, 3, 170, 1959). A. Ye. Chudakov and T. A. Ivanova are thanked for their cooperation. There

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32715
S/560/61/000/009/005/009
D045/D114

The location of the ...

are 3 figures and 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc references. The English-language reference is: F. S. Jory. Phys. Rev., 102, 1167, 1956.

SUBMITTED: January 24, 1961

Card 4/7/4

39995

S/035/62/000/008/019/090
A001/A101

3.1810

AUTHOR: Gorchakov, Ye. V.

TITLE: The outer radiation belt and auroras

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 8, 1962, 33, abstract 8A257 (In collection: "Iskusstv. sputniki Zemli", no. 9, Moscow, AN SSSR, 1961, 66 - 70)

TEXT: Averaged high-latitude boundaries of the outer radiation belt were obtained on the basis of the data from Sputnik III: $\Phi = 69^{\circ} \pm 2^{\circ}$ geomagnetic latitude in the northern hemisphere and $\Phi = 65^{\circ} \pm 2^{\circ}$ in the southern one. The effect of the atmosphere on the particle escape from the belt is noted. According to the author's estimate, the drift period around the Earth exceeds the time between consecutive collisions of ions and neutral atoms only at altitudes over 1,200 km. The outer boundary of the belt coincides with the middle of the maximum aurora frequency zone, whereas the maximum of the belt is located lower in latitude by 15°; this fact makes impossible the explanation of auroras by outer belt particles with average energy of 100 kev. Auroras at 70° latitude may be caused

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S/035/62/000/008/019/090
A001/A101

The outer radiation belt and auroras

by low-energy electrons trapped by the geomagnetic field at distances of 55,000 - 75,000 km from the Earth's center. Auroras at 80° geomagnetic latitude may be caused by penetration of corpuscles into the Earth's atmosphere. There are 6 references.

V. Temnyy

[Abstracter's note: Complete translation]

Card 2/2

34350
S/203/61/001/006/002/021
D055/D113

9,6150
3,2420 (1049, 1482)

AUTHORS: Vernov, S.N.; Chudakov, A.Ye.; Vakulov, P.V.; Gorchakov, Ye.V.; Logachev, Yu.I.

TITLE: Radiation measurements in the outer radiation belt on February 12, 1961, during the rocket flight towards Venus

PERIODICAL: Geomagnetizm i aeronomiya, vol 1, no 6, 1961, 872-874

TEXT: The article deals with data on the Earth's outer radiation belt collected when the Earth-Venus rocket launched on February 12, 1961, was 30,000 - 45,000 km from the Earth's center. The special equipment installed in the hermetic container consisted of a scintillation counter and an СТС-5 (STS-5) gas-discharge counter. The distribution of matter around the NaJ(Tl) crystal and the gas-discharge counter is shown in a table. By reducing the dimensions of the crystal and increasing the resolving power of the electronic system of the counter, the radiation intensity in the belt was correctly registered. Fig. 1 shows the overload characteristics for the counting channels of the scintillation (1) and gas-discharge (2) counters.

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Radiation measurements ...

These channels could register up to 10^6 and 10^5 pulsations/sec. respectively. To penetrate the crystal of the scintillation counter and the working volume of the gas-discharge counter, electrons must have an energy of $\geq$ 3 Mev, protons - an energy of $\geq$ 32 Mev and the bremsstrahlung quanta - an energy of $\geq$ 30 kev. Curves on fig. 2 represent the counting speed of the scintillation counter (1), that of the gas-discharge counter after corrections were made according to the curves in fig. 1 (3) and the energy release in the crystal in relation to the distance from the Earth's center (2). As all three curves were more or less parallel, the mean energy release in the crystal for one reading of the scintillation counter was 130 kev and remained constant between 32,000 and 40,000 km and the mean energy of the bremsstrahlung quanta did not vary with distance. The constancy of the mean-energy release showed that no great changes occurred in the spectrum of electrons of the outer radiation belt. A diagram (fig. 3) shows the paths of the interplanetary rocket (curve 1) and those of another three Soviet rockets (curve 2). A comparison of radiation and ionization data concerning the interplanetary rocket and the space rockets no. 1 and 2, showed that the outer radiation belt was stable for a period of 2 years when no magnetic perturbances were recorded. However, this period was not long enough to

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Radiation measurements ...

evaluate solar effects on the outer belt, but could be taken as an indication of the absence of such an effect. The space rocket no 3 was launched during a moderate magnetic storm (the change in the vertical and horizontal components of the terrestrial magnetic field was about 250 and 150 γ respectively). The external side of the belt was not measured, but the total energy release in the crystal during the entire flight coincided with that calculated for the rocket no 1 and was 1.5 times less than that of the rocket no 2, i.e. no changes occurred in the mean state of the outer zone during the flight of the rocket no 3 during a moderate magnetic storm. Since measurements were started a few hours after the beginning of a magnetic storm, the radiation intensity in the belt had not yet decreased. On the other hand, it is also possible that not all magnetic storms cause the radiation intensity of the Earth's outer radiation belt to decrease. There are 4 figures, 1 table and 3 non-Soviet references. The three English-language references are: W.H. Hess, J. Geophys. Res.,1960, 65, no 10, 3107; P. Rothwell, C.E. McIlwain. J. Geophys. Res., 1960, 65, no. 3, 799; R.L. Arnoldy, R.A. Hoffman, J.R. Winckler, J. Geophys.Res., 1960, 65, no 5, 1361.

Card 3/6

Radiation measurements ...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Institut yadernoy fiziki (Moscow State University, Institute of Nuclear Physics)

SUBMITTED: September 9, 1961

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S/203/61/001/006/006/021
D055/D113

3.2420

AUTHORS: Gorchakov, Ye.V., and Ternovskaya, M.V.

TITLE: Contribution to the problem of the angular and spatial distribution of particles in a radiation belt

PERIODICAL: Geomagnetizm i aeronomiya, v. 1, no. 6, 1961, 897-901

TEXT: This article shows how formulae are derived to establish a connection between the intensity and the angular distribution of particles at various latitudes along the force line. It is assumed that when particles are moving in a magnetic trap, their speed and magnetic moment remain constant. It is shown that, if particles are distributed at a certain point according to the law $\sin^m \theta$, their angular distribution remains unchanged on all latitudes along the force line and any change in intensity is determined by the simple function from the tension of the magnetic field. The results obtained are used for analyzing experimental data. Data obtained during the flight of the first Soviet space rocket are used to determine the index of angular distribution m at great heights. The trajectory was such that the

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S/203/61/001/006/006/021
D055/D113

Contribution to the problem ...

rocket intersected certain force lines of the dipole magnetic field at three points. The line which is 25000 km from the center of the Earth in the equatorial plane was intersected at distances of 8700, 11000 and 18250 km. At these distances, the following intensity indices were registered in the crystal of the luminescent counter: $3 \cdot 10^{10}$, $6.46 \cdot 10^{10}$ and $14.5 \cdot 10^{10}$ ev/sec. The m figures were calculated as follows: for distances of 8700-11000 km - m = 2.04 ± 0.5, 11000-18250 km-m = 0.95 ± 0.2 and for 8700-18250 km-m = 1.27 ± 0.15. [Translator's note: for the last item the distance should probably read "over 16250 km"] . The calculated errors are due to inaccuracy in determining intensity when instrument readings were being decoded (10%). There are 1 figure and 7 references; 3 Soviet and 4 non-Soviet references. English-language references are: M. Walt, L.E. Chase Jr., J.B. Cladis, W.L. Imhof, D.J. Knecht. Space Research. Proceedings of the First International Space Science Symposium. Amsterdam, 1960, 910-920; M. Nicolet. Planet. and Space Sci., 1961, 5, no. 1, 1-32; F.S. Johnson. J. Geophys. Res., 1960, 65, no. 2, 577-584; A.J. Dessler, E.N. Parker, J. Geophys. Res., 1959, 64. no. 12, 2239-2252.

Card 2/3

S/203/61/001/006/006/021
D055/D113

Contribution to the problem ...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova. Institut yadernoy fiziki (Moscow State University imeni M.V. Lomonosov. Institute of Nuclear Physics).

SUBMITTED: September 18, 1961.

B

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89610

S/020/60/136/002/013/034
B019/B056

9.9130 (1041, 1046, 1060)

AUTHORS: Vernov, S. N., Corresponding Member of the AS USSR, Chudakov, A. Ye., Vakulov, P. V., Gorchakov, Ye. V., Logachev, Yu. I., and Nikolayev, A. G.

TITLE: Radiation Measurements During the Flight of the Third Cosmic Rocket

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 136, No. 2, pp. 322-324

TEXT: The third cosmic rocket launched on October 4, 1959 contained a scintillation counter and three gas discharge counters. All gas discharge counters had a wall strength of 50 mg/cm^2 steel sheets and were, in addition, surrounded by several shields. Counter I had a shield made from 3 mm lead + 1 mm aluminum with a counter window of 0.28 cm^2, which was closed by a 0.2 mm thick aluminum sheet. Counter II had the same shield, but without counter window, and counter III was in an aluminum container made from 2.5 mm thick aluminum. The scintillation counter recorded the ionization of the crystal (NaI) and the counting rate. Preliminary results of evaluation of the instrument readings are given from the time from

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89610

Radiation Measurements During the Flight of the Third Cosmic Rocket

S/020/60/136/002/013/034
B019/B056

October 4, 1959, to October 18, 1959. The trajectory of the rocket was in practical agreement with that of the first and second cosmic rocket. From a comparison of the readings of the various counters, the authors conclude that the intensities of the particles recorded by the instruments depend on the absorption in the container walls. Measurements in the interplanetary space showed that the cosmic radiation on the boundary of the terrestrial magnetic field is very strong; only individual small fluctuations were recorded. Finally, the agreement existing between the recorded intensities and those of a monitor are dealt with. From these considerations the authors draw the conclusion that the weak variations in the time from October 4 to October 18 are in connection with the variations of the magnetic fields in the solar system and the interactions among the latter are connected with cosmic radiations. There are 1 figure, 1 table, and 3 Soviet references.

SUBMITTED: October 26, 1960

Card 2/2

LOGACHEV, Yu.I.[translator]; TIMOFEYEV, G.A.[translator]; GORCHAKOV, Ye.V.[translator]; ASTAF'YEV, V.A.[translator]; SAVIN, B.I. [translator]; SHABANSKIY, V.P., red.; PAPTAYEVA, V.A., red.; DUBKOVA, S.I., red.; PRIDANTSEVA, S.V., tekhn. red.

[Solar corpuscular streams and their interaction with geomagnetic field]Solnechnye korpuskuliarnye potoki i ikh vzaimodeistvie s magnitnym polem Zemli. Moskva, Izd-vo inostr. lit-ry, 1962. 438 p. Translated from the English. (MIRA 15:11)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (for Logachev, Timofeyev, Gorchakov, Astaf'yev, Savin).
(Solar radiation) (Magnetism, Terrestrial)

VERNOV, Sergey N., LOGACHEV, Yu. I., GORCHAKOV, Ye. V., SAVENKO, I. A., CHUDAKOV, Alek Ye. and KENZIKHOV, V. M.

"The earth's radiation belt"

report to be submitted to the 13th Intl. Astronautical Congress, IAF, Varna, Bulgaria, 23-29 Sep 1962.

GORCHAKOV, YE. V.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Physics Institute imeni P. N. Lebedev in 1962:

"Investigation of Fast Charged Particles Trapped by the Earth's Magnetic Field."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

38952
S/048/62/026/006/013/020
B125/B102

3.2420

AUTHORS: Vakulov, P. V., Vernov, S. N., Gorchakov, Ye. V., Logachev, Yu. I., Nesterov, V. Ye., Nikolayev, A. G., Pisarenko, N. F., Savenko, I. A., Chudakov, A. Ye., and Shavrin, P. I.

TITLE: Radiation studies during the flights of satellites, spaceships and rockets

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 6, 1962, 758-781

TEXT: This report deals with radiation measurements made by the second and the third Soviet spaceship, by the rocket launched toward the Venus on February 12, 1961, and by the third Soviet earth satellite (August 15, 1958). The spaceships were equipped with scintillation counters, gas discharge counters and elements for storing data through 24 hours. The northern and southern zones of increased radiation intensity are undoubtedly linked by the lines of force of the geomagnetic field. The increased radiation intensity is due to electrons of the outer radiation belt, slowed down in the jacket of the spaceship. The

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Radiation studies during the flights ...

boundaries of this belt were determined more accurately by the lower orbiting Soviet spaceship. At 16 hours after the chromosphere flare of June 17, 1958 had vanished but still a few hours before the magnetic storm, charged particle intensity increased. The electron spectrum of the outer radiation belt does not change much at an altitude of 32,000-40,000 km, nor did the magnetic storm which occurred during the flight of the third Soviet spaceship have any substantial effect on the outer radiation belt. Except for a few percent, the proton intensity of the inner radiation belt remained constant during the three weeks' flight of the third Soviet satellite. The increased radiation intensity over the Brazilian anomaly, observed on board of the second spaceship at an altitude of 320 km, was due to the inner radiation belt. In this anomaly, the proton component of the inner radiation belt is predominant at small geomagnetic latitudes. The portion of X-rays increases with increasing latitude. A zone of lower bremsstrahlung intensity separates the outer from the inner radiation belt. This zone is practically absent in the region of the Brazilian anomaly. The equator of cosmic rays determined by the second and the third Soviet spaceship resembles remotely a sine curve running between 11° of northern and 11° of southern latitude.

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Radiation studies during the flights ...

Between 60° western and 60° eastern longitude the equator of cosmic radiation lies north of the theoretical sine curve. The general trend of the lines of equal cosmic radiation intensity corresponds in general to the distribution of magnetic rigidity. There are 16 figures and 2 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of the Moscow State University imeni M. V. Lomonosov).
Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences, USSR)

4

Card 3/3

GORCHAKOV, YE.V.

VAKULOV, P.V., VERNOV, S.N., GORCHAKOV, YE.V., LOGACHEV, YU.I.
CHARAKHCHYAN, A.N., CHARAKHCHYAN, T.N., CHUDAKOV, A. YE.

Cosmic rays in the stratosphere and their correlation with solar activity.

Report to be submitted for Space Research Committee on COSPAR 6th plenary meeting
Warsaw, Poland 11 June 63-

L 9604-66 EWT(1)/FCC/EWA(h) GW
ACC NR: AR5020397 UR/0313/65/000/003/0035/0035

SOURCE: Ref. zh. Issledovaniye kosmicheskogo prostranstva, Abs. 3.62.238

AUTHOR: Vernov, S.N.; Chudakov, A.Ye; Gorchakov, Ye.V.; Logachev, Yu.I.; Nesterov, V.Ye.; Savenko, I.A.; Shavrin, P.I.

TITLE: Radiation belts of the earth

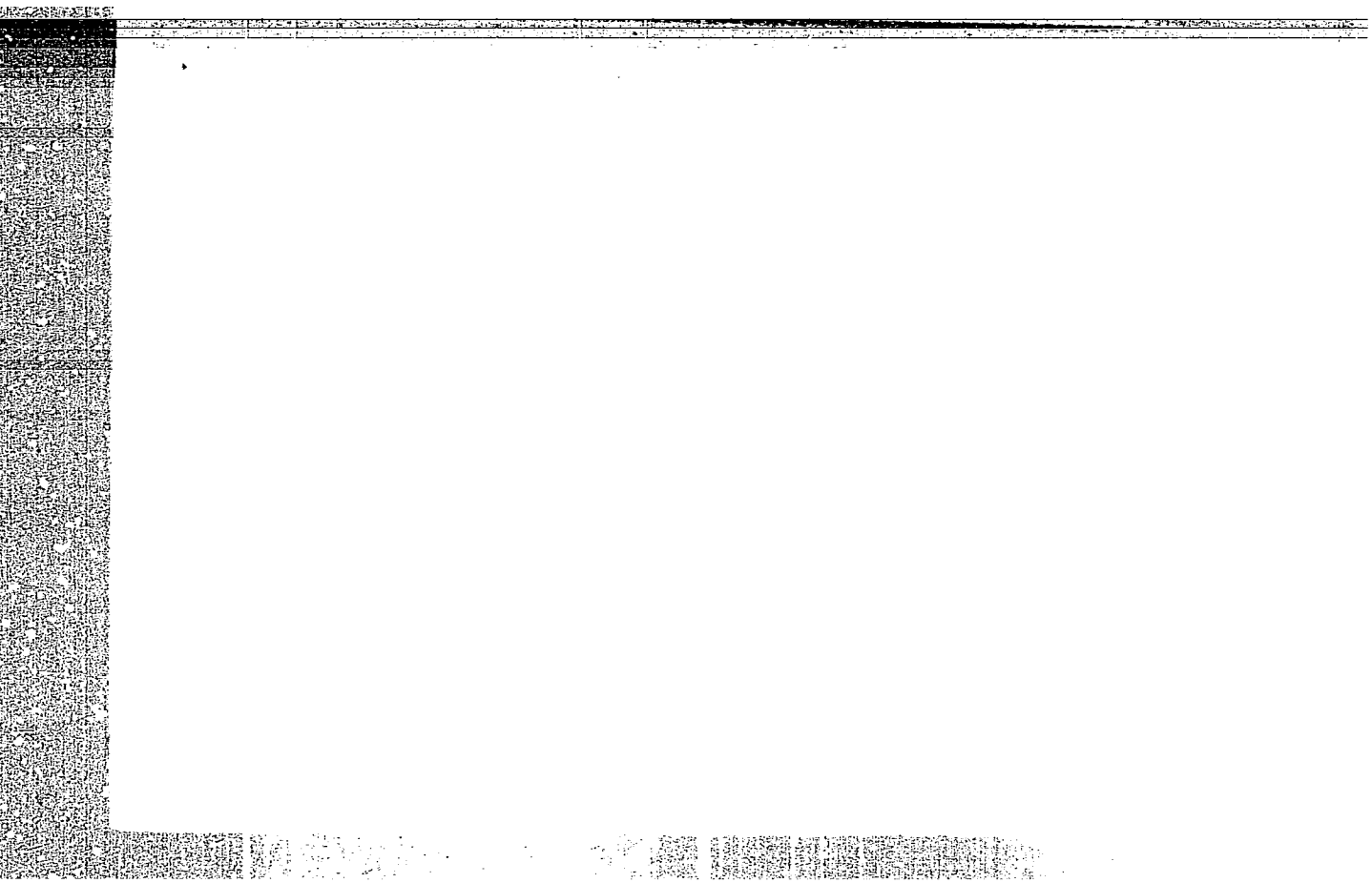
CITED SOURCE: Geofiz. byul. Mezhduved. geofiz. kom-t pri Prezidiume AN SSSR, no. 14, 1964, 96-109

TOPIC TAGS: satellite, rocket, radiation effect, cosmic radiation

TRANSLATION: A short outline is given of the results obtained from studies conducted using Soviet artificial satellites and cosmic rockets of the radiation belts and of primary cosmic radiation beyond the limits of the magnetic sphere.

SUB CODE: 04,03 ENCL: 00

Card 1/1



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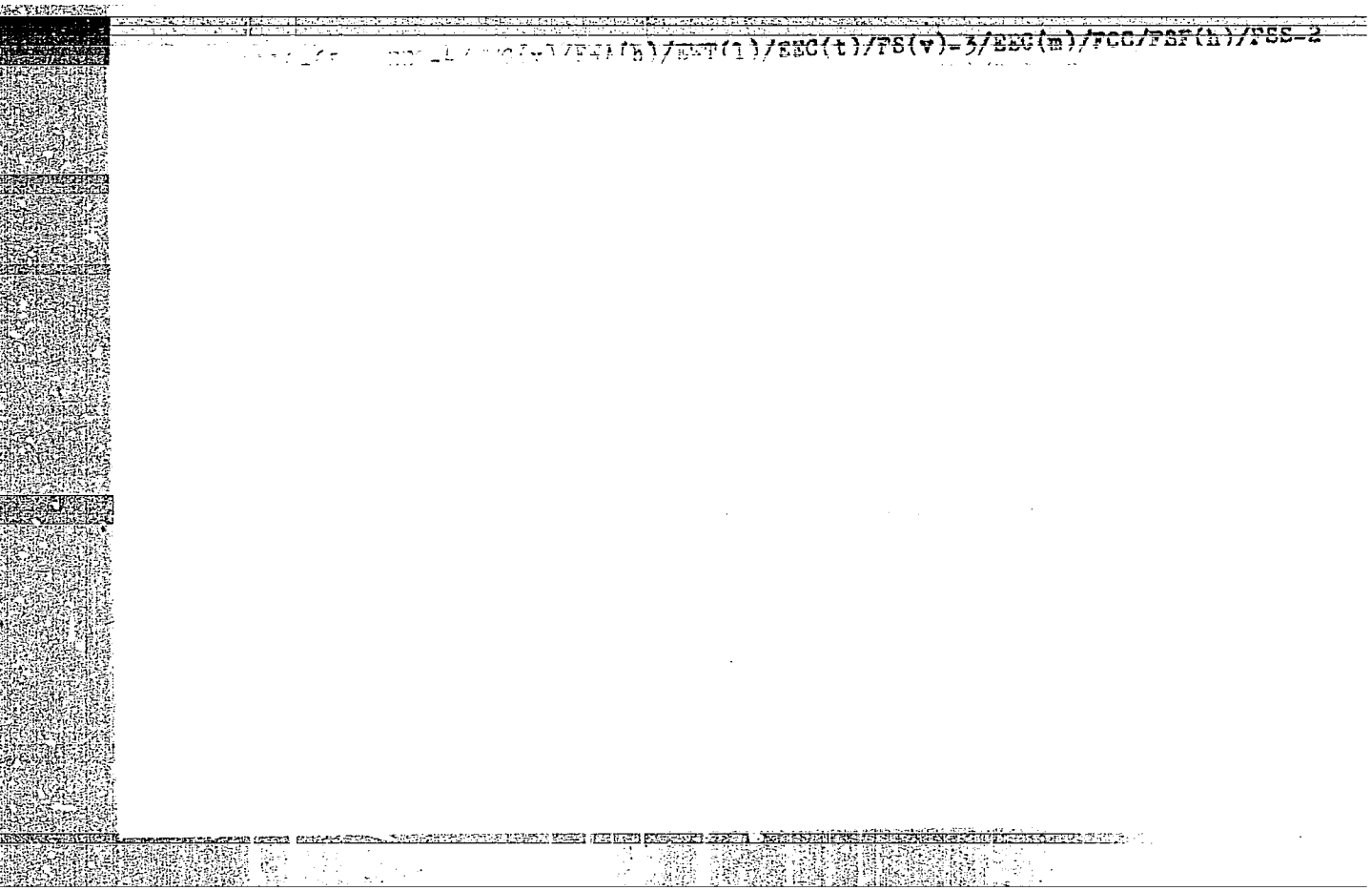

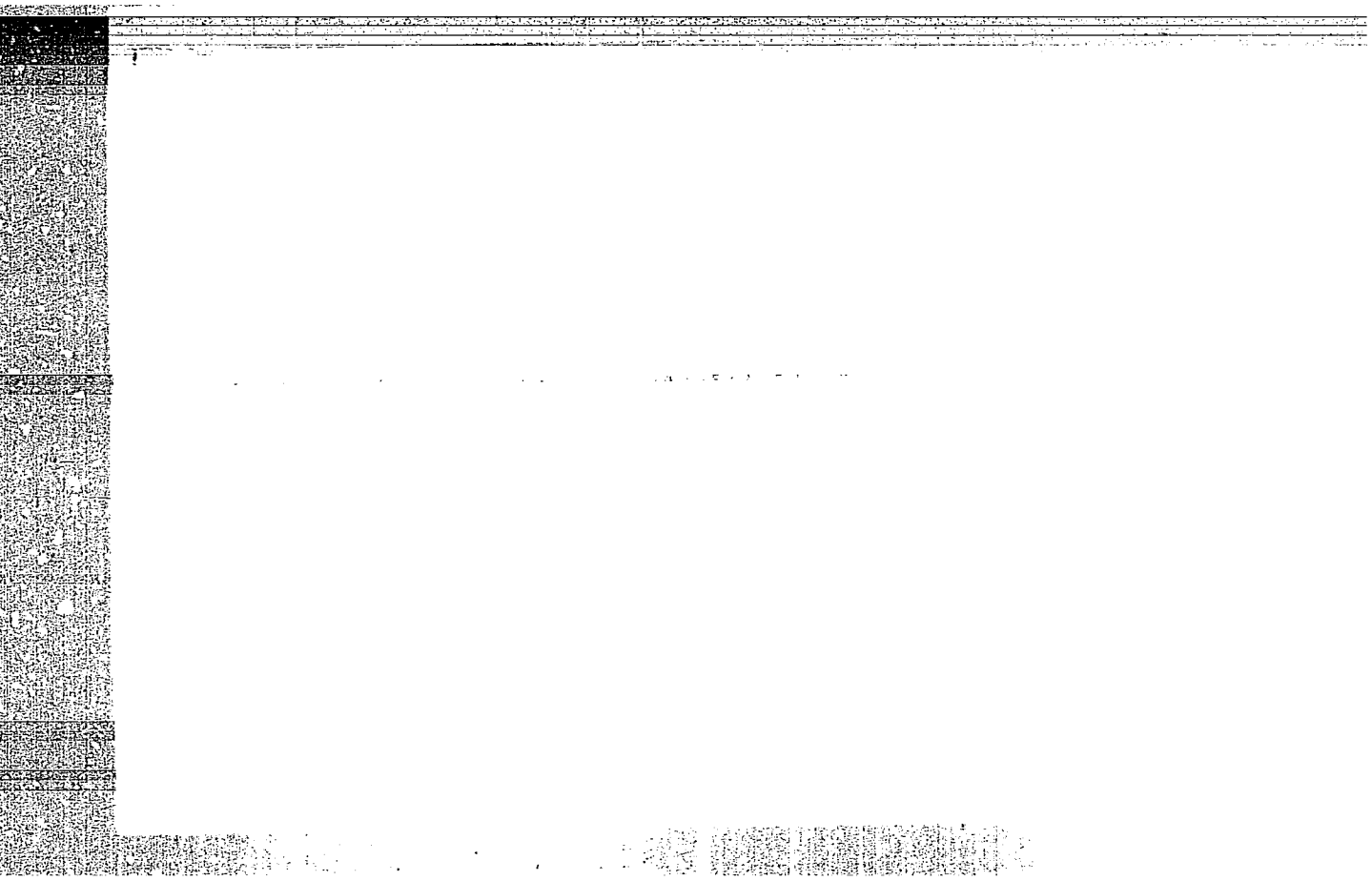

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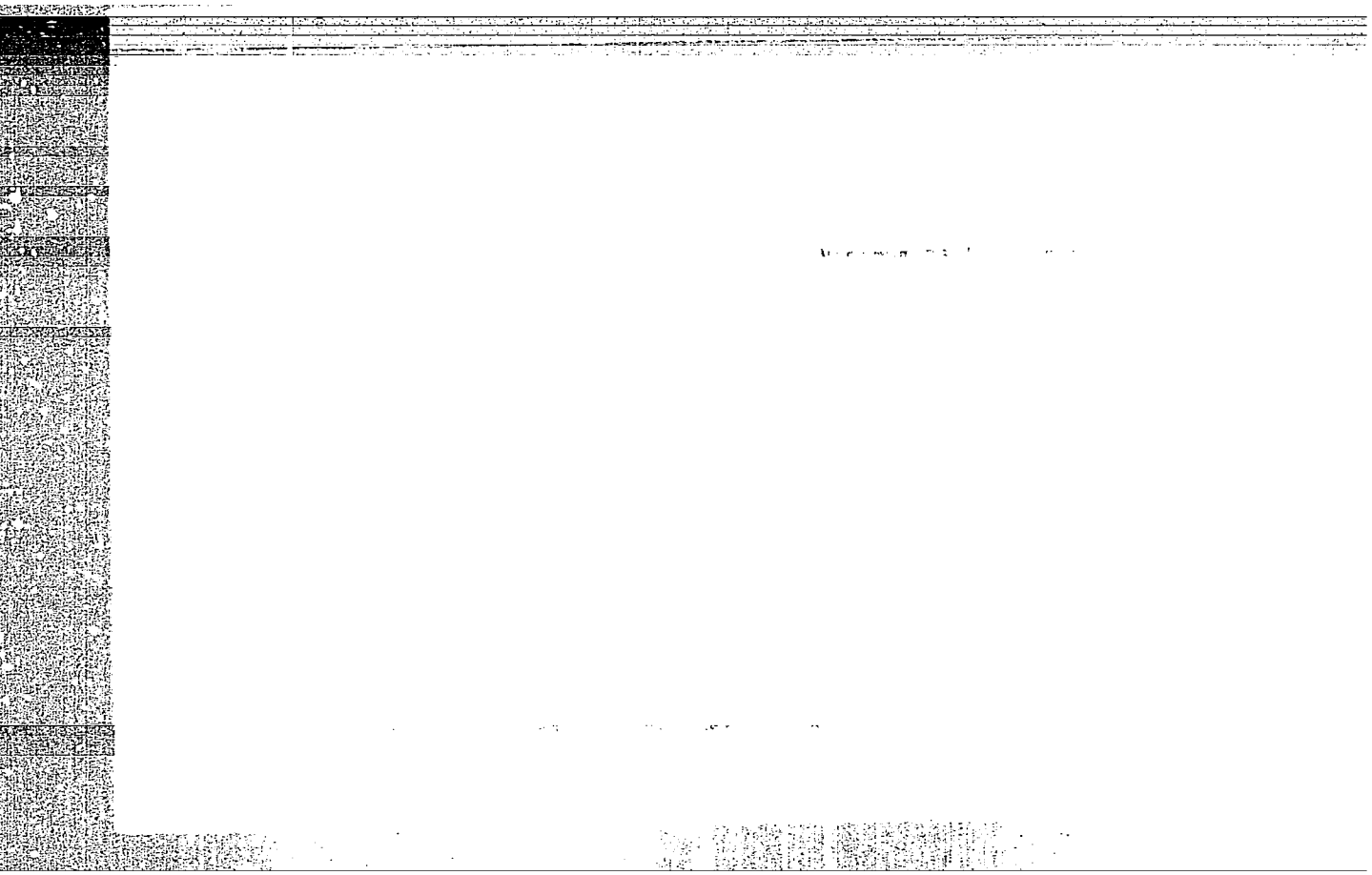
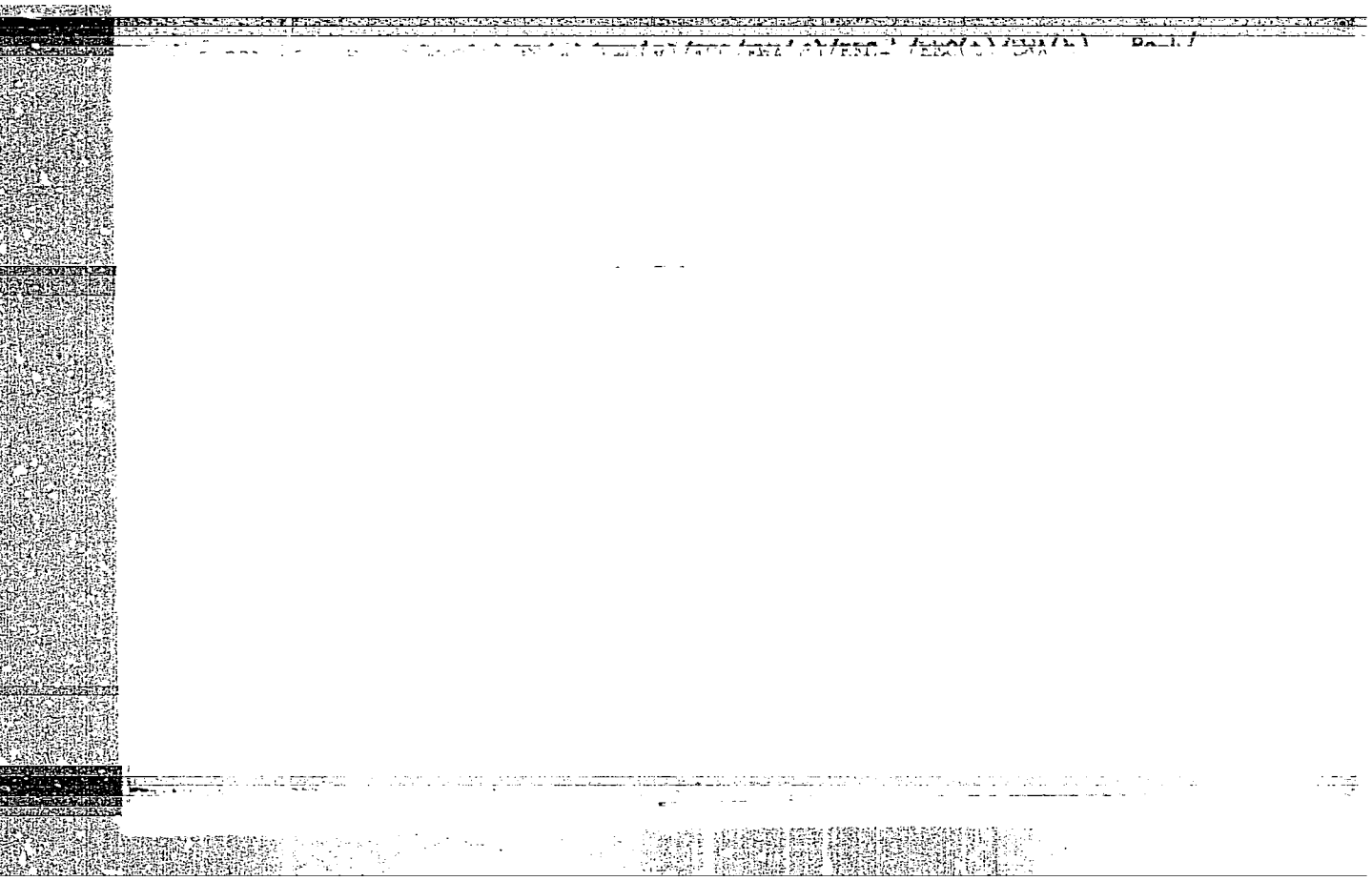


VAKULOV, P.V.; GORCHAKOV, Ye.V.; LOGACHEV, Yu.I.; CHUDAKOV, A.Ye., doktor fiziko-matem. nauk, otv. red.; ISAKOVICH, T.D., red.

[Collection of articles] Sbornik statei. Moskva, Nauka. No.6. 1965. 112 p. (MIRA 18:5)

1. Akademiya nauk SSSR. Mezhduvedomstvennyy komitet po provedeniyu Mezhdunarodnogo geofizicheskogo goda. VII razdel programmy MGG: Kosmicheskiye luchi.



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L 1553-66 FSS-2/EWT(l)/FS(v)-3/FCC/EWA(d)/EWA(h) TT/GS/GW

ACCESSION NR: AT5023610 UR/0000/65/000/000/0394/0405

AUTHOR: Vernov, S. N.; Chudakov, A. Ye.; Vakulov, P. V.; Gorchakov, Ye. V.; Kuznetsov, S. N.; Logachev, Yu. I.; Nikolayev, A. G.; Sosnovets, E. N.; Rubinshteyn, I. A.; Stolpovskiy, V. G.; El'tekov, V. A.

TITLE: Geometric position and particle composition of the earth's radiation belts

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 394-405

TOPIC TAGS: cosmic radiation, earth radiation belt, cosmic ray, Elektron 1, Elektron 2

ABSTRACT: An exhaustive study is made of data recorded by the Elektron-1 and -2 satellites, which were launched on 30 January 1964. Orbital data are given in Table 1 of the Enclosure. The first orbits were positioned so that the satellites passed their apogee at about 3 o'clock a.m. local time. The outer boundary of the radiation belt was thus crossed at about midnight and again at about 7—8 a.m. on the return branch of the orbit. The subsequent orbits were shifted toward the sunset: Elektron-1, by 8 min, and Elektron-2, by about 4 min in the 24-hr period. Elek-

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ACCESSION NR: AT5023610

tron-1 and -2 were equipped with similar instrumentation. In some cases, however, there were differences in energy thresholds. A chart summarizing all data shows the electron and proton fluxes of different energies in the equatorial plane and for comparison gives IMP-1 data. The following conclusions can be made from the chart: 1) A belt of artifically injected electrons exists at distances closest to the Earth's center. The maximum of the belt in February 1964 was at L = 1.35. The flux of electrons with energy above 2 Mev at the maximum was about 1×10^7 $cm^{-2} \cdot sec^{-1} \cdot ster^{-1}$. 2) The average directed flux of protons with an energy of 45—70 Mev at the maximum of the inner belt (L = 1.45) was about 1.5×10^3 $cm^{-2} \cdot sec^{-1} \cdot ster^{-1}$. A change in the integral spectrum at proton energies above 50 Mev was observed at L = 2.2; the spectrum of these energies is in the process of hardening, which could be explained by the theory of albedo neutrons. 3) The spatial distribution of protons with an energy of one to several Mev differs from that of the electrons. There is a definite regularity in the distribution of protons according to their energies. The average directed flux of protons with an energy above 2 Mev was about 4.5×10^5 $cm^{-2} \cdot sec^{-1} \cdot ster^{-1}$ in the equatorial plane at L = 2.8. It appears that the majority of the protons in this energy range are created by transverse drift with respect to the magnetic field lines. 4) A belt of high-energy electrons was observed at L = 2.75. Its width at the equator was about 0.4 earth radii. The average directed flux of electrons above 6 Mev was about 10^2 $cm^{-2} \cdot sec^{-1} \cdot ster^{-1}$. 5) A minimum of distribution

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ACCESSION NR: AT5023610

of electrons of above 150 kev energy was observed in the region between L = 3 and L = 4. The altitude intensity shift is subject to large fluctuations in time and may drop at times to negligible magnitudes. 6) The maximum of the outer belt is positioned, on the average, at L = 4.8. The maximum altitude intensity shift indicator m = 0.5 +0.3/-0.2 within a wide range of L. There is a sharp intensity jump on the night side at L = 7 + 0.5. On the morning side, a slow monotonic drop of intensity was observed. The average directed flux of electrons with an energy of over 70 kev at the maximum of the outer belt is about 5×10^6 $cm^{-2} \cdot sec^{-1} \cdot ster^{-1}$ and can change by more than an order of magnitude. The electron energy spectrum observed within the 70 to 600 kev range is in agreement with the data of other researchers. The electron energy spectrum in the energy range above 1 Mev appears to be softening, in comparison with measurements of earlier years. Orig. art. has: 11 figures. [FP]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 01 SUB CODE: AA, SV

NO REF SOV: 007 OTHER: 004 ATD PRESS: 4094

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