

20-119-4-48/60

Combined Effect of Ethylene Diamine Tetraacetic Acid and X-Ray Radiation
Upon Microspores of Tradescantia paludosa in the Interphase

of ionizing radiations on cells in the state of the interphase only reformations of chromosomes are formed. Chromatid reconstructions are formed in the case of effect on the cells in the prophase, whereas the semi-chromatids are formed in the premetaphase. In the interphase the chromosomes are torn by ionizing radiations like a thread, in the prophase each chromosome can be torn separately, i. e. the chromosome forms at that moment something like a double thread. In the premetaphase a chromosome consists so to speak of 4 threads, each of which can be torn separately. The author's experiments showed that the combined effect on the chromosomes mentioned in the title is not only quantitative, also a qualitative difference is found: in the case of radiation of the cells in the free interphase which had been pre-treated with ethylene diamine tetraacetic acid, with X-rays, reformations are formed not only of a chromosome type, but also of a chromatid and semi-chromatid type. The author used much

Card 2/3

21(3)

AUTHOR:

~~Delone, N. I.~~

SOV/20-122-4-11/57

TITLE:

The Sensitivity to X-Radiation of the Microspores *Tradescantia Paludosa* in Various Phases of the First Postmeiotic Mitosis (Chuvstvitel'nost' k rentgenovskomu izlucheniyu mikrospor *Tradescantia paludosa* na raznykh fazakh pervogo postmeyoticheskogo mitoz)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 4, pp 582-585 (USSR)

ABSTRACT:

This paper deals with the irradiation by X-rays of the microspores of *Tradescantia paludosa* (Saks, $2n = 12$) in the early and late interphase and in the prophase (profaza) of the first postmeiotic mitosis. The advantages of this object are discussed. The irradiation of these microspores gave the following results: The cells in the prophase have nearly the double sensitivity of the cells in the interphase; the late interphase is somewhat more sensitive than the early one. If the irradiation dose increases, the increase in the number of dicentrics and rings is higher than that in the number of fragments. There are more "transcombinations" (perekombinatsiya)

Card 1/3

SOV/20-122-4-11/57

The Sensitivity to X-Radiation of the Microspores *Tradescantia Paludosa*
in Various Phases of the First Postmeiotic Mitosis

in the prophases than in the interphases. According to the results of this and also of other papers, the chromosomes in the interphase are more sensitive to X-rays than those in the prophase if the number of the chromosome structure variations is used as a criterion. The causes of this different radiation sensitivity are rather complex and they depend on several factors: 1) The stability of the bonds within the chromosomes can vary during the passing of the chromosomes through the phases of their development. 2) For the same number of primary ruptures (razryv), there can be a different number of reunions of fragments in the previous manner, of transmutations in an other order, and of the formation of "closed" fragments which can neither recombine nor transcombine. 3) The fission of the chromosomes into chromatids and semichromatids causes an increase in the chances of chromosome structure variations. 4) The torsion and the motion of the chromosomes can be different in the various phases of the cell cyclus. There are 3 figures, 1 table, and 13 references, 0 of which is Soviet.

Card 2/3

The Sensitivity to X-Radiation of the Microspores *Tradescantia Paludosa*
in Various Phases of the First Postmeiotic Mitosis

SOV/20-122-4-11/57

ASSOCIATION: Institut biofiziki Akademii nauk SSSR
(Institute of Biophysics, Academy of Sciences, USSR)

PRESENTED: May 23, 1958, by V. N. Sukachev, Academician

SUBMITTED: May 23, 1958

Card 3/3

DELORE, H.L.

Effect of various concentrations of ethylenediaminetetraacetic acid on microspores of *Tradescantia paludosa*. *Sitologia* 1 no.2:234-237 Apr '59. (MIRA 12:9)

1. Laboratoriya radiatsionnoy genetiki Instituta biofiziki AN SSSR, Moskva.

(POLLEN)

(ACETIC ACID)

KHVOSTOVA, V.V., ~~DELOVA, N.I.~~

Radiation sensitivity of the meristem of gemmules and rootlets
in pea and barley embryos. TSitologia 1 no.3:320-321 My-Je
'59. (MIRA 12:10)

1. Laboratoriya radiatsionnoy genetiki Instituta biofiziki
AN SSSR, Moskva.

(PLANTS, EFFECT OF RADIOACTIVITY ON)

DELONE, N.L.

Duration of individual phases in the microsporegenesis of *Tradescantia paludosa*. Bot. zhur. 44 no.1:61-64 Ja '59. (MIRA 12:1)

1. Institut biofiziki AN SSSR, laboratoriya radiogenetiki, Moskva.
(Spiderwort) (Pollen)

DELONE, N.L.

Chromosome rearrangements induced by ionizing radiation. Itogi
nauki: Biol. nauki no. 3:104-122 '60. (MIRA 13:10)
(RADIATION—PHYSIOLOGICAL EFFECT) (CHROMOSOMES)

DELONE, N.L.

Sensitivity to ionizing radiation during various phases of mitosis
and meiosis. Itogi nauki: Biol. nauki no. 3:155-175 '60.

(MIRA 13:10)

(RADIATION—PHYSIOLOGICAL EFFECT) (KARYOKINESIS)

DUBININ, N.P.; KHVOSTOVA, V.V.; DELONE, N.I.

Ionizing radiations and plant breeding. Itogi nauki: Biol. nauki
no. 3:292-323 '60. (MIRA 13:10)
(PLANTS, EFFECT OF RADIATION ON) (PLANT BREEDING)

ACCESSION NR: AT4042674

S/0000/63/000/000/0149/0153

AUTHOR: Delone, N. L.; Popovich, P. R.; Antipov, V. V.; Vysotskiy, V. G.

TITLE: Alterations in mitotic activity following space flights

SOURCE: Konferentsiya po aviatsionnoy i kosmicheskoy meditsine, 1963.
Aviatsionnaya i kosmicheskaya meditsina (Aviation and space medicine); materialy konferentsii. Moscow, 1963, 149-153

TOPIC TAGS: microspore, spaceflight effect, mitotic activity, Tradescantia paludosa, Vostok 3, Vostok 4

ABSTRACT: Tradescantia paludosa microspores were cultivated in special biological cartridges on Vostok 3 and Vostok 4 to determine how conditions of space flight affect mitotic processes. In one experiment on Vostok 4, P. R. Popovich fixed cultures after an orbiting time of 56 hours. In two other tests, cultures were examined 18 and 48 hours after re-entry. Significant alterations in mitotic processes were observed as a result of exposure to conditions of space flight. The authors suggest that the basic mechanism of these alterations must have been weightlessness because other experiments have shown that gravitational forces and

Card

1/2

ACCESSION NR: AT4042674

radiation doses higher than those encountered during space flights are required to produce mitotic aberrations.

ASSOCIATION: none

SUBMITTED: 27Sep63

ENCL: 00

SUB CODE: LS

NO REF SOV: 000

OTHER: 000

Gord 2/2

L 19452-63 EWT(1)/FCC(w)/FS(v)-2/BDS/ES(a)/ES(j)/ES(c)/ES(k)/EEO-2/ES(v)/
ES(t)-2 AFFTC/AMD/AFMDC/ESD-3 Pb-l/P1-l/Po-l/Pe-l/Pq-l TT/A/RD/DD
ACCESSION NR: AP3007351 S/0293/63/001/001/0182/0185

AUTHOR: Gordon, L. K.; Delone, N. L.; Antipov, V. V.; Vy*sotskiy,
V. G. ATB

TITLE: Effect of space-flight conditions on Vostok-3 on seeds of
higher plants 12

SOURCE: Kosmicheskiye issledovaniya, v. 1, no. 1, 1963, 182-185

TOPIC TAGS: space flight effect, Vostok 3, wheat seed, lettuce seed,
beans, pine seed, chromosome reconstruction

ABSTRACT: Dry seeds of 14 different kinds of higher plants were taken on board Vostok-3. Three criteria were used to determine the effects of space flight: sprouting, rate of growth, and percentage of chromosome reconstructions. Examination revealed that flight conditions produced a statistically significant increase (27 \pm 7.44%) in sprouting of PPG-186 (a wheat-agropyron hybrid) and a significant decrease (7.8 \pm 1.96%) in sprouting of Berlin lettuce. Similar effects were noted in growth rates. The seeds of black Russian beans and pine were tested for chromosome reconstructions.

Card 1/2

L 19452-63

ACCESSION NR: AP3007351

and in both cases a definite tendency towards an increase in the number of reconstructions was observed. Orig. art. has: 3 tables.

ASSOCIATION: none

SUBMITTED: 24Apr63

DATE ACQ: 21Oct63

ENCL: 00

SUB CODE: AM

NO REF SOV: 003

OTHER: 000

Card 2/2

DELONE, N.L.; POPOVICH, P.R.; ANTIPOV, V.V.; VYSOTSKIY, V.G.

Effect of cosmic flight factors in the satellite-spaceships
"Vostok-3" and "Vostok-4" on microspores of *Tradescantia*
paludosa. *Kosm. issl.* 1 no.2:312-325 S-O '63. (MIRA 17:4)

L 11244-63

EWT(1)/EWT(m)/BDS--AFFTC/AMD/ASD--AR/K
3/0205/63/003/003/0422/0426

ACCESSION NR: AP3001068

57
56

AUTHOR: Delone, N. L.

TITLE: Change in x-ray sensitivity of *Tradescantia paludosa* microspores during mitosis

SOURCE: Radiobiologiya, v. 3, no. 3, 1963, 422-426

TOPIC TAGS: mitosis, *Tradescantia Paludosa*, X-ray sensitivity

ABSTRACT: Many studies have been made of radiosensitivity change in live cells, but few have used chromosome rearrangement during mitosis as a criterion for such sensitivity. In this work the microspores of the *Tradescantia Paludosa* plant were used because they have practically no spontaneous rearrangement of chromosomes. The microspores were irradiated by X-rays with a 200 r dose at 41 r/min at a temperature of 20°. During the four stages of mitosis the relative values were: early interphase 1.0, late interphase 1.1, early prophase 1.8, late prophase 5.5, and anaphase 6.1. The high point of sensitivity in the late prophase is formed basically at the expense of new chromosome combinations and the high point in the anaphase at the expense of free fragments. "I thank L. V. Nevzgodina and V. V. Andreyev for assistance in the study and Prof. A. Gustafsson for the clone of *Tradescantia Paludosa*."

Card 1/2

L 11244-63

ACCESSION NR: AP3001068

Orig. art. has: 3 figures, 1 table.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow. (Institute of Biological Physics, AN SSSR)

SUBMITTED: 26Jun62

DATE ACQD: 01Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 005

OTHER: 009

ch/wm
Card 2/2

DELONE, N.L.; DANILINA, A.N.

Cytochemical properties of the interphase cell nuclei with
different physiological functions. Dokl. AN SSSR 151 no.5:
1195-1197 Ag '63. (MIRA 16:9)

1. Predstavleno akademikom A.N.Belozerskim.
(CELL NUCLEI)

DELONE, N.L.; POPOVICH, P.R.; ANTIPOV, V.V.; VYSOTSKIY, V.G.

New types of chromosome rearrangements in the microspores of *Tradescantia paludosa* under the influence of certain factors during spaceship flights. Dokl. AN SSSR 152 no.5:1227-1230 0 '63.

(MIRA 16:12)

1. Predstavleno akademikom N.M.Sisakyanom.

*

L 16012-65 EWG(j)/EWG(r)/EWT(l)/FS(v) /EWG(v)/EWG(a)/EWG(c) Pb-ll/Pe-5 AMDC(a)/
ACCESSION NR: AP4048655 ASD(a)-5/AFWL/ S/0216/64/000/006/0900/0907
AMD/AFETR DD

AUTHOR: Delone, N. L.; Vy*atskiy, V. G.

TITLE: The sensitivity of different mitotic phases of *Tradescantia paludosa* microspores to acceleration B

SOURCE: AN SSSR. Izvestiya. Soriya biologicheskaya, no. 6, 1964, 900-907

TOPIC TAGS: microspora, *Tradescantia paludosa*, mitotic sensitivity, acceleration, chromosomal rearrangement, chromosomal fragmentation, mitosis

ABSTRACT: The changes in the mitotic sensitivity of microspores (*Tradescantia paludosa*) to 5000 G accelerations was investigated using a T-13-R laboratory centrifuge (radius of 15 m). The experimental temperature was 20—22C, and the duration of exposure was 15 min. It was found that such accelerations produced chromosomal rearrangement and fragmentation. There was a 1.07% chromosomal rearrangement in cells exposed to acceleration at early interphase. If the number of

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L 16012-65

ACCESSION NR: AP4048655

cell rearrangements at early interphase is assumed to be 1, when analyzed in the first and second postmeiotic mitosis, the following ratios can be given: early interphase - 1.0, medium interphase - 1.03, late interphase - 1.13, early prophase - 1.4, middle prophase - 2.06, late prophase - 5.64, anaphase 5.03. An analysis of the first postmeiotic mitosis alone yields the following sensitivity indices: late prophase - 5.91, metaphase - 5.08, anaphase - 5.76, and telophase - 4.65. Accelerations of 5000 G produce a peculiar type of chromosomal rearrangement, consisting mostly of spherical fragments, during interphase and prophase. These fragments appear directly following acceleration, irrespective of the phase, and are the basic indices of chromosomal rearrangement. The indices of the participation of fragments in crossovers during acceleration are as follows: early interphase - 40, middle interphase - 34, late interphase - 32, early prophase - 19, middle prophase - 11, late prophase - 9, and anaphase - 13. Orig. art. has: 6 figures and 3 tables.

ASSOCIATION: none

Card 2/3

L 16012-65

ACCESSION NR: AP4048655

SUBMITTED: 29Nov63

ENCL: 00

SUB CODE: LS

NO REF SOV: 001

OTHER: 006

ATD PRESS: 3142

Card 3/3

ACCESSION NR: AP4034805

S/0293/64/002/002/0320/0329

AUTHOR: Delone, N. L.; Bykovskiy, V. F.; Antipov, V. V.; Parfenov, G. P.; Vyssotskiy, V. G.; Rudneva, N. A.

TITLE: Effect of Vostok-5 and Vostok-6 space flights on *Tradescantia paludosa* microspores

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 320-329.

TOPIC TAGS: space flight, Vostok 5, Vostok 6, microspore, mitosis, vibration, acceleration, weightlessness, *Tradescantia*

ABSTRACT: Exposure of *Tradescantia* microspores to orbital flights in Vostok-5 and Vostok-6 spaceships adversely affected the mitotic mechanism. Cytological analysis of the samples revealed five types of abnormalities: Type I, incomplete mitosis due to nondisjunction of chromosomes; Type II, "rosette" chromosome alignment on the metaphase plate; Type III, nondisjunction aberrations in spindle orientation (the nuclei in the experimental and in the control spores are located in different planes); Type IV, nondisjunction of chromosomes or delayed telophase; Type V, multipolar mitosis leading to the formation

Card 1/2

L 17623-65 EWG(j)/EWT(m) AEDC(a)/AFWL/SSD/AMD/Pb-4
ACCESSION NR: AP5000096 870205764/004/006/0922/0923

AUTHOR: Delone, N. L.; Kozlov, V. A.

TITLE: The influence of beta-mercaptopyrrolamine (MPA) in decreasing the number of chromosomal rearrangements in Tradescantia paludosa microspores during gamma irradiation ^B

SOURCE: Radiobiologiya, v. 4, no. 6, 1964, 922-923 ¹⁹

TOPIC TAGS: gamma radiation, Tradescantia paludosa, microspore, radiation protection, beta mercaptopyrrolamine, chromosomal rearrangement

ABSTRACT: This investigation was concerned with the influence of beta-mercaptopyrrolamine (MPA) on the frequency of chromosome rearrangement in Tradescantia paludosa microspores following irradiation of their inflorescences with gamma rays. Chromosome rearrangement is one of the hereditary changes which occurs following exposure to ionizing radiation. The experiment included 4 variants: 1) A control group in which truncated inflorescences were placed in water; 2) a control group in which inflorescences were irradiated with gamma rays but not treated with MPA; 3) an experimental group exposed to gamma

Card 1/2

L 17623-65

ACCESSION NR: AP5000096

0

rays and treated with MPA; 4) an unirradiated experimental group treated with MPA. All irradiated groups received a total dose of 27 r (12 r/hr) at a temperature of $16 \pm 1^{\circ}\text{C}$. The tabulated results show that there was a significant difference in the incidence of chromosome rearrangement between experimental and control groups. The incidence in irradiated inflorescences not treated with MPA was 5.49 ± 0.535 , as compared to $3.04 \pm 2.84\%$ for those treated with MPA. The incidence for unirradiated, unprotected samples was $0.05 \pm 0.09\%$ as compared to 0.07 ± 0.343 for unirradiated samples treated with MPA. The authors cannot explain the mechanism of MPA and can only state that MPA significantly ($R = 4.05$) decreases the number of chromosomal rearrangements following ionizing radiation. Orig. art. has: 1 table.

ASSOCIATION: none

SUBMITTED: 28Mar64

ENCL: 00

SUB CODE: LS

NO REF SOV: 004

OTHER: 001

ATD PRESS: 3151

Card 2/2

L 15637-65 REO-2/EWG(j)/FSF(h)/FSS-2/EWG(r)/ENT(1)/FS(v)-3/BEC(k)-2/EWG(v)/
EWA(d)/EWG(a)/EWG(c) Pb-4/Pa-4/Pe-5/Pq-1/Pac-4/Pac-2/P1-4 AFMTC/AFMDC/ESD-3/
ESD(s1)/AEDC(a)/ESD/AFETR/AMD/AFTC(a)/AFTC(b)/SSD TT/GW

ACCESSION NR: AP4049492 S/0020/64/159/002/0439/0441

AUTHOR: Delone, N. L.; By*kovskiy, V. F.; Antipov, V. V. 8

TITLE: The development of mitotic disruption in *Tradescantia paludosa* microspores under the influence of different flight duration on Vostok-5

SOURCE: AN SSSR. Doklady*, v. 159, no. 2, 1964, 439-441, and insert facing p. 440

TOPIC TAGS: spaceflight, Vostok-5, mitotic disruption, mitosis, weightlessness, microspore, *Tradescantia paludosa*

ABSTRACT: The microspores of *Tradescantia paludosa* were fixed at intervals of 1.5, 76, and 120 hr after the launching of Vostok-5 and at 3.5 following its landing. Five types of mitotic aberration (similar to the previous five types registered during the Vostok-4 flight) were noted. In type I, the nucleus remained at the periphery of the cell during prophase, followed by chromosomal nondisjunction during the subsequent mitotic phases. In type II, during prophase the nucleus migrated towards the center of the cell, followed by a

Card 1/2

L 15637-65

ACCESSION NR: AP4049492

rosette formation during metaphase and by nondisjunction. In type III, the spindle orientation in the test spores differed from that in the controls. In type IV, chromosomal nondisjunction and extended telophase occurred. In type V, multipolar mitoses occurred. The aberrations described do not occur exclusively in any given group of spores but rather are evenly distributed throughout the test groups. Orig. art. has: 5 figures.

ASSOCIATION: none

SUBMITTED: 27Feb64

ENCL: 00

SUB CODE: LS, PH

NO REF SOV: 001

OTHER: 000

ATD PRESS: 3144

Card 2/2

DEIONE, N.L.; VYSOTSKIY, V.G.

Sensitivity of different phases of mitosis in the microspores
of *Tradescantia paludosa* to acceleration. Izv. AN SSSR. Ser.
biol. no.6:900-907 N-D '64.

(MIRA 17:11)

DELONE, N.L.; BYKOVSKIY, V.F.; ANTIPOV, V.V.

Development of disturbances in the mitosis mechanism of *Trandescantia paludosa* microspores under the influence of different flight periods on the Vostok-5 spaceship. Dokl. AN SSSR 159 no.2:439-441 N '64. (MIRA 17:12)

1. Predstavleno akademikom N.M. Sisakyanom.

DELONE, N.L.

Use of higher plants as indicators in studying the effect of the
factors of sputnik flights on the living cell. Probl. kosm.
biol. 4:304-307 '65. (MIRA 18:9)

L 54723-65 EEO-2/ENG(j)/FSS-2/ENG(r)/EWT(1)/PS(v)-3/EEC(k)-2/ENG(v)/EWA(d)/
EWG(a)-2/ENG(c) Po-4/Pe-5/Pq-4/Pac-4/Pae-2/Pi-4 TT/DD/GW

ACCESSION NR: AP5015676

UR/0293/65/003/003/0480/0487
58.057

AUTHOR: Delone, N. I.; Rudneva, N. A.; Antipov, V. V.

TITLE: The effect of the Vostok-5 and Vostok-6 flights on primary rootlet chromosomes of some higher plant seedlings

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 3, 1965, 480-487

TOPIC TAGS: Vostok 5, Vostok 6, space flight, biological effect, chromosomal rearrangement, plant seedling, plant genetics, mutation

ABSTRACT: Dry seeds of some higher plants (carrot, tomato, pine, bean, cucumber, wheat, lettuce, and mustard) were carried on the Vostok-5 and Vostok-6 flights to study the genetic effect of space-flight factors. After the flight, the seeds were grown, and primary rootlets were fixed when they reached a length of 2-15 mm (depending on the plant). Cells in the anaphase and telophase were studied to determine the number of general chromosomal rearrangements (fragments and bridges). When cell nuclei of the meristem, normally in the interphase state, are irradiated, the chromosome splits and then duplicates itself, resulting in "chromosome" rearrangements. In the controls, another type of rearrangement occurs more frequently--the

Card 1/2

L 54723-55

ACCESSION NR: AP5015676

so called "chromatid" rearrangement, when the chromatid breaks after it reduplicates. Cytological analysis showed a statistically reliable increase in the number of general chromosomal rearrangements in carrots and tomatoes, a tendency to increase in pine trees and beans, and some tendency to increase in cucumbers and wheat. No difference was noted between experimental and control mustard plants. It is interesting that for the same plant variety, the percentage of rootlet cells with general chromosomal rearrangements after both flights was very close. It was found that chromosomal rearrangements predominated in the experimental samples, and chromatid in the controls. This distribution was also observed after the first 4 Vostok flights (pea and wheat rootlets). The order of sensitivity obtained experimentally does not coincide with the sensitivity to gamma radiation of dry seeds of these plant varieties. More recombinations of chromosomes (bridges) than fragments were observed in experimental samples, as distinguished from the controls. Differences between experimental and control samples are small, requiring more experiments including, if possible, re-otic analysis. Orig. art. has: 6 figures and 4 tables.

[JS]

ASSOCIATION: none

SUBMITTED: 06May64

ENCL: 00

SUB CODE: LS

NO REF SOV: 012

OTHER: 007

ATD PRESS: 4031

Card 2/2

ANTIPOV, V.V.; DELONE, N.L.; PARFENOV, G.P.; VYSOTSKIY, V.G.

Results of biological tests during the flight on "Vostok" ships
with the participation of the astronauts. Probl. kosm. biol.
4:248-260 '65. (MIRA 18:9)

DELONE, N.L.; KOZLOV, V.A.

Effect of β -mercaptoethylamine on the reduction of chromosome breakages in microspores of *Tradescantia paludosa* following gamma irradiation. *Radiobiologia* 4 no.6:922-923 '64. (MIRA 18:7)

CHERNOBAY, A.V.; SHEPELEVA, A.I.; ZUBKOVA, V.S.; Primalni uchastiye:
DELYATITSKAYA, R.Ya., KATMISSKAYA, E.V.; BOBRYISHEVA, A.M.

Spectrophotometric study of N-vinylcarbazole and methyl methacrylate
copolymers. Vysokom. sced. 7 no.6:1080-1084. Je '65. (MIRA 18:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov,
stsintillyatsionnykh materialov i osobo chistykh khimicheskikh
veshchestv.

DEMAKOV, G.P., assistant

Fusariotoxicosis in cattle. Veterinariia 41 no.11:
59-60 N '64. (MIRA 18:11)

1. Kirovskiy sel'skokhozyaystvennyy institut.

L 12777-66 FSS-2/EWT(1)/FS(v)-3/EEC(k)-2/EWA(d) SCTB TT/DD/GW

ACC NR: AP6004398

SOURCE CODE: UR/0020/66/166/003/0713/0715

AUTHOR: Delone, N. L.; Yegorov, B. B.; Antipov, V. V.

ORG: none

TITLE: The sensitivity of the mitotic phases of *Tradescantia paludosa* microspores to Voskhod-1 space-flight factors

SOURCE: AN SSSR. Doklady, v. 166, no. 3, 1966, 713-715

TOPIC TAGS: Voskhod 1, microspore, *Tradescantia paludosa*, mitosis, space flight effect, combined stress

ABSTRACT: The authors analyzed the effects of the Voskhod-1 flight (including lift-off and reentry) on the various mitotic phases of *Tradescantia paludosa* microspores. Samples of the microspores with their inflorescences were placed in special containers which were attached to the interior of the space cabin. These samples were fixed at four times after the landing: 1) at 2 hr, 15 min (corresponding to middle and late prophase during the flight); 2) 24 hr; 3) 48 hr (corresponding to late interphase); 4) 120 hr (corresponding to early interphase). Some results of the analyses are shown in Tables 1 and 2 and Figures 1 and 2. The results of the experiments agreed

Card 1/5

UDC: 576.312.36

31
B

L 12777-66

ACC NR: AP6004398

Table 1. Number of chromosomal rearrangements

Sample time after landing	No. of Chromosomes	No. of rearrangements				-Type					
		abs.	%	±m	R*	Fragments			Recombination		
						abs.	%	±m	abs.	%	±m
2 hr, 15 min	2083	141	1.99	0.14	14.0	118	1.30	0.10	63	0.69	0.01
2 hr	6613	60	0.90	0.10	8.7	42	0.63	0.10	18	0.27	0.06
1231H	44	0.35	0.05	6.1	33	0.28	0.04	11	0.10	0.02	
2040H	83	0.39	0.04	6.6	48	0.23	0.01	14	0.07	0.08	
Control **	9192	0	0.00	0.02	—	5	0.05	0.02	1	0.01	0.01
	6324	2	0.03	—	—	2	0.03	—	—	—	—

* R - Reliability index of the variant and control - 2
 ** - Cosmodrome control - Moscow control

Cont 2/5

L 12777-66

ACC NR: AP6004398

Table 2. Number of microspore cells with mitotic disruptions

Sample time after landing	No. of cells with disruptions			Type of disruption									
				I		II		III		IV		V	
	abs.	%	±m	abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
2 hr, 15 min	12	0.12	0.21	1	0.08	3	0.18	8	0.59	--	--	--	--
24 hr	12	0.07	0.24	2	0.19	4	0.32	6	0.49	--	--	--	--
48 hr	51	2.57	0.35	15	0.71	20	1.21	11	0.53	3	0.11	1	0.05
120 hr	3	0.09	0.05	2	0.06	--	--	--	--	1	0.01	--	--

I - Nucleus remains at the cell wall, chromosomes do not diverge at anaphase and remain attached to the cleavage plane. Mononucleate cells are formed instead of dinucleate. II - During metaphase all chromosomes appear to be joined by the cleavage plane in a rosette pattern and mononucleate cells are formed. III - The spindle plane orientation is altered; chromosomes during metaphase and telophase and the nuclei in binucleate cells are situated along an abnormal plane. IV - Nondivergence by chromosomes which remain in a telophase attitude. V - Tri- and quadripolar mitosis.

Card 3/5

L 12777-66

ACC NR: AP6004398

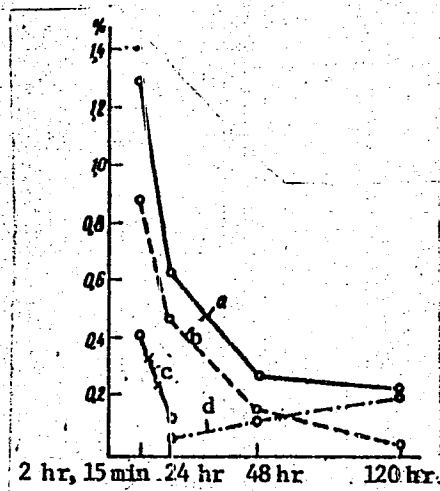


Fig. 1. Types of fragments resulting from the Voskhod-1 flight.

a - Total fragments; b - chromosomal and isochromatid fragments; c - chromatid fragments; d - spherical fragments.

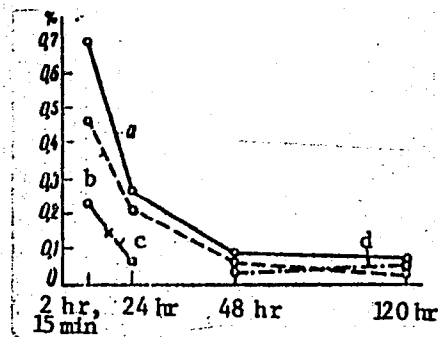


Fig. 2. Types of recombination resulting from the Voskhod-1 flight.

a - Total recombination; b - chromosomal and isochromatid recombination; c - chromatid recombination; d - spherical recombination.

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L 12777-66

ACC NR: AP6004398

with those of the Vostok-4 and Vostok-5 flights. The authors did not speculate on which space-flight factor was responsible for the observed mitotic disruptions. A slightly more expanded version of this article appeared in "Kosmicheskiye issledovaniya," no. 1, 1966, 156-161. Orig. art. has: 3 figures and 2 tables. [CD]

SUB CODE: 06/ SUBM DATE: 07Sep65/ ORIG REF: 002/ ATD PRESS: 4184

Card 5/5 HW

L 23995-66 FSS-2/EMT(1)/EEC(k)-2/EWA(d) SCTB TT/DD/RD/GW

ACC NR: AT6003859 SOURCE CODE: UR/2865/65/004/000/0248/0260

AUTHOR: Antipov, V. V.; Delone, N. L.; Parfenov, G. P.; Vysotskiy, V. G.

ORG: none

TITLE: Results of biologic experiments conducted under flight conditions in the "Vostok" spaceships with participation of the astronauts A. G. Nikolayev, P. R. Popovich and V. G. Vysotskiy ~~***~~

SOURCE: AN SSSR. Otdeleniye biologicheskikh nauk. Problemy kosmicheskoy biologii, v. 4, 1965, 248-260

TOPIC TAGS: experiment animal, space biologic experiment, biologic acceleration effect, radiation biologic effect, space biology, biologic mutation

ABSTRACT: The effect of motion, weightlessness and cosmic radiation on propagation, growth and development of organisms was studied in *Drosophila melanogaster* and *Tradescantia paludosa*. Male and female flies were placed into separate glass tubes 6 hours before start of flight and were fed agar agar and sugar. During flight the two sexes were put into one glass. On the next flight the progeny from eggs laid during weightlessness was taken along under the same conditions. The

Card 1/2

50
48
Rt/

2

I. 23995-66

ACC NR: AT6003859

2

flies emerged from the cocoons 6 days later than controls, probably due to the cooler climate in the space cabin. More females than males emerged, the weight of the test flies was lower (due probably to the high agar content of the diet) and 4 anomalies were seen in 482 flies, involving only one half of the body. No mutants were seen. It is concluded that results were normal for the 4 days' flight, but that these findings have only qualitative value. Similar arrangements were made for observing propagation of the plants during flight. Cuttings of raceme of Tradescantia clone were put into a container, to be fixated by the astronauts 6 and 9 hours respectively after the start of the two flights. Cytologic analysis showed chromosome aberration, disturbance of mitosis and growth processes, and altogether 4 types of disturbances involving the nucleus and the mechanism of mitosis. These disturbances are ascribed mainly to motion, since the radiation dose was very low (40-80 millirad). Orig. art. has: 7 figures.

SUB CODE: 06,22/SUBM DATE: none/ ORIG REF: 006

** [ADD CLUE WORD

Vostok 3

Vostok 4

12

12

Card 2/2 *pla*

L 40299-66 FSS-2/EWT(1)/EEC(k)-2 SCTB TT, DD/G

ACC NR: AP6007747 SOURCE CODE: UR/0293/66/004/001/0156/0161

AUTHORS: Delone, N. L.; Yegorov, B. B.; Antipov, V. V.

96
B

ORG: none

TITLE: The effect of factors of the space flight in the manned satellite "Voskhod"
on Tradescantia paludosa microspores

12
2

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 1, 1966, 156-161

TOPIC TAGS: microspore, cosmonaut, artificial earth satellite, satellite data analysis, mitosis, microbiology/ Voskhod artificial earth satellite, Vostok 3 artificial earth satellite, Vostok 4 artificial earth satellite, Vostok 5 artificial earth satellite, Vostok 6 artificial earth satellite

ABSTRACT: The results of a study of the effect of the factors of the space flight of "Voskhod" on Tradescantia paludosa microspores are given. Stalks of Tradescantia paludosa with racemes were placed in special holders in the satellite. The anthers were fixed after planting 4 times: 2 hrs and 15 min, and 24, 48, and 120 hrs. The buds were also fixed 1.5 hrs before planting by cosmonaut B. B. Yegorov. Mitosis in the Tradescantia paludosa microspores lasted 7 days at 30C (interphase 5 days, early prophase 1 day, and all remaining phases 1 day) and the entire cycle lasted 10 days at 20C (interphase 7 days, early prophase 1.5 days, and all remaining phases another 24 hrs). It was found that the late and middle prophase were the most sensitive, and

Card 1/2

UDC: 581.057

L 40299-66

ACC NR: AP6007747

that the early interphase was the least sensitive. This study confirmed the earlier hypothesis of N. L. Delone, V. F. Bykovskiy, V. V. Antipov, G. P. Parfenov, V. G. Vysotskiy, and N. A. Rudneva (Kosmich. issled., 2, No. 2, 320, 1964) that reorganization of the chromosomes is caused by one set of flight factors, while disruption of the mitosis mechanism is caused by another set of factors. Orig. art. has: 7 tables.

SUB CODE: 22, 06/ SUBM DATE: 02Sep65/ ORIG REF: 002

Card 2/2 *MLP*

L 03777-67 FSS-2/EWT(1)/EEC(k)-2/T SCIB TT/DD/JK/RD/GW
ACC NR: AF6028343 SOURCE CODE: UR/0293/66/004/004/0634/0640

AUTHOR: Zhukov-Verezhnikov, N. N.; Mayskiy, I. N.; Delone, N. L.; Rybakov, N. I.;
Kozlov, V. A.; Davydov, B. I.; Antipov, V. V.; Saksonov, P. P.; Rybakova, K. D.;
Tribulev, G. P.

ORG: none

TITLE: Biological investigations on the Voskhod-1 and Voskhod-2 spaceships

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 4, 1966, 634-640

TOPIC TAGS: biologic spaceflight, ~~effect~~, ~~lysogenic bacteria~~, ~~radiation~~, ~~radioprotective drug~~, ~~mercaptopyrrolamine~~, spaceflight, ~~fruit~~, ~~pine wood~~, wheat seed/
spacecraft, *antiradiation*, *Voskhod 1, Voskhod 2 spacecraft*

ABSTRACT: Experiments were performed on the Voskhod-1 and Voskhod-2 spaceships to test the effects of spaceflight on lysogenic cultures of *E. coli* K-12 (λ). The cultures were carried in 1.5-ml ampules on board spaceships and in Leonov's spacesuit pocket during his EVA. Some of the ampules contained the radioprotective drug β -mercaptopyrrolamine. Controls were kept at the cosmodrome and at the home laboratory. Results showed that on the basis of viability there was no difference between samples carried on Voskhod-1 and the controls. Experiments on Voskhod-2 resulted in a slightly higher viability on the part of experimental cultures as compared to controls. Phage production of experimental cultures carried on the two flights also did

Card 1/2

UDC: 629.198.621:576.8

L 03777-57

ACC NR: AP6028343

not exceed phage production of controls. Thus, it was not possible to demonstrate the protective properties of β -mercaptopyramine. An attempt was made to determine whether spaceflight sensitized lysogenic cultures of E. coli K-12 (λ) to consequent exposure to small doses of x-rays. Results showed that phage production in space-flown samples was almost identical to that of the controls. In addition, air-dried seeds of pine and winter wheat (PPG-186) were carried on Voskhod-2 and in Leonov's pocket during his EVA for the purpose of determining the genetic effects of space-flight factors. Results did not reveal any substantial differences between the two spaceflight-exposed groups of seeds and the controls. It is assumed that the absence of the effects of spaceflight factors on lysogenic bacteria and seeds of higher plants in these two flights is due to the particular conditions under which these flights took place. Orig. art. has: 5 tables. [BM]

SUB CODE: ²²06/ SUBM DATE: 21Apr66/ ORIG REF: 013/ OTH REF: 002/ ATD PRESS: 5063

Card 2/2 *hh*

DONSKOY, Aleksandr Vasil'yevich, doktor tekhn. nauk, prof.; LEYBIN, Yuriy Veniaminovich, inzh.; DELONE, N.N., red.; DUBROVSKIY, Ye.V., red.; SAVCHENKO, Ye.V., tekhn. red.

[High-frequency currents] Toki vysokoi chistoty. Moskva, Izd-vo "Znanie," 1961. 30 p. (Vsesoluznoe obshchestvo po rasprostraneniui politicheskikh i nauchnykh znani. Ser.4, Tekhnika, no.20)
(MIRA 14:12)

(Electric currents, Alternating)

YEMEL'YANOV, V.S., otv.red.; BARDIN, I.P., red.; VINOGRADOV, A.P., red.;
 GOL'DANSKIY, V.I., red.; GULYAKIN, I.V., red.; DOLIN, P.I., red.;
 YEFREMOV, D.V., red.; KRASIN, A.K., red.; LEBEDINSKIY, A.V., red.;
 MINTS, A.L., red.; MURIN, A.N., red.; NIZE, V.E., red.; NOVIKOV,
 I.I., red.; SEMENOV, V.F., red.; SOBOLEV, I.N., red.; BAKHAROVSKIY,
 G.Ya.; nauchnyy red.; BERKOVICH, D.M., nauchnyy red.; DANOVSKIY,
 N.F., nauchnyy red.; DELONE, N.N., nauchnyy red.; KON, M.A.,
 nauchnyy red.; KOPYLOV, V.N., nauchnyy red.; MANDEL'TSVAYG, Yu.B.;
 MILOVIDOV, B.M., nauchnyy red.; MOSTOVENKO, N.P., nauchnyy red.;
 MURINOV, P.A., nauchnyy red.; POLYAKOV, I.A., nauchnyy red.;
 PREEOBRAZHENSKAYA, Z.P., nauchnyy red.; RABINOVICH, A.M., nauchnyy
 red.; SIMKIN, S.M., nauchnyy red.; SKVORTSOV, I.M., nauchnyy red.;
 SYSOYEV, P.V., nauchnyy red.; SHORIN, N.A., nauchnyy red.;
 SHREYBERG, G.L., nauchnyy red.; SHTeyNMAN, R.Ya., nauchnyy red.;
 KOSTI, S.D., tekhn.red.

[Concise atomic energy encyclopedia] Kratkaya entsiklopediya
 "Atomnaya energiya." [___Tables of isotopes (according to published
 data available at the beginning of 1958)] ___Tablitsa izotopov. (po
 dannym, opublikovannym k nachalu 1958. 12 p. Gos. nauch. izd-vo
 "Bol'shaya sovetskaya entsiklopediya," 1958. 610 p. (MIRA 12:1)

1. Sotrudniki Bol'shoy Sovetskoy Entsiklopedii (for Bakharovskiy,
 Berkovich, Danovskiy, Delone, Kon, Kopylov, Mandel'tsvayg, Milo-
 vidov, Mostovenko, Murinov, Polyakov, Preobrazhenskaya, Rabinovich,
 Simkin, Skvortsov, Sysoyev, Shorin, Shreyberg, Shteynman).
 (Atomic energy)

DELONE, N.N.

BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; BERKOVICH, D.M.,
zaml glav. red.; LEHNER, A.Ya., doktor tekhn. nauk, prof.,
zam. glav. red.; AVEN, O.I., red.; AGEYKIN, D.I., red.; kand.
tekhn. nauk, dots., red.; AYZERMAN, M.A., red.; VENIKOV, V.A.,
doktor tekhn. nauk, prof., red.; VORONOV, A.A., doktor tekhn.
nauk, prof., red.; GAVRILOV, M.A., doktor tekhn. nauk, prof.,
red.; ZERNOV, D.V., red.; IL'IN, V.A., doktor tekhn. nauk,
prof., red.; KITOV, A.I., kand. tekhn. nauk, red.; KOGAN, B.YA.,
doktor tekhn. nauk, red.; KOSTOUSOV, A.I., red.; KRINITSKIY,
N.A., kand. fiz.-mat. nauk red.; LEVIN, G.A., prof. red.;
LOZINSKIY, M.G., doktor tekhn. nauk, red.; IOSSIYEVSKIY, V.I.,
red.; MAKSAREV, Yu.Ye., red.; MASLOV, A.A., dots., red.; POPKOV, A.A., red.;
RAKOVSKIY, M.Ye., red.; ROZENBERG, L.D., doktor tekhn. nauk,
prof., red.; SOTSKOV, B.S., red.; TIMOFEYEV, P.V., red.;
USHAKOV, V.B., doktor tekhn. nauk, red.; FEL'DBAUM, A.A.,
doktor tekhn. nauk, prof., red.; FROLOV, V.S., red.;
KHARKEVICH, A.A., red.; KHRAMOY, A.V., kand. tekhn. nauk, red.;
TSYPKIN, Ya.Z., doktor tekhn. nauk, prof., red.; CHELYUSTKIN,
A.B., kand. tekhn. nauk, red.; SHREYDER, Yu.A., kand. fiz.-
mat. nauk, dots., red.; BOCHAROVA, M.D., kand. tekhn. nauk,
starshiy nauchnyy red.; DELONE, N.N., inzh., nauchnyy red.;
BARANOV, V.I., nauchnyy red.; PAVLOVA, T.I., tekhn. red.
(Continued on next card)

BERG, A.I.--- (continued). Card 2.

[Industrial electronics and automation of production processes] Avtomatizatsiia proizvodstva i promyshlennaia elektronika. Glav. red. A.I.Berg i V.A.Trapeznikov. Moskva, Gos.nauchn. izd-vo "Sovetskaiia Entsiklopediia." Vol.1. A - I. 1962. 524 p.
(MIRA 15:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Sotskov, Kharkevich, Zernov, Timofeyev, Popkov).
(Automatic control) (Electronic control)

BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; BOCHAROVA,
M.D., kand. tekhn. nauk, st. nauchn. red.; DELONE, N.H.,
inzh., st. nauchn. red.; BARANOV, V.I., nauchn. red.;
ZABELINA, Ye.P., mlad. red.; PAVLOVA, T.I., tekhn.red.

[Automation of production processes and industrial
electronics; encyclopedia of modern technology] Avtomati-
zatsiia proizvodstva i promyshlennsia elektronika; entsi-
klopediia sovremennoi tekhniki. Glav. red. A.I.Berg i
V.A.Trapeznikov. Moskva, Sovetskaia entsiklopediia.
Vol.2. K - Pogreshnost' izmereniia. 1963. 528 p.

(MIRA 16:12)

(Automation--Dictionaries)
(Electric engineering--Dictionaries)

DELONE, N.V.

ALEKSAHDROV, Yu.A., DELONE, N.V., SLOVOKHOTOV, L.I., BOKOL, G.A.
SHTARKOV, L.H.

"Photodisintegration of Deuteron at 50-150 Mev."

Lebedev Physics Inst. Acad. Sci. USSR.

paper submitted at the A-U Conf. on Nuclear Reactions in Medium and Low
Energy Physics, Moscow, 19-27 Nov 57.

DELONE, P. N.

STENON, Nikolay [Steno, Nicolaus]; STRATANOVSKIY, G.A. [translator];
BELOUSOV, V.V., redaktor; SHAFRANOVSKIY, I.I., professor, redaktor;
PETROVSKIY, I.G., akademik, redaktor; ANDREYEV, N.N., akademik,
redaktor; BYKOV, K.M., akademik, redaktor; KAZANSKIY, B.A., akademik,
redaktor; SHCHERBAKOV, D.I., akademik, redaktor; YUDIN, P.F., akade-
mik, redaktor; DELONE, P.N., redaktor; KOSHTOYANTS, Kh.S., redaktor;
SAMARIN, A.M., redaktor; LEBEDEV, D.M., professor, redaktor; FIGUROV-
SKIY, M.A., professor, redaktor; KUZNETSOV, I.V., kandidat filosof-
skikh nauk, redaktor; ZAYCHIK, N.K., redaktor izdatel'stva; SMIRNOVA,
A.V., tekhnicheskiy redaktor

[A solid body enclosed by nature within a solid. Translated from
the Latin] O tverdom, estestvenno sodershashchemsia v tverdom.
Perevod G.A.Stratanovskogo. Redaktsiia, stat'i i primechania
V.V.Belousova, i I.I.Shafranovskogo. [Leningrad] Izd-vo Akad.nauk
SSSR, 1957. 150 p. (MLRA 10:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Belousov, Delone,
Koshtoyants, Samarin)
(Geology)

I 20201-66 EWA(d)/EWP(t)/EWP(n) JD
ACC NR: AP6010314

SOURCE CODE: CZ/0037/65/000/006/0461/0465

AUTHOR: Delong, Alfred

31
B

ORG: Metallurgical Research Institute, VZKG, Ostrava (Vyzkumny ustav metalurgicky VZKG)

TITLE: Measurement of the amplitude and relative deformation of longitudinally oscillating rods

SOURCE: Ceskoslovensky casopis pro fysiku, no. 6, 1965, 461-465

TOPIC TAGS: ferromagnetic material, material deformation, wire product

ABSTRACT: The article describes an indirect method of measuring the relative deformation of longitudinally oscillating test rods made of ferromagnetic material. The relation between the amplitude of the oscillations and the relative deformation is found. The amplitude of the oscillations is measured with an induction recorder, calibrated statically. Orig. art. has: 4 figures and 6 formulas. [JPRS]

SUB CODE: 20 / SUBM DATE: 17Aug64 / ORIG REF: 002 / OTH REF: 008
SOV REF: 001

Card 1/1 *mjs*

2

DE LONG, A

621.385.833
 5297. Czechoslovak table-type electron microscope.
 A. DELONG AND V. DEBRICKA. *Státníprůmysl. Obzor*, 16,
 No. 7, 1955 (1955) In Czech. EL

The physical principles of electron microscopy are reviewed and the Czechoslovak table-type microscope is described in detail (with photographs, drawings and circuits). The instrument consists of 4 independent units: (1) the optical system supported on a horseshoe base, (2) h.v. source with auxiliary circuits, (3) storage batteries for supplying the lens system, and (4) air-cooled oil rotary pump. The optical system consists of the usual electron gun, Wehnelt's cylinder and anode, and is furnished with a 4-stage magnetic-lens system. The magnification can be varied from 10^3 to 3×10^4 . The picture is photographed on a microfilm and it is also possible to take stereoscopic photographs. The instrument can also be employed as a diffraction camera. The h.v. source operates with a h.f. generator and a 6-stage multiplier and provides low-ripple stabilized voltages of 30-75 kV.

R. J. SIDOROWICZ

①
 AK
 ME

Delong, A.

The Scope of Electron Reflection Microscopy in the Study of the Structure of Metals. A. Delong, V. Drahoš, L. Bezdek, and J. Růžička. *Hvězdičká Listy*, 1968, II, (6): 365-363. [In Czech]. The new Czechoslovak table-model electron microscope, adaptable to reflection microscopy with resolutions of 400Å, is used in a study of steels, mostly pearlitic of carbon steels, as a function of carbon content. Cementite congregation and other phenomena were observed, and are illustrated by EM micrographs. — F. F.

4
21

S/A

CZECHOSLOVAKIA/Electronics - Electron Microscopy

H-4

Abs Jour : Ref Zhur - Fizika, No 10, 1958, No 23314

Author : *Delong Armin, *Drahos Vladimir, **Bezdek Ladislav, **Ruzicka Dalibor

Inst : *Laboratory for Electron Optics, CSAB, Brno; **VTAAB Lab-
oratory on the Study of Properties of Metals CSAB, Brno, Czech-
oslovakia

Title : Possibility of Application of Electron Emission Microscopy
for the Study of the Structure of Metals.

Orig Pub : Hutnicke listy, 1957, 12, No 3, 206-215

Abstract : Description of an attachment to the Czechoslovak electron
microscope, which makes it possible to use the latter as an
emission microscope. With the aid of this attachment the
authors, using the thermoelectronic emission of metallo-
graphic specimens activated with berium (by depositing this
metal in vacuum by evaporation), have investigated the struc-
ture of carbon steels and also certain processes connected
with the changes in the structure.

Card : 1/1

DELONG, ARMIN

"Prakticka elektronova mikroskopie. [I. vyd.] Praha, Ml. Ceskoslovenske akademie
ved, 1958. [Practical electron microscopy. 1st ed. illus., bibl., diagrs., graphs,
indexes, tables]."

p.370 (Praha, Czechoslovakia)

Monthly Index of East European Accession (EEAI) LC, Vol. 7, No. 8, August 1958

DELONG, Armin, inz.; DRAHOS, Vladimir, inz.; SPECIALNY, Jan; ZOBAC,
Ladislav, inz.

An experimental high-resolving-power electron microscope. Slaboproudy
obzor 21 no.4:195-206 Ap '60. (EEAI 9:8)
(Electron microscope)

DELONG, Armin, inzh. (Chekhoslovakiya); DRAGOSH, Vladimir [Drahos, V.],
inzh. (Chekhoslovakiya)

Instrument of extraordinary possibilities. Nauka i zhizn' 27
no.5:26-27 My '60. (MIRA 13:6)
(Czechoslovakia--Electron microscope)

DRAHOS, Vladimir (Brno); DELONG, Armin (Brno)

Electron interferometry and the phase contrast. Pokroky mat fyz astr
7 no.2:80-90 '62.

DELONG, Armin, inz., C.Sc.; DRAHOS, Vladimir, inz., C.Sc.; KROUPA, Jiri,
inz.

Velocity analyser for measuring stability of the accelerating
voltage in an electron microscope. Slaboproudy obzor 23
no.6:311-316 Je '62.

1. Ustav pristrojove techniky, Ceskoslovenska akademie ved,
Brno.

45263
Z/037/62/000/005-6/007/049
E140/E562

AUTHORS: Delong, A. Drahoš, V. and Zobač, L.

TITLE: A high resolution electron microscope

PERIODICAL: Československý časopis pro fyziku, no.5-6, 1962,
471-478

TEXT: Some significant features of a recently constructed high-performance magnetic-type electron microscope are described in detail. A double condenser lens and a three-stage imaging system are used, the electron-optical magnification being variable from 5000 to 180000. The resolving power of the instrument is better than 10 Å. The valves of the vacuum system are electromagnetic and the control of its working positions is automatized. Electronic stabilizers for feeding the coils of the lenses are placed separately from the optical system. A high long-term stability was obtained by improved design of the high voltage multiplier. There are 4 figures.

ASSOCIATION: Ústav přístrojové techniky ČSAV, Laboratoř elektronové optiky, Brno (Institute of Instrumentation of the ČSAV, Laboratory of Electron Optics, Brno)

Card 1/1

DELONG, A.; DRAHOS, V.; ZOBAC, L.

Electron microscope with high resolving power. Cs cas fys
12 no.5/6:471-478 '62.

1. Ustav pristrojove techniky, Ceskoslovenska akademie ved,
Laborator elektronove optiky, Brno.

DRAHOS, V., inz., CSc.; DELONG, A., inz., CSc.; KOMRSKA, J., promovany fyzik.

Interference electron microscopy. *Jemna mech opt* 8 no.8:
242-246 Ag'63

1. Ustav pristrojove techniky, Ceskoslovenska akademie ved,
Brno (for Drahos and Delong). 2. Ustav vlastnosti kova, ~~Ceako-~~
slovenska akademie ved, Brno (for Komrska).

DRAHOS, Vladimir; DELONG, Armin

Adaptation of a ~~transmission~~ electron microscope for
interference electron microscopy. Cs cas fys 13 no. 4:
278-286 '63.

1. Ustav pristrojove techniky, Ceskoslovenska akademie
ved, Laborator elektronove optiky, Brno.

L 12868-65 EWP(t)/EWP(b) AS(mp)-2/BSD/AFETR/SSD/ASD(a)-5/AFWL/RAEM(a)/ESD(dp)/
ACCESSION NR: AP4044981 ESD(qs)/ESD(t) Z/0039/64/025/009/0509/0515

AUTHORS: Delong, Armin (Engineer, Candidate of sciences); Drahos, Vladimir (Engineer, Candidate of sciences); Specialny, J.

TITLE: Optical system of electron microscope with high resolution 6

SOURCE: Slaboproudy obzor, v. 25, no. 9, 1964, 509-515

TOPIC TAGS: electron microscopy, electron lens, electron optics,
optical resolution / TESLA BS 413 microscope

ABSTRACT: The electron microscope itself was designated TESLA BS 413 and was described by the authors elsewhere (Slaboproudy obzor v. 21, 1960, no. 4, p. 195; Proc. Eur. Conf. El. Micr. Delft, v. 1, 1960, p. 89). The optical system described, designed for maximum resolution and maximum operating speed and ease of service, consists of 5 lenses -- two condensers, one objective, and two projection lenses. The magnification can be varied from 5500 to 180,000 or from 2600 to

Card 1/2

L 12868-65
ACCESSION NR: AP4044981

80,000, with a possible setting at 200 for scanning purposes. The possible accelerating-voltage settings are 30, 50, 80, and 100 kv. The alignment of the optical system is facilitated by the use of a large number of centering elements, and the alignment procedure is described. The methods of testing and determining the resolution are described. The instrumental resolving power is better than 10 Å, and the best resolution recorded was 6 Å. Orig. art. has: 6 figures.

ASSOCIATION: Ustav pristrojove techniki CSAV, Laborator elektro-
nove optiky, Brno (Institute of Instrument Engineering CSAV, Labor-
atory for Electron Optics)

SUBMITTED: 05Nov63

ENCL: 00

SUB CODE: EC, OP

NR REF SOV: 000

OTHER: 008

Card 2/2

DRAHOS, Vladimir, inz. CSc.; DELONG, Armin, inz. CSc.

Optical system of an interference electron microscope. Slaboproudy
obzor 25 no.9:523-527 S '64.

1. Institute of Instrument Technology, Czechoslovak Academy of
Sciences, Laboratory of Electronic Optics, Brno.

KOMESKÝ, J.; DUBČEK, V.; ČADBOŮ, A.

The application of Fresnel fringes to the determination of the local filament diameter in an electron biprism. *Chekhosl fiz* (journal) 14 no.10:753-764 '64.

1. Institute of Metallurgy of the Czechoslovak Academy of Sciences, Brno, Leninova 42 (for Komeský). 2. Institute of Instrument Technology of the Czechoslovak Academy of Sciences, Brno 12, Kralovopolská 147 (for Dubček and ČadboŮ).

L 18479-66 EWT(1)/EWT(m)/EWT(j) RM
ACC NR: AP6003660

SOURCE CODE: CZ/0055/65/015/010/0760/0765

45
43
B

AUTHOR: Drahos, V.; DeLong, A.

ORG: Institute of Instrumental Technology, Czechoslovak Academy of Sciences, Brno.

TITLE: Observation of charges on specimens in a transmission electron microscope

SOURCE: Chekhoslovatskiy fizicheskiy zhurnal, v. 15, no. 10, 1965, 760-765 and insert pages 770a and 770b

TOPIC TAGS: electron optics, electron microscopy, chromatic aberration, magnetic domain, polystyrene

2144155

ABSTRACT: In transmission electron microscopy the electric charges caused by electron bombardment on nonconducting specimens and objects often influence the image-forming process. This phenomenon is especially disturbing in low-angle electron diffraction and interference electron microscopy. Also, when perforated collodion or formvar membranes are used as test objects in the process of centering the optical system, the alignment can be influenced by charges on the specimen, especially if the "voltage center" (i.e., the center of chromatic aberration) is sought by changing the accelerating voltage. H. Mahl and W. Weitsch previously described a method of checking the fluctuating charges by means of shadow projection in a modified AEG-Zeiss EM8 electron microscope (Naturwiss. 46, 1959, 487; Optik 17, 1960, 107). The present paper describes the testing in which the Czechoslovakian

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Tesla model BS 413 experimental shadow-projection high-resolving power electron microscope was employed. In this instrument the charges on the specimen can be observed without any alteration of the optical system. To prevent the inception of the charges and achieve their annihilation at least partially, the specimens are covered with a thin layer of carbon which also improves their thermal stability. This shadow-projection arrangement of the optical system can also be used for the observation of magnetic domains and low-angle electron diffraction. In the experiment, the collodion foil specimen and homogenized polystyrene latex were used as test objects. The author thanks Mr. J. Komrska for his comments. Orig. art. has: 4 figures and 8 formulas.

SUB CODE: 20/ SUBM DATE: 12Mar65/ ORIG REF: 003/ OTH REF: 003/

OC

Card 2/2

L 20241-66 EWT(1)
ACC NR: AP6010316

SOURCE CODE: CZ/0037/65/000/006/0476/0483
41

AUTHOR: Drahos, Vladimir; Delong, Armin

ORG: Electronic Optics Laboratory, Institute of Instrumentation, CSAV, Brno
(Ustav pristrojove techniky CSAV, Laborator elektronove optiky) ^B

TITLE: Complex method of measuring thickness and internal potential with an electron microscope 21, 44, 55

SOURCE: Ceskoslovensky casopis pro fysiku, no. 6, 1965, 476-483

TOPIC TAGS: electron microscope, phase shift, electromagnetic wave interference, image contrast, electron flow

ABSTRACT: The article describes a method enabling determination of the internal potential of amorphous and polycrystalline objects. The phase shift of electron waves is evaluated by the displacement of the interference fringes and the thickness of the object by means of the image contrast. Orig. art. has: 4 figures and 15 formulas. [JPRS]

SUB CODE: 20, 09 / SUBM DATE: 13Nov64 / ORIG REF: 004 / OTH REF: 007

Card 1/1 *LJC*

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DE LONG B,

DE LONG, B.

Theory of the construction of a hyperbolic survey. p. 46. (Zemmerictvi. Praha. Vol. 4,
no. 4, Mar. 1954) East

SO: Monthly List of European Accession (SEAL) IC, Vol. 4, No. 6,
June 1955, Uncl.

DELONG, B.

Adjustment of trilateration.

p. 16 (Geodetický a Kartografický Sborník) 1957. Praha, Czechoslovakia.

SO: Monthly Index of East European Accessions (EEAI) LC, Vol. 7, no. 1, Jan. 1958

DELONG, B.

Calculation of altitudes in high mountains by trigonometric means.

p. 208 (GODETICKY A KARTOGRAFICKY OZOR) Vol. 2, no. 6, June 1956,
Praha, Czechoslovakia

SO: Monthly Index of East European Accessions (EEAI) LC, VOL. 7, No. 3,
March 1958

DELONG, B.

Czechoslovakia

Die genauesten Radarinstrumente in Haenden der Vermessungsingenieure (tschech.)
S. 54 bis. 58

SO: Vermessungs Technik, Nov 1955, Unclassified.

DELONG, B.

Combination of triangulation with trilaterality from the point of view of accuracy. p. 23

GEODETICKY A KARTOGRAFICKY SBOHNIK. (Ustredni sprava geodesie a kartografie)
Praha, Czechoslovakia, 1958 (published 1959)

Monthly List of East European Accessions (EEAI), LC, Vol. 8, No. 10, Oct. 1959
Uncl.

CZECHOSLOVAKIA/Optics - Optical Technology -

K

Abs Jour : Ref Zhur Fizika, No 12, 1959, 28391
Author : Delong, Borivoj
Inst :
Title : Use of Polaroid Films in Electron Optical Light Modulators
Orig Pub : Jemna mech. a opt., 1958, 3, No 12, 403-406, 430

Abstract : The author considers theoretically the properties that polaroid films must satisfy in order to be used in electron optical light modulators, used in geodetic range finders. Expressions are obtained for the transmission coefficients of two polaroids, rotating relative to each other, as a function of the coefficient of transmission of an individual polaroid. The spectral coefficients of transmission of the polaroids produced by the firm "Meopta, Bratislava" are given. It is shown that these films can be used in electron:

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DELONG, B.

Accuracy of electrooptical rangefinder with a visual-phase comparison. In Russian. p. 213.

STUDIA GEOPHYSICA ET GEODAETICA. (Ceskoslovenska akademie ved. Geofysikalni ustav) Praha, Czechoslovakia, Vol. 3, no. 3, 1959.

Monthly List of East European Accessions (EEAI), LC, Vol. 8, no. 11, Nov. 1959
Uncl.

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CZ/30-59-9-9/20

13,4000
9(6)

AUTHOR: Delong, Bořivoj, Engineer, Candidate of Technical Sciences

TITLE: Sources of Light^o of Electrooptical Telemeters With Visual Phase Comparison

PERIODICAL: Jemná Mechanika a Optika, 1959, Nr 9, pp 314 - 320 (ČSR)

ABSTRACT: The author describes two principles of electrooptical telemeters with visual phase comparison and their light-source efficiency. In the first principle the "Kerr's modulator" is used, by which basically the same conditions are created as discovered 30 years ago by A. Karolus and O. Mittelstädt, shown in Figure 1. The Soviet "SVV-I" and "TSD-I" optical telemeters are based on this principle. In the second principle, instead of the "Kerr's modulator" a crystal modulator, preferably of quartz, is used as shown in Figure 2, by which similar conditions are created. A detailed survey of this principle is performed by the Geodetický, Topografický a Kartografický Vědecký Ústav (Geodetical, Topographical and Cartographical Research Institute) in Prague. In a separate paragraph, the author discusses the problem of calculating the light-source efficiency of the necessary minimum light intensity at observations during daytime as well as during the night. His results were

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3,4000

AUTHOR: Delong, Bořivoj

TITLE: Geodetical Tests of the NASM-2A Geodimeter

PERIODICAL: Studia Geophysica et Geodaetica, 1960, No. 4, pp. 325 - 337

TEXT: The paper describes the technique and the results of geodetical field tests conducted with the electro-optical range finder, Trade Mark Geodimeter, System Bergstrand, Type NASM-2A, Serial No. 136. The NASM-2A geodimeter serves for the precision measurement of short, medium, and long geodetic ranges from 20 m to over 30 km under very favorable observation conditions. The usual measuring range is about 15 - 20 km. The principle of this geodimeter is based on light waves amplitude-modulated by a Kerr cell. The field tests were conducted jointly in the 2nd and 3rd quarter of 1959 by the Research Institute of Geodesy, Topography, and Cartography, abbreviated (Czech expansion unknown) VUGTK, in Praha, the Geodetical and Topographical Establishment in Praha, and the Geodetical Establishment in Bratislava. The test program comprised five stages: 1) Measurement of the geodetic control base at Hvězda, 2) length measurements of the bridge axis at Orlik, 3) field tests at the Pecný Geodetical Observatory, 4) main field tests in the base network at Jesenské, X

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Geodetical Tests of the NASM-2A Geodimeter

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5) measurements of the control base at the Geodetical Establishment in Bratislava. Results of field tests are compiled in 3 tables. They indicate that the accuracy of measurements lies within a few millimeters for 20 m to 20km ranges. The root mean square error of the arithmetic means calculated from 11 to 50 range measurements was in all cases less than ± 3 mm. The Geodimeter can successfully replace the geodetical measurements with Invar tapes, thus saving much time. Based on data compiled the speed of light in vacuum has been determined to be

$$c_0 = (299,792.5 \pm 0.04) \text{ km/sec}$$

The paper was reviewed by F. Fiala. There are 3 tables, 1 figure and 2 references: 1 English and 1 Czech.

ASSOCIATION: Research Institute of Geodesy, Praha 7-Letná, Kostelní 42

SUBMITTED: February 4, 1960

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96120
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A201/A126

AUTHORS: Delong, Borivoj, Candidate of Technical Sciences, Engineer; Sokolík, Bohuslav, Engineer; Neuman, Premek, Engineer.

TITLE: Electro-optical geodimeter of the VÚGTK

PERIODICAL: Geodetický a kartografický obzor, no. 5, 1960, 83 - 86

TEXT: The article describes the principle, design and performance of a new Czechoslovak geodimeter developed and built in 1959 jointly by the Výzkumný ústav geodetický, topografický a kartografický (Geodetic, Topographic and Cartographic Research Institute) in Prague, and the Ústav radiotechniky elektrotechnické fakulty ČVUT (Institute for Radio Engineering, Department for Electrical Engineering, ČVUT) in Prague. The theoretical basis of the instrument has been described in the 2nd collective volume of the Edice VÚGTK under the title "Research on the electro-optical geodimeter of the VÚGTK". The operating principle of the instrument is shown in Figure 1. The light source L emits isotropic light waves which are focused by the condenser K into the center of the annulus formed by the electrodes of the quartz crystal Kr, which acts as a light modulator in addition to its stabilization function. As a result, the quartz modulator Kr, together with two polarization foils P and A, of which the former acts as the polarizer and
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Electro-optical geodimeter of the VUGTK

the latter as the analyzer, produce the amplitude modulation of the light waves. The modulated light is sent to the terminal point of the measured distance by the transmitting lens O_1 . At the terminal point, the light is reflected by the mirror R and returns to the initial point of the measured distance. The reflected light strikes the receiving lens O_2 which focuses it onto the cathode of the photomultiplier F. The receiving system photoelectrically determines the phase difference between the transmitted and the reflected modulated light-waves on a low frequency. Therefore, the instrument is equipped with two oscillators: The main oscillator O operating on the 5 Mc frequency, and the auxiliary oscillator Po operating on a frequency differing from that of the main oscillator by 10 kc. The signal from the auxiliary oscillator is mixed in the mixer Sm with the signal from the main oscillator and with the signal from the last dynode of the photomultiplier. In this manner two low-frequency signals of the same frequency and of an unchanged phase relation are obtained which are fed to the synchronous detector Sd. Connected to the detector is the galvanometer G whose hand indicates the magnitude of the phase difference. When the galvanometer hand is set to zero, the measured distance D is given by the relation

$$2D = N \cdot L + l \quad (1)$$

where N is the integral amount of modulated light-wave lengths, L is the modulation
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Electro-optical geodimeter of the VUGTK

wave length, and l is the increment which is a function of the phase difference φ

$$l = \frac{\varphi}{2\pi} \cdot L. \quad (2)$$

The zeroing of the galvanometer hand is done by the phase shift of the signals from the main oscillator and from the mixer in relation to the signal from the photomultiplier. This phase shift is made possible by the phasing element which in turn has two elements: The rough-phasing element, Fh, by which the phase is shifted over the range of 0-180° in ten steps of 18°, each step representing a change in distance of 1.5 m; and the fine-phasing element Fj, by which the phase is shifted continuously over 20° providing for sufficient overlapping of the adjacent steps. At zero position of the galvanometer hand, the value can be determined from the readings of the rough and the fine-phasing element scales using equation (2). The value N in equation (1) can be determined from the results of the distance measurements with two different modulation frequencies according to the relation

$$N = \frac{l_2 - l_1}{L_1 - L_2}$$

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Electro-optical gephimeter of the VÚGTK

where L_1 , L_2 are the respective modulation wavelengths pertaining to the modulation frequencies F_1 and F_2 , respectively, and l_1 , l_2 are the respective increments. The modulation wavelength L is calculated from the modulation frequency of the oscillator F using the relation

$$L = \frac{v}{F},$$

where v is the light velocity in the atmosphere. The polarization foils are the only foreign components used in the instrument. The metacrylate-base foils, developed by the Meopta Bratislava n. p. (Meopta Bratislava, National Enterprise) in cooperation with the národní podnik Meopta Praha (Meopta Praha, National Enterprise) have proved to be unsatisfactory since they were ineffective for the marginal values of the spectrum and, consequently, could not be employed with the high-performance photomultiplier, developed by the Výzkumný ústav vakuové techniky (Research Institute of Vacuum Engineering), which is used in the receiving part of the instrument and which has its best spectral sensitivity in the region of the lower boundary of the visible spectrum. The quartz modulator of the instrument consists of a polished quartz plate of the BT crystal section and of annular contact electrodes which are pressed against the crystal by two steel springs. The entire assembly is mounted in a modified "Telefunken" crystal holder. (Previous models prepared by the Výzkumný ústav elektrotechnické keramiky (Research

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Electro-optical geodimeter of the VÚGTK

Institute of Electrotechnical Ceramics) in Hradec Králové, and subsequently by the Výzkumný ústav pro elektrotechnickou fyziku (Research Institute of Electro-technical Physics) in Prague, using vapor-deposited electrodes (silver, gold, aluminum, and silver-aluminum) were found inadequate due to their instability). The optimum modulation effect of the modulator is in the vicinity of the parallel resonance of the crystal. A modulation depth of about 0.4 was obtained at about 70 v. This depth is sufficient for the measurement of short distances. For the main oscillator a connection was chosen in which the modulating crystal is the element which determines the oscillator frequency. This arrangement secures a frequency stability in the order of 5×10^{-5} which is adequate for the testing stage of the instrument and for measurements of short distances. For the auxiliary oscillator a connection with crystal control was used since the stability of this oscillator determines the stability of the differential frequency. For the rough phasing element a delay chain, shown in Figure 2, was used. Fine phasing is done by the element the wiring diagram of which is shown in Figure 3. By a simultaneous, continuous variation of the resistors R_1 and R_2 , the phase difference between the voltages E_1 and E_2 can continuously be varied. The scale of the element is graduated in 100^1 parts permitting a reading of the measured distance with an accuracy within 1.5 cm. The synchronous detector is formed by two 6H31

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Electro-optical geodimeter of the VUGTK

vacuum tubes in bridge connection, with the galvanometer connected between their anodes. The signal from the photomultiplier is fed to the first two grids in phase, the signal from the main oscillator is fed, after mixing, to the third grids in the opposite phase. The optical system is of temporary nature, as readily available components had to be used in its construction. Normal camera lenses with a focus distance of 100 mm and an F-number of 1:2.8 were used for the transmitting and the receiving lenses. A point tungsten bulb of 30 watt (6v, 5a) serves as the light source. Tests with this instrument showed that this optical system has a range of about 250 m which is rather little. For geodimeters with longer ranges optical systems consisting of lenses and mirrors, such as one used in the NASM-2A geodimeter, will have to be used. It is planned to replace the temporary optical system with a new one, specially designed for the specific uses of this geodimeter. The new optical system will extend the range of the instrument to 2-3 km. The geodimeter has been tested under laboratory conditions only. It was found that the instrument was capable of indicating distance changes above 5 cm. This value represents the inherent error of the phasing element which is independent of the distance measured. Also there is the error due to the instability of the frequency. Consequently, the mean error in each measurement can be determined from the relation

$$m = \pm (5 \cdot 10^{-5} \cdot D + 5 \text{ cm})$$

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Electro-optical geodimeter of the VUGTK

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where D is the distance measured. The accuracy of the instrument can be improved by improving the frequency stability of both oscillators and by a more precise execution of some of the electronic components. The geodimeter weighs little over 5 kg and is mounted on a tripod. The power supply has about the same weight. Laboratory tests have confirmed the soundness of the original design conception and the capability of the instrument of measuring geodetic distances. Further development will be aimed at the improvement of the optical system and of the stability of the crystal frequency. There are 5 figures and 3 Soviet-bloc refer-ences.

ASSOCIATION: VUGTK, Praha (VUGTK, Prague) (B. Delong); Ustav radiotechniky, Praha (Institute of Radio Engineering, Prague) (B. Sokolík and P. Neuman).

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S/035/62/000/002/052/052
A001/A101

AUTHOR: DeLong, B.

TITLE: An investigation of the electric optical range finder of VÚGTK
(Research Institute for Geodesy, Topography and Cartography)

PERIODICA: Referativnyy zhurnal, *Astronomiya i Geodeziya*, no. 2, 1962, 35 - 36,
abstract 2G241 ("Sb. výzkumn. prací. Výzkumn. Ústav geodet.
topograf. a kartograf.", 1960, v. 5, no. 2, 7 - 65, Czech, Russian
and German summaries)

TEXT: The results of theoretical investigations are presented on the de-
sign of the electric optical range finder devised by the Research Institute for
Geodesy, Topography and Cartography in Prague. The article consists of 8 sec-
tions. The first section is introductory. The second section considers the
operational principle of the electric optical range finder with visual phase fixa-
tion; a Kerr cell or a quartz crystal is used as a modulator and demodulator.
The third section sets forth the theory of both modulators and formulates condi-
tions for attaining the maximum modulation effect. The fourth section investi-
gates the dependence of exposure to light of an observer's eye on the modulation ✓

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An investigation of the electric...

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phase difference between the emitted and received light fluxes (see RZhAstr, 1960, no. 7, 7071). The fifth section analyzes the question on selection of a light source for day and night measurements from the viewpoint of necessary illumination and the optimum spectral composition of light. The sixth section compares two measurement methods: with gradual frequency variation and with a change in the phase of standard voltage. From the point of design and processing of results, the first method is considered to be more advantageous, but it is not applicable in combination with the quartz modulator. The seventh section studies the precision of electric optical range finders with visual phase fixation. The conclusion has been drawn that the precision does not practically depend on the line length for short distances; the error of one measurement amounts to a few decimeters. An increase in the number of measurements improves the precision. In order to improve precision considerably, one has to change over to photoelectric phase fixation. The eighth section describes the design of a device developed in the Institute (see RZhAstr, 1961, 100220). There are 33 references. ✓

M. Ratynskiy

[Abstracter's note: Complete translation]

Card 2/2

NEUMAN, P., inz.; SOKOLIK, B., inz.; DELONG, B., inz.

An electrooptical range finder with a quartz modulator. Jemna
mech opt 5 no.11:336-342 N '60.

1. Ustav radiotechniky, Ceske vysoke uceni technicke, Praha
(for Neuman and Sokolik). 2. Vyzkumny ustav geodeticky, Praha
(for DeLong).

Z/024/60/006/008/001/001
D252/D304

AUTHOR: Delong, Bořivoj, Candidate of Technical Sciences, Engineer

TITLE: Results of verification tests performed with the NASM-2A geodimeter

PERIODICAL: Geodetický a kartografický obzor, v. 6, no. 8, 1960, 141-145

TEXT: The Výzkumný ústav geodetický, topografický a kartografický v Praze (Research Institute for Geodesy, Topography and Cartography in Prague), the Geodetický a topografický ústav v Praze (Institute for Geodesy and Topography in Prague) and the Geodetický ústav v Bratislavě (Geodetic Institute in Bratislava) performed surveying tests to verify the accuracy and application range of a Geodimeter system Bergstrand, type NASM-2A (serial no. 136) produced by the Swedish firm AGA. The tests were divided as follows: (1) Measurement of the geodetic reference base in Hvězda; (2) Measurement of the axial length of the bridge under construction in Žďárkov; (3) Verification measurements at

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Results of verification..

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the Pecny Geodetic Observatory; (4) Main verification measurements in one development network; and (5) Measurement of the new reference base at the Geodetic Institute in Bratislava. The tests produced the following results: The instrument operates with an accuracy of some millimeters in the 20 m - 20 km range, under favorable conditions even in larger ranges, and is, therefore, suitable for replacing distance measurements with invar wire. The length of the Zďakov bridge axis was measured with an accuracy of ± 2.0 mm and differed only 3.0 mm from the length measured with invar wire. The geodimeter is, therefore, also suitable for special measurements of short distances. The new geodetic reference base at the Geodetic Institute in Bratislava is destined for precise comparison of optical distance-meters and consists of two sections which were measured with an accuracy of ± 1.9 and ± 1.7 mm respectively. The fact that the described measurements were completed within 22 night hours indicates the suitability of the tested geodimeter for large-scale mapping. (Technical Editor: Engineer, Doctor František Brož, Director of the VÚGTK, Prague). There are 4 figures and 3 tables.

ASSOCIATION: VÚGTK, Praha (Prague).
Card 2/2

Z/030/60/000/011/001/002
A121/A026

3.4000

AUTHORS: Neuman, P.; Sokolik, B.; DeLong, B.; - Engineers

TITLE: Electro-Optical Range Finder With Quartz Modulator

PERIODICAL: Jemná Mechanika a Optika, 1960, No. 11, pp. 336 - 342

TEXT: The prototype of an electro-optical range finder with quartz modulator, range up to 3 km, mounted on a tripod (Fig. 8), has been developed in cooperation of the Výzkumný ústav geodetický, topografický a kartografický (Geodetic, Topographic and Cartographic Research Institute) in Prague and the Ústav radiotechniky elektrotechnické fakulty ČVUT (Radiotechnical Institute at the Electrotechnical Faculty of ČVUT) in Prague, and was constructed by the Výzkumný ústav elektrotechnické keramiky (Electrotechnical Ceramics Research Institute) in Hradec Králové. Figure 1 shows its block-diagram; the upper part is the transmitting system, the lower part the receiving system. A description of the main component parts is given. Equation (1) is the basic equation of the measured distance D at the initial galvanometer adjustment; Equation (2) serves for the precise computation. The author develop the quartz modulator theory, discuss the maximum modulation effect arising in case of rectangular angle adjustment of the

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Electro-Optical Range Finder With Quartz Modulator

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polarizer and analyzer oscillation direction, whereby this angle is parted by the plane formed by the optical axis of the crystal and the direction of the transmitted light (Equations 3, 4; Figs. 2, 4). Equation (5) expresses the relative electro-optical transmission factor of the modulator, the graphic representation of which is called the electro-optical phenomenon characteristic (Equation 6 and Fig. 3). Equations (7) to (14) serve for the computation of the quartz modulator characteristic. Applying Equations (13), (14) (Refs. 1, 2, 3 and 5), (15), (16) and using a 125 v biasing modulator, the Equations (17) and (18) are obtained, showing the effective voltage V_e and, by comparison of Equations (18) and (6), the constant $k_1 = 6.28 \cdot 10^{-3}$. The maximum electro-optical transmission at a modulating voltage $v = 125$, achieved by double refraction of light in the quartz crystal ($V_p = 125$ v) is according to Figure 3 too high and will cause deformations; therefore, the amplitude of up to 100 v is being chosen corresponding to a modulation depth of 0.90. A comparison with the Kerr modulator, a description of the quartz modulator current capacity (Fig. 5) amounting to 1.8 w at 100 v modulating voltage, and a description of constructional elements is given. Czechoslovak polarizing foils (Meopta Bratislava), tested at the Meopta Laboratory in Prague, were not found suitable; the maximum spectrophotometric sensitivity of the receiving system's photomultiplier tube, supplied by the Výzkum-

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Electro-Optical Range Finder With Quartz Modulator

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ný ústav vakuové techniky (Vacuum Engineering Research Institute), is in the lower region of the visible spectrum (blue color); therefore, foils from abroad were used. A detailed description of the prototype quartz modulator follows. A modulation depth of about 0.4 has been obtained at a modulation voltage of 70 v. A phase comparison between emitted and reflected modulated light waves may be photoelectrically performed at low frequency; therefore, the apparatus is equipped with two oscillators, i.e., the main oscillator O and the auxiliary oscillator Po (Fig. 1). The low-frequency signal of about 10 kc/sec oscillation frequency arising by transformation of modulated light in the photomultiplier cathode, the arrangement of synchronized detectors (Sd), the phase adjustment and phase change, whereby each phase difference of 18° is equal to a change of about 1.5 m in distance, total phase range 0 - 180° are described. A reciprocal functional replacement of both oscillators, described in detail, is ensured. Figure 6 shows the phasing element (Fh) diagram consisting of a phase-shifting section ending with its characteristic resistance. Figure 7 shows the diagram of the fine phasing element (Fj); two 6H31 electron tubes in bridge connection serve as synchronized detectors (Sd) with attached galvanometer). A common 100 mm lens, 1 : 2.8, is used as condenser and transmitting-receiving objective; a 30 w, 6 v, 5 amp tungsten lamp serves as light-source. The computed range amounts

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Electro-Optical Range Finder With Quartz Modulator

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to 250 m, the laboratory tests were performed at a distance of 55 m. A lens-reflector system as used at the NASM-2A type geodimeter should be applied to obtain a range-finder of longer measuring range. The mean error in range-finding is expressed by Equation on Page 342 (D = measured distance). The range finder and the feeding apparatus weigh 5 kg each. Figure 8 shows the control panel, Figure 9 the inner arrangement of the emitting system, Figure 10 the quartz modulator of light, and Figure 11 the coarse-phasing equipment. Further development requires an accomplishment of the range finder's optical system and stability-increase of the crystal frequency. There are 8 references: 1 Swedish, 2 English, 3 Czechoslovak and 2 German.

✓c

ASSOCIATIONS: Ústav radiotechniky ČVUT (Radiotechnics Institute of ČVUT), Prague (Neuman and Sobolik); Výzkumný ústav geodetický (Geodetic Research Institute), Prague (Belong)

SUBMITTED: February 29, 1960

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