"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

SOV/51-8-1-28/40

AUTHOR: Rautian, S.G.

TITLE: Discussion of Some of the Papers Presented at the Conference on the Theory of Spectroscopic Instruments

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 1, pp 126-127 (USSR)

ABSTRACT: Calculated apparatus functions of monochromators are reliable only if aberrations are absent and even then calculation does not allow for all the factors involved. In particular it is desirable to allow for the frequency coherence of illumination of the monochromator exit slit. When aberrations are present it is best to find the apparatus function by experimental methods and development of reliable experimental methods is an important task. I agree with A.V. Ioganson when he says that it is necessary to measure the absorption coefficients of a number of narrow and broad lines using instruments of high resolving power. The most important practical recommendation which follows from G.G. Petrash's paper is this: systematic distortions in the recording system should be several times smaller than distortions due to the monochromator apparatus function. This recommendation is valid both for single and double-beam instruments for all apparatus functions and all types of spectra. The

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recommendation is still valid when we consider an ideal monochromator. Another interesting result reported by Petrash is the separation of the effects of displacement of the spectrum and distortion of its form. Since, at low distortions, the displacement does not depend on the spectrum form, it can be neglected. It follows that it is not advisable to use instruments in which the scanning rate varies with the change of the steepness of the signal. In connection with V.M. Arkhipov's paper it is useful to remember that all the advantages of interference spectroscopy lie in the optical part of the apparatus, i.e. in the interferometer itself and are in no way related to the new methods of recording employed when an interferometer is used as the dispersing element (new methods of modulation, etc.).

Note. This is a complete translation.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

82611

S/056/60/039/001/027/029
B006/B063

24.3500

AUTHORS: Rautian, S. G., Sobel'man, I. I.

TITLE: Negative Absorption in Metal Vapors

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 1(7), pp. 217-219

TEXT: The paper of Ref. 1 described the use of negative absorption for amplifying and generating radiation in the visible region of the spectrum. The authors of the present paper studied this problem on potassium vapors excited by ultraviolet light from a potassium lamp. However, the intensity of the excited radiation turned out to be insufficient. This was found to be typical of metals, and also other sources of radiation were of no use. Therefore, the authors suggested avoiding these difficulties, which arise in direct optical excitation of metal vapors, by using a mixture of two vapors where the resonance level of one vapor is near the excited level of the other. Owing to the resonant energy transfer it might be possible to increase the intensity

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Negative Absorption in Metal Vapors

S/056/60/039/001/027/029
B006/B063

of the excited radiation. This effect leads to an intense sensitized fluorescence, as may be seen from the papers of Refs. 2 and 3. A mixture of sodium and mercury vapors, irradiated with Hg resonance radiation of λ = 2537 A, is taken as an example. The distances ΔE of 10 sodium levels from the resonance level 6^3P_1Hg and their radiation width A are compiled in a Table. The levels 9^2S and 8^2P are specially discussed. In the case of exact resonance ($\Delta E = 0$) the excitation transfer cross section would be $\sigma \approx 3 \cdot 10^{-14} cm^2$; when $\Delta E \neq 0$, $\sqrt{\sigma}\, \Delta E/vh \sim 1$, i.e., the cross section is not reduced by more than one order of magnitude. $3 \cdot 10^{-15} cm^2$ is therefore the lowest limit. Extinguishing collisions are shown to be negligible. A formula is given and briefly discussed for N_{8p}, the absolute sodium concentration on the 8^2P level. For the transitions $n^2S - 8^2P$ and $n^2D - 8^2P$ the absorption coefficient, k, is negative. A formula is given for the calculation of $|k|$. For the transition $8^2S - 8^2P$ ($\lambda = 30.2\mu$), $|k| = 2$, and for $7^2S - 8^2P$ ($\lambda = 7.77\mu$), $|k| = 0.02$. Finally, the authors thank P. A. Bazhulin for his discussions. There are

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Negative Absorption in Metal Vapors

S/056/60/039/001/027/029
B006/B063

9 references: 6 Soviet, 1 US, and 2 German.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Institute of Physics imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: May 12, 1960

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

SHISHLOVSKIY, Aleksandr Andreyevich. Prinimali uchastiye: KONDILENKO, I.I., dotsent; GORBAN', I.S., dotsent. VERES, L.F., red.; RAUTIAN, S.G., red.; MURASHOVA, N.Ya., tekhn.red.

[Applied physical optics] Prikladnaia fizicheskaia optika. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1961. 822 p. (MIRA 14:3)

(Optics, Physical)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

S/051/61/010/001/015/017
E201/E491

AUTHORS: Rautian, S.G. and Sobel'man, I.I.

TITLE: On the Question of Negative Absorption

PERIODICAL: Optika i spektroskopiya, 1961, Vol.10, No.1, pp.134-135

TEXT: The authors consider conditions necessary for negative absorption (i.e. luminescence of higher intensity than absorbed light) by excited organic molecules. The level bands of such molecules (e.g. aromatic hydrocarbons) consist of singlet (S_0, S_1, S_2,...) and triplet (T_1, T_2,...) terms illustrated in a figure on p.134. If transitions from S_1 and T_1 to the higher vibrational states in S_0 represent intensity maxima in fluorescence and phosphorescence spectra, induced emission is greater than absorption, i.e. negative absorption occurs. To detect negative absorption, the following conditions should be satisfied: the excited molecules should not absorb frequencies which are of interest in this connection, phosphorescence should have a high quantum yield and there should be a sufficiently high concentration of excited atoms. There are 1 figure and

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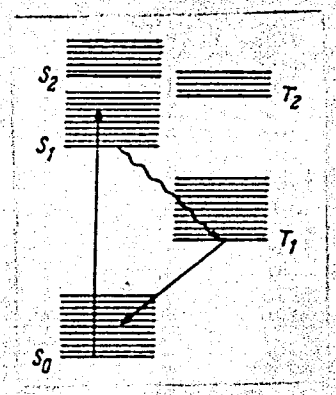
S/051/61/010/001/015/017
E201/E491

On the Question of Negative Absorption

6 references: 2 Soviet and 4 non-Soviet.

SUBMITTED: April 29, 1960

Fig.



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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

27193

S/056/61/041/002/015/028
B111/B112

24.7400 (1055,1160,1555)

AUTHORS: Rautian, S.G., Sobel'man, I.I.

TITLE: Line shape and dispersion in the absorption band with consideration of forced transitions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 2, 1961, 456-464

TEXT: The authors consider an atom with non-degenerate levels with the probability of spontaneous transition from E_3 to E_2 being much lower than the decay probability of the second level ($\gamma_{32} \ll \gamma_2$). The atom is assumed to be located in a strong electromagnetic field of the frequency $\omega_\lambda \approx \omega_{32} = (E_3-E_2)/\hbar$ and in a weak field with a continuous spectrum which must be studied for the calculation of induced emission and absorption of the frequencies $\omega_\mu \neq \omega_\lambda$. The solution is given generally. It is specialized for the case of a point resonance, i.e. $\omega_\lambda = \omega_{32}$. It is found among others that

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S/056/61/041/002/015/028
B111/B112

Line shape and dispersion ...

with small $G^2 = \pi c^3 \omega_{32}^{-2} \cdot \gamma_{32} N_\lambda$ (N_λ -total number of photons per unit volume) the forced transitions change the lifetime in the same way as the spontaneous transitions. With increasing G^2 the forced and spontaneous transitions are different. It is found that the solution of the problem is determined by the sign of $G^2 - (\gamma_2 - \gamma_3)^2/4$. In the following, the authors study weak fields and calculate the coefficient k_μ of forced emission. Under the condition $k_\mu \lambda \ll 1$, the imaginary part of the dielectric constant can be calculated from the emission coefficient k_μ. $\varepsilon''(\omega_\mu) = (-\lambda/2\pi) k_\mu$. N.G. Basov, A.M. Prokhorov (Ref. 2: UFN, 57, 485, 1955) are mentioned. There are 5 figures and 19 references: 9 Soviet and 10 non-Soviet. The two most recent references to English-language publications read as follows: Ref. 16: R.I. Collins, D.F. Nelson, et. al., Phys. Rev. Lett., 5, 303, 1960; Ref. 17: P.P. Sorokin, M.J. Stevenson, Phys. Rev. Lett., 5, 557, 1960.

ASSOCIATION: Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P.N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: February 11, 1961

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

31777
S/056/61/041/006/054/054
B111/B104

24.6100

AUTHORS: Rautian, S. G., Sobel'man, I. I.

TITLE: Photodissociation of molecules as means for obtaining a substance with negative absorption coefficient

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 6, 1961, 2018 - 2020

TEXT: Photoexcitation was applied to achieve an inverse occupation of levels of different systems (atoms, molecules, crystals, etc.) by producing excited atoms through photodissociation of molecules. Under certain circumstances (see Ref.1: F. A. Butayeva, V. A. Fabrikant, Issledovaniya po eksperimental'noy i teoreticheskoy fizike (Studies in experimental and theoretical physics), Sb. pamyati akad. G. S. Landsberga, Izd. AN SSSR, 1959, str. 62) an inverse occupation of levels may result, which can be used to amplify and produce electromagnetic radiation with frequency ω_{32} (2,3-levels). The principal property of such a system consists in that molecular energy absorption takes place in a relatively wide spectral

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S/056/61/041/006/054/054
B111/B104

Photodissociation of molecules as ...

range ($\sim 10^3$ cm^{-1}) if the width of atomic emission lines is small (~ 0.01 — 0.1 cm^{-1}). This leads to high amplification factors k_ω. If E_ω varies little in the range of effective absorption, the following relation is satisfied:

$$k_\omega = \frac{\lambda^2 E_\omega \bar{K}_\omega A_{32} \Gamma}{4\hbar\omega_0 A_3 \gamma},$$

where λ denotes the wavelength, γ the line width, A_{32} the Einstein factor for the transition $3 \rightarrow 2$, A_3 the total decay probability of the third level, E_ω the spectral luminous density of excited radiation, $\bar{K}_\omega$ the mean absorption coefficient, and Γ the absorption band width. For a direct atom excitation

$$M = \frac{A_{32} \cdot \Gamma}{A_3 \cdot \gamma} \simeq 10$$

holds. In the case of crystals, $M \sim 10^2$ — 10^3. If the absorption spectrum is assumed to be very wide, one has $M \sim 10^4$ — 10^5. If $\gamma = 0.03$ cm^{-1}, $\lambda = 1\mu$, and $\lambda_0 = 2000$ Å, one obtains $k_\omega = 0.3$ cm^{-1} already at low absorption energies of ~ 1 w/cm^3. This value exceeds the threshold for the production of electromagnetic radiation. The greatest

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B111/B104

Photodissociation of molecules as ...

difficulty in connection with this method is that photodissociation cannot be well established unless one of the atoms is in the resonant state. There are 1 figure and 8 references: 3 Soviet and 5 non-Soviet. The three most recent references to English-language publications read as follows: M. H. Maimann, Nature, 187, 493, 1960; P. P. Sorokin, M. J. Stevenson, Phys. Rev. Lett., 5, 557, 1960; W. Keiser et al., Phys. Rev., 123, 766, 1961.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR)

SUBMITTED: October 19, 1961

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

S/051/62/012/003/013/016
E032/E314

24.3900

AUTHORS: Vil'ner, L.D. (Deceased), Rautian, S.G. and Khaykin, A.S.

TITLE: On some possible applications of the Fabry-Perot interferometer with internal illumination

PERIODICAL: Optika i spektroskopiya, v. 12, no. 3, 1962, 437 - 439

TEXT: The authors are concerned with the properties of a Fabry-Perot interferometer containing an emitting medium between the plates. This type of modification of the Fabry-Perot interferometer is of interest in view of the suggestion made by A.M. Prokhorov (Ref. 1 - ZhETF, 34, 1658, 1958) that it may be suitable for use as a resonator for a quantum oscillator (Ref. 2 - N.G. Basov, O.N. Krokhin, Yu.M. Popov - Usp. fiz. nauk, 72, 161, 1960). Other applications are also discussed in the present paper. It is assumed that the medium between the plates has a finite absorption coefficient and emits uniformly throughout its volume. A formula is derived for the intensity

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distribution and it is shown that the resulting interference pattern takes the form of concentric interference rings. Analysis shows that this arrangement improves the line-to-background ratio and may therefore be suitable for the spectral analysis of very small quantities of impurities and similar applications. There is 1 figure.

SUBMITTED: June 12, 1961

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

KUZNETSOVA, T.I.; RAUTIAN, S.G.

On the theory of quantum generators. Zhur. eksp. i teor. fiz. 43 no.5:1897-1903 N '62. (MIRA 15:12)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.
(Masers)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

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L 14536-63 EWA(k)/EWT(1)/FBD/BDS/T-2/3W2/EEC(b)-2/ES(t)-2 AFFTC/ASD/
ESD-3/RADC/APGC/AFWL Pi-4/Pi-4/Po-4 WG/K/IJP(C)/THB/AEB
ACCESSION NR: AP3005316 S/0181/63/005/008/2105/2115

86
85

AUTHOR: Kuznetsova, T. I.; Rautian, S. G.

TITLE: On the instability of monochromatic oscillation conditions in solid-state lasers 25

SOURCE: Fizika tverdogo tela, v. 5, no. 8, 1963, 2105-2115

TOPIC TAGS: solid-state laser, laser theory, laser, laser stability, laser instability, monochromatic-oscillation instability, nonmonochromatic oscillation

ABSTRACT: Analysis of laser oscillation stability has been carried out in the form of solutions of wave equations in a negative-absorption layer.[1] It is assumed that oscillation is continuous and that a standing wave with frequency ω, one of the natural frequencies of the cavity, is established with saturation conditions. It is also assumed that in addition to this "strong" field, other "weak" fields with frequencies differing from ω are present which have small amplitudes so that they do not reach saturation conditions and thus do not affect the dielectric constant of the medium. Conditions are considered under which these waves decay or increase with time; the latter case corresponds to instability

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ACCESSION NR: AP3005316

of monochromatic emission observed in real solid-state systems. The instability is shown to depend to a considerable extent on inhomogeneities of the medium due to the saturation phenomenon. If these inhomogeneities are neglected, then in all practical cases the "weak" field solutions decay with time. Strict calculations show that a region of frequencies exists near the transition frequency. In this region there is an increase with time of "weak" field amplitudes when the amplitude of the "strong" field is sufficiently great. A real criterion of instability depends on the ratio of lifetimes of the lower and upper levels responsible for oscillation. The analysis concerns instabilities of the monochromatic condition only, and does not consider the nature of the steady state as such, which depends on behavior of the substance in a strong nonmonochromatic field. Orig. art. has: 3 figures and 29 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Institute of Physics, AN SSSR)

SUBMITTED: 21Feb63 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 009 OTHER: 003

Card 2/2

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

AID Nr. 981-13 3 June

EMISSION BY ATOMS MOVING IN THE FIELD OF A STANDING WAVE (USSR)

Rautian, S. G., and I. I. Sobel'man. Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 3, Mar 1963, 934-945. S/056/63/044/003/026/053

Equations describing atoms moving in the field of a standing wave composed of two superposed waves of the same frequency traveling in opposite directions (the case obtaining in quantum generators) are used to derive spontaneous emission probability, stimulated emission probability, and generated power of the gas quantum generator. Both weak and strong fields are considered, as well as spontaneous emission of atoms along and across the wave. The variation in peak intensity of the narrow line is analyzed. The integral of narrow line intensity shows the intensity to be a strong-field effect. [BB]

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACCESSION NR: AP4039681 S/0181/64/006/006/1857/1861

AUTHOR: Rautian, S. G.

TITLE: Relaxation terms in the density matrix equation

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1857-1861

TOPIC TAGS: optical laser, density matrix, relaxation oscillation, monochromatic radiation

ABSTRACT: In the analysis of optical lasers by mathematical means developed in connection with the problems of nuclear magnetic resonance, lasers, and microwave oscillators, no allowance was made for the relaxation terms in the density matrix equation. Relaxation terms can be computed if the system is represented, as in this article, phenomenologically and assuming the terms are proportional to the corresponding elements of the density matrix. The interaction between the system and monochromatic radiation is considered in order to compute the probability that the system will emit a photon with the external field frequency after excitation of the upper level. In the case of strong saturation this probability is independent of

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACCESSION NR: AP4039681

relaxation of the non-diagonal elements of the density matrix and is determined only by the life-times of the upper and lower levels. A study of special features of relaxation in the presence of a strong electromagnetic field indicates that: 1) the population of the lower level is due to the transitions (spontaneous and stimulated) from the upper level; 2) the rate of relaxation of the lower level considerably exceeds the rate at which it is populated. Orig. art. has: 16 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physics Institute, AN SSSR)

SUBMITTED: 29Jul63 DATE ACQ: 19Jun64 ENCL: 00

SUB CODE: EC NO REF SOV: 005 OTHER: 005

Card 2/2

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 13559-65 EWA(k)/EWT(1)/EEC(k)-2/T/EEC(b)-2/EWP(k)/EWA(m)-2 Po-4/Pf-4/Pi-4
IJP(c)/BSD/AFMD(t)/ASD(a)-5/AFETR/RAEM(a)/RAEM(c)/RAEM(e)/ESD(c)/ESD(gs)/ESD(t)
JHB/WG

ACCESSION NR: AP4048263 S/0141/64/007/004/0682/0692

AUTHORS: Kuznetsova, T. I.; Rautian, S. G.

TITLE: Plane solution of the wave equation for a layer with negative absorption coefficient with account of saturation

SOURCE: IVUZ. Radiofizika, v. 7, no. 4, 1964, 682-692

TOPIC TAGS: laser material, absorption coefficient, reflection coefficient, laser optics

ABSTRACT: This is a continuation of earlier work by the authors (ZhETF v. 43, 1897, 1962; FTT v. 5, 2105, 1963), who showed that the standing waves produced in a plane layer of laser active medium bounded by perfectly reflecting mirrors cause the gain to be decreased as a result of saturation of the permittivity. The calculations in this article are made for arbitrary reflection coefficients, so as to check on the assumption that a decrease in reflec-

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ACCESSION NR: AP4048263

tion on the boundaries of the layer causes the field to deviate more from a standing wave and alleviates the effect of the resultant inhomogeneity of the medium. The field frequency and the flux of electromagnetic energy through the boundaries of the layers are evaluated and the results are compared with theoretical deductions based on the transport equations. It is shown that no matter how small the permittivity modulation caused by the reflections, the inhomogeneity due to this modulation cannot be neglected. Neglect of the inhomogeneity is equivalent to using linear theory, which is known to be incapable of dealing with this type of problem. Orig. art. has: 47 formulas and 3 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 06Dec63 ENCL: 00

SUB CODE: EC, EM NR REF SOV: 006 OTHER: 000

Card 2/2

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 8953-65 EWG(j)/EWA(k)/FBD/EWT(1)/EEC(k)-2/K/EEC(t)/T/EEC(b)-2/EWP(k)/EWA(m)-2/EWA(h) Pn-4/Po-4/Pf-4/Peb/Pi-4/Pl-4 IJP(c)/SSD/BSD/AFWL/ASD(d)/ESD(gs)/ESD(t)/RAEM(t)/AFMD(f)/AFETR/RAEM(a)/ASD(a)-5 WG/JHB

ACCESSION NR: AP4043000 S/0051/64/017/002/0157/0167

AUTHOR: Rautian, S. G.; Germogenova, T. A.

TITLE: Stimulated emission of atoms moving in the field of a strong standing wave

SOURCE: Optika i spektroskopiya, v. 17, no. 2, 1964, 157-167

TOPIC TAGS: stimulated emission, gaseous laser, optical maser, laser, neon helium laser

ABSTRACT: The probability of stimulated emission of an atom moving in the field of a monochromatic standing wave has been calculated by the application of an approximate method developed by T. A. Germogenova and S. G. Rautian (ZhETF, 46, 745, 1964). The condition for the application of this method was the smallness of the ratio

$$\max\left|\frac{V_{mn}}{\gamma_n-\gamma_m}\right| \quad \text{where } V_{mn}=\frac{p_{mn}}{h}E(t)$$

and m and n pertain to the atomic transition m→n; $2\gamma_m$ and $2\gamma_n$ are the probabilities of depopulation of these states; p_{mn} is the matrix

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ACCESSION NR: AP4043000

element of dipole transition m→n. It was found that when the field frequency ω coincides with transition frequency ω_{mn} (Ω=0) the probability of stimulated emission W_1 is proportional not to the field intensity but to the field amplitude, i.e., only a small portion of excitation events leads to the stimulated emission of photons $\hbar\omega$. A large portion of atoms escapes from the excitation state due to relaxation processes. When the saturation width is considerably larger than the Doppler width, the probability of stimulated emission is close to unity. The results obtained were used for calculating the $3s_2 \rightarrow 2p_4$ transition probability for a neon-helium laser (λ=6328 Å), which until now has not been determined by other methods. The following value was obtained: $2\gamma_{mn} = A_{mn} = 1.7 \times 10^7$ sec^{-1}. Thus the absolute measurements of the intensity of generation may serve as a means for determining the probability of transition. Orig. art. has: 4 figures and 32 formulas.

ASSOCIATION: None

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

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ACCESSION NR: AP4043000

SUBMITTED: 26Jul63 ATD PRESS: 3105 ENCL: 00

SUB CODE: NP, EC NO REF SOV: 008 OTHER: 003

Card 3/3

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 22216-66

ACC NR: AR6005173 SOURCE CODE: UR/0058/65/000/009/A018/A018

AUTHORS: Aref'yev, I. M.; Malyshev, V. I.; Rautian, S. G.

30
B

TITLE: Vacuum spectrometer for the far infrared

10

SOURCE: Ref. zh. Fizika, Abs. 9A146

REF. SOURCE: Tr. Komis. po spektroskopii. AN SSSR, t. 2, vyp. 1, 1964, 650-655

TOPIC TAGS: ir spectrometer, vacuum, diffraction grating

TRANSLATION: A vacuum long-wave ir spectrometer is described, for the region 60 - 1000μ with four interchangeable echelettes with d = 0.25, 0.5, 1.2 mm, measuring 300 x 300 mm.

SUB CODE: 20

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACCESSION NR: AP4019244 S/0056/64/046/002/0745/0754

AUTHORS: Germogenova, T. A.; Rautian, S. G.

TITLE: Concerning the interaction between a quantum system and a strong field

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 745-754

TOPIC TAGS: strong electromagnetic interaction, interaction matrix element, quantum level system, level damping, quantum generator, maser, laser, monochromatic quantum generator, solid state quantum generator, maser stability, monochromatic maser stability

ABSTRACT: In view of the stringent limitations imposed on the interaction matrix elements and their derivatives in most solutions of the equations describing the interaction between a quantum system and a strong field, the authors obtain an approximate solution based on a procedure proposed by A. M. Molchanov in his lectures at

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Moscow State University. The fundamental matrix of the system of differential equations is sought in the form of a product of matrice; this procedure is like that used by the method of "variation of the constants." The initial linear system is reduced to a nonlinear one which is solved by successive approximations. The solution obtained is applied to an electromagnetic field, and the specific features of the saturation effect at a large difference between the probabilities of spontaneous damping of the combining levels is ascertained. The system is described in two ways, with the aid of probability amplitudes and with the aid of a density matrix. The second method of solution is useful for an investigation of the stability of monochromatic emission from a solid-state quantum generator. It is shown that stability is obtained if the fields at other than the monochromatic frequency attenuate in time, and the conditions under which this occurs are given. "The authors are deeply grateful to A. M. Molchanov, who suggested the idea of solving the problem in the manner shown above." Orig. art. has: 37 formulas.

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ACCESSION NR: AP4019244

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova AN SSSR (Mathematics Institute, AN SSSR); Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 24Jul63 DATE ACQ: 27Mar64 ENCL: 00

SUB CODE: PH NO REF SOV: 012 OTHER: 005

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 34864-65 EWG(j)/EWA(k)/FBD/EWT(1)/EWI(m)/EPF(c)/EEC(k)-2/EPF(n)-2/EPR/EEC(t)/T/EWP(t)/EEC(b)-2/EWP(k)/EWP(b)/EWA(m)-2/EWA(h) Pn-4/Po-4/Pf-4/Pr-4/Ps-4/Peb/Pi-4/Pu-4/Pl-4 IJP(c) WG/JD S/0051/65/018/002/0326/0328

ACCESSION NR: AP5005050

AUTHOR: Rautian, S. G.; Rubin, P. L.

TITLE: On certain features of gas lasers using mixtures of oxygen and noble gases

SOURCE: Optika i spektroskopiya, v. 18, no. 2, 1965, 326-328

TOPIC TAGS: oxygen neon laser, oxygen argon laser, line broadening, frequency shift, laser action

ABSTRACT: The authors take issue with the explanations proposed by W. R. Bennett at al (Phys. Rev. Lett., v. 8, 470, 1962; Proc. Third Conference on Quantum Electronics, Paris, 1963; Appl. Opt. Suppl. no. 1, 1962, pp. 24-62) for the anomalies observed in laser action of atomic oxygen. It is shown that these phenomena can be naturally explained from a different point of view, namely by taking into account the difference between the velocity distribution of the excited atoms from Maxwellian. The anomalous effects were observed in mixtures of oxygen with neon and with argon. The anomalous line broadening can then be attributed to the additional translational energy imparted to the excited atoms. Calculations made

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ACCESSION NR: AP5005050

for an oxygen-neon system confirmed this assumption. The anomalous shift in generation frequency and the lack of generation in the 3^3P_1--3^3S_1 transition is likewise explained in light of this hypothesis. It is pointed out that further research is necessary to confirm the analysis, and that analogous phenomena can occur also in other methods in which negative absorption is obtained (chemical reactions, photodissociation of molecules, and others). Orig. art. has: 4 formulas.

ASSOCIATION: None

SUBMITTED: 02Mar64 ENCL: 00 SUB CODE: EC, OP

NR REF SOV: 004 OTHER: 005

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 34865-65 EWG(j)/EWA(k)/FBD/EWT(1)/EPA(sp)-2/EEC(k)-2/EPA(w)-2/EEC(t)/T/EEC(b)-2/EWP(k)/EWA(m)-2/EWA(h) Pn-4/Pz-6/Po-4/Pab-10/Pf-4/Peb/Pi-4/Pl-4 IJP(c) WG/AT

ACCESSION NR: AP5005054 S/0051/65/018/002/0336/0337

AUTHOR: Petrash, G. G.; Rautian, S. G.

TITLE: Spectroscopic applications of gas lasers

SOURCE: Optika i spektroskopiya, v. 18, no. 2, 1965, 336-337

TOPIC TAGS: gas laser, laser action, level population, transition probability, gas discharge plasma

ABSTRACT: The authors discuss possible measurements of the probabilities of spontaneous transitions with the aid of a gas laser. Ordinary spectroscopic methods determine either the product of the Einstein coefficient by the population of one of the levels, or else some other quantity, but not the ratio of the population levels or the population levels themselves. Since the gas laser ceases to operate when the population levels become equal it becomes possible to determine the probability ratios of transitions that begin at different levels, by measuring the ratio of the spontaneous emission fluxes in these transitions. Other criteria for the equality of the populations may be a direct measurement

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of the gain and the determination of the conditions at which the gain is close to zero. This method may be preferable in some cases. The change in the spectral composition of the spontaneous emission of the atom in the presence of a strong field in the laser can also be used to determine the absolute values of the transition probabilities. Orig. art. has: 3 formulas.

ASSOCIATION: None

SUBMITTED: 02Apr64 ENCL: 00 SUB CODE: OP, EC.

NR REF SOV: 001 OTHER: 002

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 53655-65 EWT(1)/EPA(s)-2/EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pt-7/Pi-4/Pu-4 IJP(c) JD/WW/JG

ACCESSION NR: AP5011134 UR/0051/65/018/004/0722/0723

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B

AUTHOR: Rautian, S. G.; Khaykin, A. S.

TITLE: Sensitized fluorescence of a mixture of sodium and mercury vapors

SOURCE: Optika i spektroskopiya, v. 18, no. 4, 1965, 722-723

TOPIC TAGS: sensitized fluorescence, level population, radiative lifetime, transition probability, mercury vapor, sodium vapor, fluorescence line, mercury sodium vapor

ABSTRACT: In view of contradictory information on the relative population of the level 8^2P relative to the levels 9^2S and 7^2D obtained in different studies of sensitized fluorescence of sodium — mercury vapor, the authors determined the level populations by measuring the absolute brightnesses of the sodium fluorescence lines in the principal, sharp, and diffuse series. The level populations were calculated from transition probabilities published by E. M. Anderson et al. (Vestn. LGU v. 4, 27, 1956) and D. R. Bates and A. Damgaard (Phil. Trans. Roy. Soc., London, v. 242, 101, 1949). Although the results showed the population of the 8^2P to be considerably lower than the populations of 9^2S and 7^2D, a calcula-

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tion of the corresponding transition probabilities indicates that the small level population of 8^2P is not due to a small cross section for the transition, but to strong extinction of the level. In the case of the 9^2S and 7^2D levels, the probability of radiative decay is one order of magnitude larger than for the 8^2P level, and extinction plays a relatively smaller role. To explain the difference in the level populations it is therefore sufficient to assume that the extinction of the 9^2S and 7^2D levels is one order of magnitude smaller than that of 8^2P, and there are no grounds for suspecting that the cross section for the transfer of excitation from the mercury to the 8^2P level of sodium is anomalously small. The extinction mechanism is probably due not to impurities but to formation of molecular ions. "The authors thank M. I. Epshteyn for furnishing the calibrated photomultipliers and D. A. Goukhberg for developing and preparing the low pressure mercury-quartz lamps." Orig. art. has: 1 formula and 1 table. [02]

ASSOCIATION: None

SUBMITTED: 13Jul64 ENCL: 00 SUB CODE: OP, EC

NO REF SOV: 005 OTHER: 004 ATD PRESS: 4013

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

DUDKIN, V.A.; MALYSHEV, V.I.; RAUTIAN, S.G.

Studying hydrogen bonds in the critical temperature region of some substances. Opt. i spektr. 18 no.6:984-989 Je '65. (MIRA 18:12)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

L 10268-66 EWT(1)

ACC NR: AP6000221 SOURCE CODE: UR/0056/65/049/005/1605/1610

AUTHOR: Kuznetsova, T. I.; Rautian, S. G.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Contribution to the calculation of the polarization of an atom in a strong electromagnetic field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 5, 1965, 1605-1610

TOPIC TAGS: quantum device, spectral line, line width, fluorescence, electromagnetic field, relaxation process

ABSTRACT: This is a continuation of earlier work by one of the authors (Rautian, with I. I. Sobel'man, ZhETF v. 41, 456, 1961) on the interaction between a two-level quantum system with two monochromatic fields, one of which is strong and the other is weak, where the amplification factor for the weak field was calculated. Since the earlier work did not take into account polarization components at the combination frequencies that result from the action of the two fields on the system (atom), and since the amplification factor cannot be defined for a nonmonochromatic field, the authors calculate the polarization of an atom due to a strong monochromatic field and an arbitrary weak field. Furthermore, they analyze a more general two-level system than in the earlier work, for which the width of the fluorescence line differs from

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the sum of the population relaxation constants. The conditions under which the polarization components at the combination frequencies are of the same order of magnitude as the components of the weak field frequencies are determined. The results can be applied to investigate the propagation of a modulated signal in the active medium of a laser amplifier, where in the case of weak modulation the field can be strong at the carrier frequency and weak at the sideband frequencies. Orig. art. has: 17 formulas. [02]

SUB CODE: 20/ SUBM DATE: 12Jun65/ ORIG REF: 002/ OTH REF: 003/ ATD PRESS: 4166

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACC NR: AP6036057 SOURCE CODE: UR/0056/66/051/004/1176/1188

AUTHOR: Rautian, S. G.

ORG: Institute of Physics of Semiconductors, Siberian Department, Academy of Sciences SSSR (Institut fiziki poluprovodnikov Sibirskogo otdeleniya Akademii nauk SSSR)

TITLE: Effect of collisions on the spectral characteristics of gas lasers 45

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 4, 1966, 1176-1188

TOPIC TAGS: gas laser, ~~laser~~ spectroscopy, laser theory

ABSTRACT: The purpose of the investigation was to explain theoretically the asymmetry observed in the 3.39-μ neon line from the point of view of stimulated processes that occur in the field of a monochromatic standing wave. The theory is based on taking simultaneous account of both Doppler and collision line broadening with due allowance for their statistical dependence. Since in such an approach the collision integral in the equation for the density matrix does not reduce to the usual relaxation terms with relaxation constants, an expression is derived for the collision integral in which the diffusion of the atom in velocity space is considered and account is taken of the

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ACC NR: AP6036057

simultaneously produced atomic oscillator phase shifts due to perturbations of the motions of the atom. It is shown that such an analysis explains the experimentally observed asymmetry of the generation power vs. frequency plot. The effect of saturation in a standing wave-field is estimated for both strong and weak collisions. An expression for the frequency dependence of the power is obtained. The theoretical results can be used to investigate various elastic and inelastic atomic collisions. Orig. art. has: 2 figures and 42 formulas.

SUB CODE: 20/ SUBM DATE: 22Apr66/ ORIG REF: 009/ OTH REF:008/ ATD PRESS: 5106

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACC NR: AP/001744 SOURCE CODE: UR/0053/66/090/002/0209/0236

AUTHOR: Rautian, S. G.; Sobel'man, I. I.

ORG: none

TITLE: Effect of collisions on the Doppler broadening of spectral lines

SOURCE: Uspekhi fizicheskikh nauk, v. 90, no. 2, 1966, 209-236

TOPIC TAGS: particle collision, Doppler effect, spectral line, line broadening

ABSTRACT: This is a review article devoted to a detailed analysis of the effect of collisons on Doppler broadening and to the relation of impact broadening on the Doppler effect. The general treatment of the effect of collisions on pure Doppler broadening is first discussed, neglecting possible interference with the vibrations of the oscillator. Other causes of broadening, such as radiative decay, broadening due to interaction of the emitting atom with the surrounding particles, are then discussed, followed by a simultaneous account of radiative decay and the Doppler effect. Although the effect of collisions on pure Doppler broadening is of interest in a number of physical problems, it has been discussed in the past only within the framework of the Brownian movement model. Consequently, the authors expand on this model and treat Doppler broadening also by the kinetic equations method. Two types of collisions are treated, those in which the phase and velocity change simultaneously, and those in which either the phase alone or the velocity alone changes. The broadening due to the interaction and to the Doppler effect is discussed both under the assumption that

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ACC NR: AP7001744

they are statistically independent and under the assumption that they are statistically dependent. The possibility of experimentally testing the theory developed in the article is discussed. It is indicated that the results obtained in the article can be extended to a broad class of nonlinear problems, including calculations of the intensity of laser action. The results obtained by A. Javan and A. Szoke (Phys. Rev. Letts. A16 (5), 12, 1966) are shown to confirm the conclusion that the Doppler and impact mechanisms are statistically dependent for both strong and weak collisions. Orig. art. has: 5 figures and 123 formulas.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 010/ OTH REF: 010

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S/169/61/000/008/007/053
A006/A101

3.9300 (1019,1109,1327)

AUTHOR: Rautian, T. G.

TITLE: Damping of seismic waves and the energy of earthquakes. I.

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 8, 1961, 11, abstract 8A105 ("Tr. In-t seysmostoyk. str-va i seysmol. AN TadzhSSR", 1960, v. 7, 41-86, Tadzh. and Engl. summary)

TEXT: The author analyzes the classification of earthquakes from the energy of elastic waves. Experimental data were obtained during the complex Tadzhik seismological expedition (TKSE) with the aid of ВЭГИК (VEGIK) seismographs at 3 to 700 km epicentral distances. The author suggests two classifications: 1) using the magnitude of seismic energy, passing through the reference sphere of some fixed radius R (reference-sphere) and 2) using the energy passing through the boundary of the seat, i.e. the boundary of the elastic deformation zone. The latter method should be preferred, but requires the knowledge of the seat dimensions. For classifications by the first method R was assumed to be equal to the mean depth of the seats of the earthquakes investigated: (10 km) for shallow and weak earthquakes this tolerance is very formal. The general

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Damping of seismic waves and the energy ...

system of determining the energy is as follows: 1) the density of seismic energy $\mathcal{E}$ at the observation point at distance r from the seat is calculated by formula: $\mathcal{E}(r) = \int^{\tau} (P(r), \vec{n})\, dt$, where P is the Umov vector, τ is the duration of oscillations, $\vec{n}$ is the normal to the wave front; 2) $\mathcal{E}(r)$ is reduced to its value on the reference-sphere or the seat surface using formulae

$$\mathcal{E}(R) = \mathcal{E}(r)\,\psi(R)/\psi(r)$$

or

$$\mathcal{E}(r_0) = \mathcal{E}(r)\,\psi(r_0)/\psi(r),$$

where ψ is the experimental function of absorption, r_0 is the mean radius of the seat; 3) the energy density is integrated over the reference-sphere or along the seat boundary (practically $\mathcal{E}$ is multiplied by $4\pi R^2$ or $4\pi r_0^2$, due to the lack of data on $\mathcal{E}$ values in the depth). Some peculiarities of calculating energy densities from seismograms are noted. The seismogram is visually approximated by segments of damped superposed or consecutive sinusoids; frequencies f and mean amplitudes a of sinusoids are approximately estimated. The energy density is found from formula

$$\mathcal{E}(r) = 2\pi^2 \rho \sum_{i} v_i (a_{ik} f_{ik})^2 \tau_{ik},$$

$$i = p, s; \quad k = 1, 2, \ldots$$

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Damping of seismic waves and the energy ...

The time during which the amplitude decreased by e times was taken as duration τ. Amplitude α was found with the aid of formula $\alpha = A'/2V(f)$, where A' is the full vector of shift on the seismogram, V is the magnification of the instrument, and factor 2 takes into account the effect of the free surface. The full vector was usually estimated to be $\sqrt{2}\,A$, where A is the maximum shift among the shifts in individual components. The evaluation of energy is connected with errors of two types: 1) from inaccurate integration, determination of V of phase distortions of the instrument, etc., 2) from angular non-uniformity in energy liberation by the seat, ground conditions etc. The errors of the latter type are considerably higher. Experimental data are described on damping of $\mathcal{E}$ at distances of 3 - 10 up to 500 - 700 km, and of the sum of maximum amplitudes P and S: $A_p + A_s$, obtained in ZKSS with the aid of VEGIK instruments (the pass-band is approximately from 50 to 1.5 cycles) for earthquakes with seats within the crust. At distances up to 80 km A decreases as $r^{-2.1}$ and $\mathcal{E}$ as r^{-4} - $r^{-4.5}$. At r = 80 - 250 km the damping decreases down to r^{-1} and r^{-2} respectively, on account of the arrival of waves refracted on the crust bottom. At 250 - 700 km distances the damping increases again and attains r^{-3} and $r^{-3.5}$. Probable deviations of the logarithm of energy density are 0.5, and of the sum of amplitudes 0.3. Then nomograms are described facilitating the determination of

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A006/A101

Damping of seismic waves and the energy ...

energy. The energy on the reference-sphere determined by such a nomogram is found with an accuracy to a factor of ten. The notion of energy class $k = \lg E$ is introduced. E is measured in Joules. Moreover, an approximate, but much more rapid method of evaluating E, is proposed. It is based on the correlation of the reference-sphere energy and sum $A_p + A_s$. The result is $\lg E = 3.9 + 1.87 \lg (A_p + A_s)$ where the sum of amplitude, measured in millimeters corresponds to $V = 20,000$ and $r = R = 10$ km. The correlation of the reference-sphere energy E and energy E_0 liberated by the seat is:

$$\lg E_0 = \lg E + (n + 2)(\lg R - \lg r_0),$$

where r_0 is the radius of seat, and n is the exponent in the damping function $\psi(r) = 1/r^n$. It is assumed that $\lg r_0 = \lg \alpha + 1/\beta \lg E_0$. Using for α and β values obtained in TKSE and taking $n = 4$, the author obtains $\lg E_0 = 5.66 + 0.62 \lg E$. Sensitivity of E_0 to variations of n, α and β is investigated. E_0 is proportional to the third power of r_0; the ratio of energy streams of two earthquakes at the same epicentral distance is not equal to the ratio of energies in the seat. An attempt is made of estimating the correlation between $E(E_0)$ and the magnitude of the earthquake. Assuming the similarity of frequency characteristics of VEGIK and Wood-Anderson seismographs, the following expression is

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Damping of seismic waves and the energy ... S/169/61/000/008/007/053
A006/A101

obtained: $\lg E = 3.9 + 1.87\ M$, where M is determined from volume waves at small distances. The formula is compared with analogous relations, suggested by other authors. Data on earthquakes are presented in an appendix, which had been used when studying energy damping. There are 15 references.

S. Solov'yev

[Abstracter's note: Complete translation]

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTIAN, T.G.

S/169/61/000/010/009/053
D228/D304

AUTHORS: Bune, V. I., Gzovskiy, M. V., Zapol'skiy, K. K., Koylis-Borok, V. I., Krestnikov, V. N., Malinovskaya, L. N., Nersesov, I. L., Pavlova, G. I., Rautian, T. G., Reysner, G. I., Riznichenko, Yu. V., and Khalturin, V. I.

TITLE: Methods of the detailed study of seismicity

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 10, 1961, 12-13, abstract 10A144 (Tr. In-ta fiz. Zemli AN SSSR, no. 9, 1960, 327 p.)

TEXT: The Tadzhik complex seismologic expedition was organized with the aim of studying the nature of earthquakes and the conditions of their genesis. The most seismically-active zones of the USSR (Garmo and Stalinabad) were chosen as the work areas. The specific conditions of working and processing the data demanded the development of special systems of observation and methods of interpretation. The large amount of recorded

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D228/D304

Methods of the detailed...

seismic phenomena permitted the use of statistical methods for studying their distribution in space and time; these methods, in their turn, provided the basis for introducing the quantitative indices of the seismicity characteristics of the seismically-active areas. The actual seismic observations were closely coordinated with geologic investigations, and this provided the possibility of exposing the tectonic basis of the seismic phenomena. A general review of the work area is given in Chapter 1, and concise data on major earthquakes are cited together with the general position of the expedition stations. A description of the standard main and auxiliary apparatus used at the stations, and also the layout and description of newly developed equipment--including an automatic seismic station with a magnetic memory--is cited in Chapter 2. The methods developed and utilized in the expedition for studying the crust's structure in the area under investigation from the records of nearby earthquakes are described in Chapter 3. Horizontal and vertical hodographs were constructed. The resulting material enabled the crust to be represented as a one-layer mass

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with a longitudinal-wave velocity of 6.0 - 6.1 km/sec. At the Mohorovicic boundary, the velocity suddenly changes to 8.0 km/sec. and then somewhat decreases, but at a depth of 300 km it subsequently increases to 9.2 km/sec. These data underlay the construction of isochrone charts used to localize the epicenters and to determine the focal depths. The isochrone charts were constructed with an account of the heterogeneity of the work area's geologic structure and the peculiarity of the seismic stations' location. This enabled the precision of hypocenter localization to be substantially increased, reducing it to 1 - 2 km at the center of the work area's topographic map. In Chapter 4, the definition of the concept of seismic energy at the focus is given, and the basic formulas are derived for its calculation. On the basis of experimentally obtained laws for the dying out of energy with distance, nomographs were constructed to determine practically the energy at the focus from the records of nearby earthquakes. Appraisal of the precision of calculation of the energy in relation to different factors shows that it may be determined accurately to the order of its magnitude. In this connection, the value $K = \lg E$ j.

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is introduced for characterizing the energy class of earthquakes. The value of K is compared with the earthquake magnitude M. The study of the iso-energy lines shows that the different degrees of the dying out of seismic energy along and across the strike of geologic structures exert a decisive influence on the form of the isoseisms. In Chapter 5, the frequencies of seismic vibrations are studied--in relation to the earthquake energy, the distance from the source, the geologic conditions at the point of observation and at the hypocenter, etc.--from recordings at both the customary stations and a special ЧМСС (ChISS) seismic-station intended for frequency analysis of seismic waves directly at their place of registration. A detailed description is given for the frequency-selective seismic-station ЧМСС-1954 (ChISS-1954) and for the results of the investigation of its recordings. Certain epicentral zones with an anomalous frequency are thereby revealed. The procedure for theoretically calculating the focal characteristics, and also for appraising these latter from empirical data, is given in Chapter 6. Several formulas are

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cited for determining the size of a focus in relation to its energy on the basis of different physical propositions. The dynamic parameters of the foci are determined; there appear to be definite predominant directions for both the strike and dip of the fracture planes. The characteristics of the seismic conditions of the Garmo and Stalinabad seismically-active regions--both as a whole and in individual areas--are quoted together with the variations in the parameters of the conditions in time. The quantitative expression of the seismicity during constant seismic conditions is determined by the seismic activity. The possibility is shown of constructing graphs of the recurrence of earthquakes from short observations of weak shocks, and methods are given for determining the period required to obtain the parameters of the seismic conditions with a pre-set precision in relation to the energy of the recorded earthquakes. The statistical constancy of the seismic conditions is determined by the so-called measure of dispersion of the frequency of earthquakes. A brief description of the area's stratigraphy and the history of its geologic development is given in Chapter 8. The structural schemes and descriptions of the most important

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deep faults are cited. The contemporary structure of the Garmo area is depicted as two main regions: the alpine geosynclinal zone in the south and the activated epi-Hercynian platform in the north. In section, it is drawn as several steps of Paleozoic basement adjoining each other along deep faults. A comparison of the seismicity with the tectonics of the study areas is made in Chapter 9. The construction of maps of isolines of seismic activity and gradients of the rate of tectonic movements is recommended for appraising the connection between the seismicity and the tectonics. Methods are cited for constructing such maps. The congruence between these magnitudes is established for the regions under investigation, and areas with the maximum gradient values correspond to those with the highest values of seismic activity. 272 references. [Abstracter's note: Complete translation.]

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31920
S/619/61/000/017/002/002
D239/D302

3,9300

AUTHORS: Nersesov, I.L., Rautian, T.G., Khalturin, V.I. and Riznichenko, Yu.V.

TITLE: Instructions for dynamic measurements on seismograms

SOURCE: Akademiya nauk SSSR. Institut fiziki Zemli. Trudy no. 17 (184). Moscow, 1961. Voprosy inzhenernoy seysmologii no. 5, 146-167

TEXT: The term " dynamic" signifies measurements of amplitude and period of oscillations, directions of first motion and duration of the trace, as opposed to kinematic measurements of times of arrival of phases. The objective is to obtain information of the strength and type of movement at the focus. Data from a long chain of stations are necessary and these data must be strictly comparable, on a uniform basis. It is assumed that

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D239/D302

Instructions for dynamic ...

all such stations are fitted with type СГК (SGK) or СВК (SVK) seismographs or others of similarly wide bandwidth. The instructions are based on experience of near earthquakes (up to 700 km) in Central Asia, but recommendations are also given for dealing with earthquakes out to 100° epicentral distance, where diffraction begins to affect matters. The instructions are divided into eight sections as follows: 1) Dynamic quantities determinable from seismograms. These are A_i, T_i, the amplitude and period of first arrivals of each phase: A_{max}, T_{max} the maximum amplitude and corresponding periods of each phase: A_m, T_m, the the mean ditto: τ the duration of each wave-group. A distinction is made between relative duration which is measured between points of amplitude one third the maximum, and the absolute duration which is measured between points of fixed amplitude. The latter clearly depends on the energy. 2) measurement of

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Instructions for dynamic ...

amplitude and period of first arrivals (details). 3) Separation of basic wave-groups on the trace (illustrated by examples). 4) Measurement of maximum amplitudes and the corresponding periods (details). 5) Measurement of mean amplitudes and mean periods (details). 6) Determination of total duration of seismic oscillation (definitions). 7) Calculation of seismic energy density. The formula evolved is

$$\mathcal{E} = 0.085 \frac{v}{V_s} \left[\frac{A_1^2}{T_1^2} \cdot \tau_1 + \frac{A_1^2}{T_2^2} \cdot \tau_2 + \ldots\ldots \frac{A_n^2}{T_n^2} \cdot \tau_n \right] \text{ erg/cm}^2,$$

where the symbols are: v = velocity of given wave-group, V_s = velocity of S-waves, A = ground amplitude

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Instructions for dynamic ... 31920 S/619/61/000/017/002/002 D239/D302

in mm, T = period in seconds of first arrivals of phases 1,2,... ... n and τ = duration of phases 1,2, ... n. This section is also illustrated by examples and a nomogram for rapid calculation is given. 8) Calculation of the seismic energy at the focus. This simply involves evaluation of $4\pi R^2 \epsilon (R)$. Another nomogram is given for this. A third nomogram can be used for estimating magnitude. All these data should be reported on a special form designed for the purpose and a completed example is given. There are 13 figures.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTIAN, T.G.; SAMOYLOVA, L.S.

Principle of calculating the energy density by the method of approximating seismograms with line segments of sinusoids. Trudy Inst. fiz. Zem. no.25:88-94 '62. (MIRA 15:11)
(Seismometry)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACC NR: AT6033696 SOURCE CODE: UR/3231/66/000/002/0150/0182

AUTHOR: Pisarenko, V. F.; Rautian, T. G.

ORG: none

TITLE: Statistical classification by several characteristics [Pattern Recognition]

SOURCE: AN SSSR. Institut fiziki Zemli. Vychislitel'naya seysmologiya, no. 2, 1966. Mashinnaya interpretatsiya seysmicheskikh voln (Machine interpretation of seismic waves), 150-182

TOPIC TAGS: earthquake, seismic wave, statistic analysis, pattern recognition, seismology

ABSTRACT: A convenient and practical method of statistical discrimination, dispensing with the enormous number of observations that would otherwise be required when applying the Neyman-Pearson test to seismological problems, is proposed. The determining quantity in this method is " a posteriori " probability, calculated on assuming independence of parameters, thus reducing sharply the required amount of source data ("learning material"). The application of this method is illustrated by showing how deep earthquakes can be distinguished from shallow earthquakes according to dynamic characteristics of the tracing. 50 tracings each of deep (H > 50 km) and shallow (with foci within the earth's crust) earthquakes are employed as

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the learning material. Four parameters are considered, (apparent oscillation frequency f_p of P-waves; apparent oscillation frequency f_s of S-waves; time t_{max} between first arrival and maximum amplitude of P-waves; ratio A_p/A_b between maximum amplitude of P waves and mean amplitude of the "background" of oscillations in the interval between P- and S-wave groups), of which two (f_s and f_p) are linked by linear correlation to a correlation factor of the order of 0.6. It is shown that this correlation may be disregarded without detriment to soundness of discrimination, i.e. to percentage of erroneous solutions. It is estimated that, with respect to the characteristics considered, deep earthquakes can be correctly distinguished from shallow earthquakes in 87 ± 3% of cases. Orig. art. has: 6 figures, 6 tables, 16 formulas

SUB CODE: 08, 12, 09/ SUBM DATE: none/ ORIG REF: 007/ OTH REF: 003

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

ACC NR: AT6033059 SOURCE CODE: UR/3231/66/000/001/0160/0186

AUTHOR: Pisarenko, V. F.; Rautian, T. G.

ORG: none

TITLE: Effect of such factors as the station and the focus on the accuracy of determination of seismic parameters

SOURCE: AN SSSR. Institut fiziki Zemli. Vychislitel'naya seysmologiya, no. 1, 1966. Analiz seysmicheskikh nablyudeniy na elektronnykh mashinakh (Use of electronic computers in the analysis of seismic observations), 160-186

TOPIC TAGS: earthquake, seismologic station, seismicity, statistic analysis

ABSTRACT: The recording of earthquakes differs at every individual station owing to some unknown local features and other variables; this causes distortion of the recorded period. Another disturbing factor is the earthquake focus, which generates oscillations with a particular inherent period. In this connection the author presents a new, more accurate statistical method of evaluating the accuracy of the averaging of measurements, based on analysis of variance and the Fischer test. A quantitative measure of the proportion of the effect of specific factors (features of the focus γ_ξ, features of the station γ_n, gaussian noise

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γ_ϵ) on the scatter of observational findings is introduced. This measure γ is determined from the formula $\gamma_i = \frac{s_i^2}{s^2}$, where s_i^2 is the variance due to this particular scatter and s^2 is the total variance of the individual measurement. It is shown that a large number of averaged measurements is not necessarily required for a high accuracy of the results of the averaging. On estimating by means of prior sampling the variance s^2 of the individual measurement and the degree of influence of one random factor or another, γ_ξ, γ_n, γ_ϵ, it is possible to optimally organize the selection of material for further observations. Orig. art. has: 31 formulas, 4 tables, 1 figure.

SUB CODE: 08, 12, 12/ SUBM DATE: none/ ORIG REF: 005/ OTH REF: 001

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

NERSESOV, I.L.; KAUTIAN, T.G.

Kinematics and dynamics of seismic waves at distances of up to 3,500 km from the epicentre. Trudy Inst.fiz.Zem. no.32:63-87 '64. (MIRA 18:2)

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTIAN, T.G.

Determining the energy of earthquakes at distances up to 3,000 km.
Trudy Inst.fiz.Zem. no.32:88-93 '64.

(MIRA 18:2)

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

USSR/Human and Animal Physiology. Sense Organs. Vision. T

Abs Jour: Ref Zhur-Biol., No 20, 1958, 93699.

Author : Rautin, G.N., Gur'yeva, M.K.
Inst : AS SSSR
Title : Color Differentiation in Point Sources.

Orig Pub: Dokl. AN SSSR, 1957, 112, No 6, 1037-1040.

Abstract: A determination was made of the influence of the angular parameter of point sources of light and their intensity of light and dispersions upon a precision of color differentiations of two normal trichromates. A double trichromatic colorimeter was used in the investigation. The intensity of the red, green, blue, and yellow sources of light measuring 1, 2, 4, 5, and 10' was equalized by means of neutral filters. In

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USSR/Human and Animal Physiology. Sense Organs. Vision. T

Abs Jour: Ref Zhur-Biol., No 20, 1958, 93699.

limits of 2 - 10' the angular dimension of the sources did not affect the precision of the color differentiations. For a distance of 30' between the sources of light there was a linear relationship between the precision of color differentiation and the logarithm of illumination (in limits of $E = 8.10^{-5} - 4.10^{-7}$ lux). With a change in illumination to 90 times the number of degrees, the color differentiation increased 2 - 6 times. With the light sources measuring 5' and dispersion 10, 30', 1, 3, 5 degrees, the precision of light differentiation had a weakly expressed maximum at 1 degree. Light differentiation for point sources was 5 - 15 times worse than for sources having tangible dimensions. Variations in the coloration of signals, produced by the atmosphere of various types of weather

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTKAUSKAS M.I.

SOV/77-4-2-15/18

23(4) 23 (5)

AUTHOR: Lyalikov, K.S.

TITLE: Successes of Soviet Electrophotography (Uspekhi sovetskoy elektrofotografii) A Scientific and Technical Conference on Questions of Electrography (Nauchno-tekhnicheskaya konferentsiya po voprosam elektrografii)

PERIODICAL: Zhurnal nauchnoy i prikladnoy fotografii i kinematografii, 1959, Vol 4, Nr 2, pp 149-152 (USSR)

ABSTRACT: This is an account of a scientific and technical conference on electrography, the first to be held in the Soviet Union and evidently in the world. It was organized in Vil'nyus on December 16-19, 1958 by the Soviet narodnogo khozyaystva Litovskoy SSR (Council for National Economy of the Lithuanian SSR), the Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta ministrov Litovskoy SSR (State Scientific and Technical Committee of the Council of Ministers of the Lithuanian SSR) and the Nauchno-issledovatel'skiy institut elektrografii (Scientific Research Institute of Electrography). The conference, attended by over 300 scientific workers, was opened by the Deputy Chairman of the Council for National Economy of the Lithuanian SSR P.A. Kul'vets, after which the director of the Institute for Electrography, I.I.Zhilevich, reviewed the state and prospects for development of electrography in the USSR. He stated that research in this field should be carried out along the following lines: a) a search for new photo-active materials with high dark resitance; b) physical research into the internal photoeffect; c) development of photosemiconductor layers; d) development of the theory of the electrophotographic process. K.S. Lyalikov (speaking also for O.G. Popova) gave a report in which he suggested determining the light sensitivity of electrophotographic layers in GOST units. N.Z. Plavina (speaking also for I.I.Zhilevich, L.I.Nyun'ko, N.N.Markevich, P.I. Kalinauskens and O.M. Suveyzdis) reported on some research on the sensitization of a semiconductor in electrophotographic layers. V.M. Fridkin gave a report on highly sensitive electrophotographic layers and an electrophotocopying device, and reviewed the formation process of the latent electrophotographic image on the basis of the zonal theory. He also described the design of an electrosensitometer for determining sensitivity by the relaxation period of a charge on the surface of the layer, and the circuit of an electrophotographic copying device. Anfilov finished describing the latter and then spoke on the mechanics and kinetics of the development of the latent electrophotographic image in liquid developers.

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SOV/77-4-2-15/18

Successes of Soviet Electrophotography; A Scientific and Technical Conference on Questions of Electrography

K.M. Vinogradov described some of the features of the cascade and liquid methods of electrophotographic development. Yu.Ye. Karpeshko devoted his report to the criterion of light sensitivity of the elctrophotographic process. After the reports, a discussion took place on methods of determining the light sensitivity of electrophotographic layers. A.N. Chernyshev spoke on the prospects of developing polygraphic processes using electric and magnetic forces. O.V. Gromov (speaking also for I.I. Zhilevich, A.A. Sukhiy, V.A. Gordeyeva, A.S. Pauzha and Yu. I. Kevalaytis) reported on the development of elctrophotographic reproducing equipment. A.S. Pauzha (speaking also for I.I. Zhilevich, A.S. Borisovich, N.M. Gal'vidiks and M.I.Rautkauskas) reported on the use of electrographic methods in recording oscillographs and other recording instruments.

V.I. Yurchenko (speaking also for L.N.Palin) spoke on the possibility of electrophotographically recording images from electron-beam tubes. L.S. Korol' (speaking also for N.N. Markevich, T.I. Kozlovskaya, B.I. Kalinauskene, M.K. Naynens, I.I. Zhilevich and K.A. Montrimas) gave a detailed description of laboratory and machine methods of producing photosemiconductor papers (zinc oxide was used). A.A. Sukhiy (speaking also for I.I. Zhilevich, O.V. Gromov, V.A. Gordeyev, N.V. Fedotov and T.N. Ger) described a laboratory and industrial machine for producing photosemiconductor papers. T.A. Shishkina (speaking also for Ya.A. Oksman) reported on a method of examining electrophotographic materials using an a/c bridge. S.I. Khotyanovich (speaking also for A.I. Gikens and I.S. Shilevkens) spoke on developing materials for electrophotography and ferromagnitography, including developers giving a "reverse" image. B.I. Tikhonov reviewed methods of measuring the electrostatic potentials of electrophotographic layers, stressing that the oscillating electrode should not be placed above a layer with varying potential as this causes self-discharge. E.V. Krukovskis (speaking also for R.G.Gorevoy, A.V.Osipov and Ye. S. Kheyfets) spoke on the practice of producing velveteen papers in an electrostatic field, and showed samples produced by the Grigishskaya paper factory. Ye.L. Nemirovskiy then gave a historical review of the development of electrographic methods in which he paid tribute to the work of the Scientific Research Institute of Electrography in Vil'nyus and the Institut poligraficheskogo mashinostroyeniya (Moskva)-(Polygraphic Machine-Building Institute (Moscow)). Debates were then held

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on methods of measuring the potential of charged electrophotographic layers, the vibration pick-up most-used was shown in B.I. Tikhonov's report to be not always accurate. S.G.Grenishin stated that the bad influence of the oscillating electrode can be eliminated if the electrode probe above its surface is fixed and the pick-up is connected to it by a shielded cable. In the debate on Ye.L. Nemirovskiy's report it was stated that the research of Academicians A.N. Terenin and Ye.K. Putseyko should be considered as the basis of all work on electrophotographic papers with ZnO, as they were the first to show the possibility of optical sensitization of the internal photoeffect in ZnO. N.M.Gol'vidis then gave a report on the depositing of charges by a corona discharge. A.I. Kaminskas and A.P. Yapulis reviewed some of the results of the use of electrographic methods in radiography. L.I. Nyun'ko (speaking also for I.I. Zhilevich, I.I. Plavin, Yu.K. Vishchakas and Yu.A.Zibuts) reported on relaxation processes in semiconductor layers, using a vibration electrometer. Yu.K.Vishakas gave a report on research on some physical properties of the polycrystalline layers of selenious cadmium. M.P. Mikalkyavichyus spoke on some of the photoelectric properties of Sb_2S_3 and Sb_2Se_3: the absorption maximum of the latter is about 900 mμ. S.M. Neyman reported on methods of obtaining selenium light-sensitive layers, including sublimation and thermal treatment; it was also found that the sensitivity of the layers increased after storage for 1.5 to 2 months at room temperature. P.M. Podvigalkin (speaking also for S.G.Grenishin) spoke on research into the electrical properties of electrophotographic layers of amorphous selenium and powdered zinc oxide. N.E. Shiktorov (speaking also for A.G. Taurayitis) discussed the production of selenium layers and some of their properties. Finally the following reports on ferromagnetography were delivered; 1) B.Ya. Kaznacheyev, V.M.Zhogina, "Electrodeposition of Magneto-hard Alloys with Given Magnetic Characteristics" 2) M.T.Arutyunov, "Visualization of Magnetic Oscillograms by the Ferrographic Method" 3) V.T.Patrunov, "Ferrographic Recording of Facsimile Images" 4) I.I.Zhilevich, I.I. Gikis, B. Ye. Buchek, I.I. Naynise, A.K.Kiznis, "Mock Experiments in Non-Pressure Ferromagnetic Printing". There was also an exhibition showing the work of the Electrographic Institute. The most important conclusion of the conference was that a solid approach had been made to the possibility of wide technical use of the methods of electrography. It was considered that although work in this field actually started only in 1955-56 it has covered as much ground as the USA in 10 years. While admitting that it was easier to reproduce results already achieved than to be the first to arrive at them, the conference observed that the Americans took good care that no important information appeared in the literature available.

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RAUTKIN, F.A., kand.tekhn.nauk

Most efficient water supply structures for pastures of Bet-Pak-Dala and Sary-Arka. Gidr. i mel. 10 no.7:41-46 Jl '58. (MIRA 11:9)
(Bet-Pak-Dala--Irrigation)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

AUTHOR: Rautkin, F.A., Candidate of Technical Sciences 99-58-7-7/10

TITLE: Economical Types of Watering Structures on the Pastures of Betpak-Dala and Sary-Arka (O ratsional'nykh tipakh obvodnitel'-nykh sooruzheniy na pastbishchakh Betpak-Dala i Sary-Arka)

PERIODICAL: Gidrotekhnika i melioratsiya, 1958, Nr 7, pp 41-46 (USSR)

ABSTRACT: This article deals with the experience gained in setting up certain types of artificial watering structures which are to aid cattle breeding in Central Kazakhstan. Water was supplied for the first time to the grazing range Ulanbel'-Bulattau in 1951 (extending over 300 km), followed by three other tracks (Baykhatynskaya, Kogashikskaya and Chiiliyskaya). In addition to natural water springs, water ditches and water holes, artificial shaft wells were built only in the western part of the Betpak-Dala area. When available, ground water sources are preferably utilized. Also, "takyr" type water holes are of great importance even if their water depth does not exceed 5-10 m. 1,000 - 1,500 watering places are to be built in the Betpak-Dala area, and even more watering places are to be built in the Sary-Arka area. The construction details of the artificial water structures are shown in figures.

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99-58-7-7/10

Economical Types of Watering Structures on the Pastures of Betpak-Dala and Ulary-Arka

There are 4 diagrams, 1 photograph and 1 map

1. Water - Control systems 2. Cattle - Applications
3. Water tanks - Design

Card 2/2

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

KURSHIN, L., inzhener; RAUTMAN, Yu., inzhener.

Suspended roofs for mechanized operations in open pits. Stroi. mat. 2 no.12:26 D '56. (MLRA 10:2)
(Clay) (Roofs)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

S/081/62/000/001/019/067
B156/B101

AUTHORS: Rautschke, R., Naumann, H., Funk, H.

TITLE: Spectrographic determination of niobium and tantalum in solutions

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 1, 1962, 145, abstract 1D81 (Acta chim. Acad. scient. hung. v. 28, nos. 1-3, 1961 103-109)

TEXT: The specimen being analyzed is converted into a solution by melting a weighed amount with 30 times the amount of dry $KHSO_4$ for 10 min; the melt is then dissolved in a 10% solution of tartaric acid. Alternatively a weighed batch is dissolved in HF (100 mg of HF per 1 g of solution). The tartaric acid solutions remain stable for 8-10 days; their Nb or Ta contents must not exceed 2.5 mg/ml. The solution is introduced into the discharge by means of a carbon disc rotating at 5 rpm. The depth to which the disc is immersed in the solution (2 mm) is controlled by a micrometer screw. The counter-electrode is a 5 mm diameter carbon rod ground to cone-shape.

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To determine the Nb and Ta in the tartaric acid specimens, spectra are excited by high-voltage spark discharge (capacity 2400 μμF, inductance 1.5 mH, voltage 9.3 kv), and photographed with a Q-24 spectrograph, the gap between electrodes being 2 mm. Preliminary spark transfer time is 120 sec when determining Nb and 150 sec when determining Ta. Exposure times are 90 sec and 120 sec respectively. Spectrograph slot width is 0.014-0.015 mm. The analysis line pairs are Nb 2927.8 - Ta 2933.5 Å and Ta 2400.63 - Nb 2398.73 Å. Analysis sensitivity is 0.1 γ/ml of Nb and 0.5 γ/ml of Ta. The mean error in determining Nb is ± 5.5%, the figure for Ta ± 6.5%. Standard solutions are prepared by dissolving pure Nb_2O_5 and Ta_2O_5. When analysing HF solutions, the spectra are excited by a discharge of capacity 12 000 μμF, inductance 0.08 mH, and voltage 12 kv. Before analysis, the carbon disc surfaces are impregnated with a solution of NaCl. The depth to which the disc is immersed in the solution is 4 mm. The mean error in determining Nb is ± 5.4%, the figure for Ta ± 4.3%. [Abstracter's note: Complete translation.]

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

KARAKIN, F.F.; RODICHEV, A.F.; PUTIY, G.P.; BASOV, A.P.; PYATAKOV, L.V.; RAUTSEP, A.P. [Rautsepp, A.]; BLAGONRAVOV, S.I.; GRECHIKHO, A.M.; DRUZHININ, N.N.; SHUKHMAN, D.I.; BAUSIN, A.F.; LOYKO, P.G.; CHERNAKOV, B.A.; SHORNIKOV, F.M.; SOPIN, P.F.

Remarks of the members of the Conference. Torf. prom. 37 no.5: 22-28 '60. (MIRA 14:10)

1. Ivanovskiy gosudarstvennyy torfotrest (for Karakin). 2. Sverdlovskiy torfotrest (for Rodichev). 3. Gosplan USSR (for Putiy). 4. Leningradskiy gosudarstvennyy trest torfyanoy promyshlennosti (for Basov). 5. Moskovskiy oblastnoy sovnarkhoz (for Pyatakov). 6. Gosudarstvennyy nauchno-tekhnicheskiy komitet Estonskoy SSR (for Rautsep). 7. Gor'kovskiy sovnarkhoz (for Blagonravov). 8. Belorusskiy sovnarkhoz (for Grechikho, Shukhman). 9. Yaroslavskiy sovnarkhoz (for Druzhinin). 10. Bobruyskaya mashinno-meliorativnaya stantsiya (for Loyko). 11. Gipromestprom Gosplana RSFSR (for Chernakov). 12. Mezhkolkhoznoye torfopredpriyatiye "Volosovskoye" Leningradskoy oblasti (for Shornikov). 13. Vsesoyuznyy nauchno-issledovatel'skiy institut torfyanoy promyshlennosti (for Sopin).
(Peat industry)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTSKIS, M. K.

RAUTSKIS, M. K.: "The epizootiology of strongyloidosis of pigs and basic prophylatic measures of combatting it in the Lithuanian SSR." Acad Sci Lithuanian SSR. Inst of Biology. Vil'nyus, 1956. (Dissertation for the Degree of Candidate in Biological Sciences.)

Knizhnaya letopis', No 39, 1956, Moscow.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

UDINTSEV, G.B.; AGAPOVA, G.V.; BERSENEV, A.F.; BUDANOVA, L.Ya.; ZATONSKIY, L.K.; ZENKEVICH, N.L.; IVANOV, A.G.; KANAYEV, V.F.; KUCHEROV, I.P.; LARINA, N.I.; MAROVA, N.A.; MINEYEV, V.A.; RAUTSKIY, Ye.I.

New relief maps of the bottom of the Pacific Ocean. Geofiz. biul. no.14:159-167 '64. (MIRA 18:4)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU, R., chim.; HOBINCU,A., ing.; SPORN,A., dr.; DUMITRESCU,M., chim.; PETROVICI,C., ing.; PERLEA,M., ing.

Determining the valuation and control criteria for hard and plasticized polyvinyl chloride. Ind alim anim 11 no.2:50-53, 57 F'63.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU,R., chim; HOBINCU,A., ing.; SPORN,A., dr.; DUMITRESCU,M., chim.; PERLEA,A., ing.

Determining the valuation and control criteria of high and low pressure polyethylene and polystyrene. Ind alim anim 11 no.1: 16 - 19 Ja'63.

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Country : Rumania
Category :

Abs. Jour. :

Author : Festiropol, A.; Rautu, R.
Institut. :
Title : Determination of Neutralizing Substances in Milk

Orig. Pub. : Igiena, 1957, 6, No 3, 230-235

Abstract : The possibility was investigated of utilizing the methods of Elbe and Pfeiffer (Elbe K., Pfeiffer, H., Zeitschr. fur Untersuchung der Lebensmittel, 1933, 65, 435), and Nernovskaya-Zelenkova (RZhKhim, 1955, No 19, 43322), for detection of neutralization of milk with alkalies. It was found that in the instances when the first mentioned method yield uncertain results, the 2nd mentioned method can be successfully used to establish the fact of neutralization of the milk (not, however, for a quantitative determination). -- A. Marin.

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RUMANIA

TAMOVICEANU, Yolanda, RAUTU, R., PERLEA, M.

Institute of Hygiene and Public Health of the Rumanian People's Republic. Section of Alimentation Hygiene. (Institutul de Igiena si sanatate publica al R.P.R. Sectia de Igiena a alimentatiei) - (for all)

Bucharest, Igiena, Vol XII, No 1, Jan-Feb 63, pp 27-32.

"The Advantages of Iodinating Salt with Alkaline Iodates." (Paper read on 17 May 1960 at the Scientific Session of the Institute of Endocrinology.)

(3)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU, S.

The calculation of vibration frequencies of frames in tiers.

p. 785 (Academia Republicii Populare Romine. Institutul de Mecanica Aplicata. Studii Si Cercetari De Mecanica Aplicata. Vol. 7, no. 3, July/Sept. 1956. Bucuresti, Rumania)

Monthly Index of East European Accessions (EEAI) LC. Vol. 7, no. 2, February 1958

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

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RUM/8-59-1-9/24

AUTHORS: Bălan, St., Răutu, S., Arcan, M., Petcu, V.

TITLE: Study of the Behavior of Constructions by Experimenting With Mockups From Plastic Materials

PERIODICAL: Studii si Cercetări de Mecanică Aplicată, 1959, Nr 1, pp 151 - 172 (RUM)

ABSTRACT: A new method of experimentation with reduced scale mockups has been developed for the studies and calculations of new construction types. The mockups can be made from the same material as the prototype or from some other material. The authors first pose the problem of similarity, indicate with "m" the elements of the mockup and with "p" that of the prototype, and establish the following scales:

scale of lengthes: $\ell_m = \frac{1}{\lambda} \ell_p$ (1);

scale of time: $t_m = \frac{1}{\tau} t_p$ (2);

scale of unitary power: $\sigma_m = \frac{1}{\alpha} \cdot \sigma_p$ (3);

scale of move: $\sigma_m = \frac{1}{\beta} \cdot \delta_p$ (4);

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scale of elasticity modules: $E_m = \frac{1}{\gamma} \cdot E_p$ (5).

Each mockup is made for a certain type of stress, and the problems of similarity have to be examined only for the respective stress. The relations thus become more simple and easier to be solved. The authors then study the cases of a mockup made from the same material as the prototype, where $E_m = E_p = E$ and $\gamma = 1$: a) Static stress in the elastic zone: If the mockup is stressed only by external load, the relations between the mockup values and prototype values are:

$$p_m = \frac{1}{\alpha} p_p; \quad \varepsilon_m = \frac{1}{\alpha} \cdot \varepsilon_p; \quad P_m = \frac{1}{\alpha \cdot \lambda^2} P_p; \quad \delta_m = \frac{1}{\alpha \lambda} \cdot \delta_p \quad (6).$$

If the stresses which provide from the proper weight are not neglectable, they have to respect the similarity relation: $G_m = \frac{1}{\lambda \gamma} \cdot G_p$, thus $\alpha = \lambda$. This case is not advantageous since the displacements are very small and difficult to be measured. In case the proper weight has to be considered, the similarity relations are:

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$$p_m = \frac{1}{\lambda} p_p; \quad \varepsilon_m = \frac{1}{\lambda} \cdot \varepsilon_p; \quad P_m = \frac{1}{\lambda^3} \cdot P_p; \quad \delta_m = \frac{1}{\lambda^2} \cdot \delta_p \quad (7)$$

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b) Static stresses at heavy axial loads: The deformation scale has to be the same as the scale of the length: $\frac{1}{\alpha\lambda} = \frac{1}{\lambda}$, $\alpha = 1$

and the similarity relations become:

$$p_m = p_p; \quad \varepsilon_m = \varepsilon_p; \quad P_m = \frac{1}{\lambda^2} P_p; \quad \delta_m = \frac{1}{\lambda} \delta_p \qquad (8)$$

c) Static stresses in the elastic plastical zone: It is necessary that $\sigma_m = \sigma_p$, thus $\alpha = 1$. The similarity conditions are given in this case by the relations (8). d) Dynamic stresses: The inertial powers interfere in this case with the external stresses. Accepting the time (2), the acceleration ratio is:

$$a_m = \frac{\tau^2}{\alpha \cdot \lambda} \cdot a_p \qquad (9)$$

and the inertial power ratio is:

$$\frac{I_m}{I_p} = \frac{m_m \cdot a_m}{m_p \cdot a_p} = \frac{\tau^2}{\alpha \cdot \lambda^4}.$$

Since all forces which act on the system have to be in ratio with $\frac{1}{}$, the scale of time is: $\tau = \lambda$. (Nr 10). If there are concentrated masses

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(M_m, M_p) on the construction, it is necessary that

$$\frac{M_m}{M_p} = \frac{1}{\tau^2 \cdot \lambda} = \frac{1}{\lambda^3} \qquad (11).$$

The authors then proceed to the examination of mockups made from some other material than the prototype. A good material has to be homogeneous and isotropic, to be easily processable, to have a relatively small elasticity module in order to supply easily measurable deformations. a) Static stress in the plastic zone: Using the scale of lengthes (1) and unitary power (3), results for the scales of forces, extension and displacement:

$$P_m = \frac{1}{\alpha \cdot \lambda^2} P_p, \quad \varepsilon_m = \frac{\tau}{\alpha} \varepsilon_p, \quad \delta_m = \frac{\tau}{\alpha \cdot \lambda} \delta_p \qquad (12).$$

The value of α is: $\alpha = \rho \cdot \lambda$ (Nr 13). b) Static load at heavy axial stresses: The similarity can be guaranteed if the influence of the proper weight can be neglected or is replaced by an external stress. By posing the condition: $\frac{\delta_m}{\delta_p} = \frac{\ell_m}{\ell_p} = \frac{1}{\lambda}$,

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one obtains the supplementary relation: $\alpha = \gamma$, and the relations:

$$\delta_m = \frac{1}{\lambda}\delta_p; \quad P_m = \frac{1}{\gamma \cdot \lambda^2} \cdot P_p; \quad \varepsilon_m = \varepsilon_p; \quad p_m = \frac{1}{\gamma} p_p \qquad (14).$$

c) Static stress in the elastic-plastical zone: To obtain a similarity between the bahavior of the mockup and the prototype in the elastic-plastical zone, there is a relation necessary between the elasticity modules of the materials used for the construction of the mockup and prototype (Figure 1):

$$\sigma_m = \frac{1}{\alpha}\sigma_p; \qquad E_m(\sigma_m) = \frac{1}{\gamma} E_p(\sigma_p) \qquad (15)$$

By knowing the values α and β, the relations between the other parameters are:

$$\varepsilon_m = \frac{\gamma}{\alpha}\varepsilon_p, \quad P_m = \frac{1}{\alpha \cdot \lambda^2} \cdot P_p, \quad \delta_m = \frac{\gamma}{\alpha \cdot \lambda}\delta_p \qquad (16)$$

d) Dynamic stresses: Knowing the coefficients α, β and γ, the acceleration ratio is:

$$a_m = \frac{\gamma \cdot \tau^2}{\alpha \cdot \lambda},$$

Card 5/11 an the time scale:

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$$\frac{1}{\tau} = \frac{1}{n} \sqrt{\frac{1}{\rho} \cdot \gamma} \cdot \qquad (17)$$

Experiments with plastic mockups are being carried out in many foreign laboratories. The new plastics allow the observation of the plastified zone by a decoloration of the material. This method has been called "Chromoplasticity". Plastics used for the construction of mockups are polyvinyl-chloride varieties, developed at the Institutul de cercetări chimice "ICECHIM" (Chemical Research Institute) by a team led by State Prize Winner N. Goldenberg. Three plastic varieties have been used: 1) "SDE", 2) "SDP-1", and 3) "SDP-2"; "SDP-3" and "SDP-4". SDE: perfect elastic behavior for $\sigma < p$, elasticity module at bending: E = 36,000 kg/sq cm, proportionality limit: σ_p = 550 kg/sq cm, flow limit: σ_c = 600 kg/sq cm. "SDP-1": becomes white if the tensional flow limit has been reached. Elasticity module at bending: 30,000 - 36,000 kg/sq cm, flow limit: at tension: 550 - 700 kg/sq cm, at compression: 600 - 800 kg/sq cm, at bending: 550 - 750 kg/sq cm. The flow limit values within this interval, depend from the thermal treatment of the material. "SDP-2", "SDP-3" and "SDP-4": elasticity module at bending: 20,000 - 35,000 kg/sq cm, flow limit: at tension: 450 - 500 kg/sq cm,

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at bending: 480 - 600 kg/sq cm. The values of the elasticity module and flow, depend from the thermal treatment of the material. "SDP-2", "SDP-3" and "SDP-4" become white at tension and black at compression. The characteristics diagrams of the second and third varieties are very similar to the theoretical diagrams of Prandtl, being almost perfectly elastic for $\sigma < \sigma_c$ and perfectly plastic for $\sigma = \sigma_c$ (Figure 2). The first experiment has been carried out within the Chair of Mechanical Constructions of the Institutul de Constructii (Institute of Constructions) in Bucharest with the "SDE" plastic, by checking the frequency of the proper vibrations of a seven-story frame (Figure 4). The plastic mockup has been built in a scale of 1:30. The concentrated masses have been reduced to 1/40,000 and the time value scale was $t_m = \frac{1}{K_t} t_p$. The experiments have proved that the hypothesis of the infinite rigid spars of the frame is admissible. New statical computation methods of tower constructions have been checked by another experiment [Ref 2], accomplished with "SDE" material. By using "SDP-1" material, the moment of the appearance of the first plastic joint, the points of the appearance of the joint, their order and the computation of the bearing capacity have been checked by a frame (Figure 6), loaded symmetrically [Ref 2]. Based

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on a computation of G.I. Rozenblat [Ref 3], the appearance order of the plastic joint should be, as shown by Figure 6. According to the calculation of the first order, the breaking load is

$P_r \quad \frac{8 M_c}{\ell}$, $M_c = 103$ kg. cm, $P_r = 82.4$ kg.

According to the calculation of the second order [Ref 6], the breaking load is $P_r = 72.6$ kg. The real breaking load resulting from the experiment was 76 kg. The results obtained from mockups can be used for the construction of normal size if:

$$\eta = \frac{1}{1 + 1.6\left[\frac{N_1}{P} \cdot \frac{y_1}{\ell} + \frac{N_2}{P} \cdot \frac{y_4}{\ell}\right]}$$

is equal for both, the model and the construction. Since this condition is not satisfied, there is no similarity between the mockup and the construction, which has an influence only upon the bearing capacity. The bearing capacity of the prototype is:

$$P_{rp} = \alpha \cdot \lambda^2 \cdot P_{rm} \cdot \frac{\eta_p}{\eta_m},$$

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representing the influence of the axial loads upon the bearing capacity of the frame. The η coefficient is 0.98 - 0.99 for the prototype and 0.85 - 0.95 for the mockup. In case of a metal prototype with $\lambda = 50$, $E = 2,100,000$ and $\sigma_c = 2,400$, and a mockup of "SDP-1" with $\sigma_c = 550$ kg/sq cm, $E_m = 36,000$ kg/sq cm, the following result is being obtained:

$$\frac{\eta_p}{\eta_m} = 1.12.$$

The experiment supplies the appearance points of the plastic joint, their order and the bearing capacity. Another experimental frame [Ref 5] is shown by Figure 8. Two mockups have been made, the one from "SDP-2" and the other from "SDP-3". The results are shown by the table on page 162. A series of experiments have been conducted with photoelasticity. Photoelastic mockups are made from "Dinox F-110", an optical active epoxy resin, produced in Rumania [Ref 6]. The behavior of a girder with rectangular holes made of "SDP-1" and of "Dinox F-110" has been studied simultaneously. The authors have examined: a) the bearing capacity; b) the influence of the concentration of tension in the hole corners upon the bearing capacity; c) the regions of entrance into the

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plastic zone; d) the coincidence of these regions with the maximum stress, resulting from the photoelastic mockup. Mockup Nr 1 (Figure 10) has $\frac{L_o}{H} > 5$, thickness 6.5 mm, square-shaped holes with the side $\frac{H}{3}$, dimension of solid section $\frac{H}{3}$ x 6.5 mm. Mockup Nr 2 (Figure 11) had $\frac{L_o}{H} > 5$, thickness 6.5 mm, rectangular holes with $\frac{H}{2}$ base and $\frac{H}{3}$ height, dimension of solid section $\frac{H}{7}$ x 6.5 mm. The experimentation with mockup Nr 1 has proved that the loss of the bearing capacity of the bar was due to the unitary forces of tension in the lower section, in the region of the two central solid sections. Figure 12 shows the distribution of the tension in the elastic field. Accomplishing the calculations, P = 112 kg, at which the plastification has appeared, thus resulting for the "SDP-1" mockup: σ = 530 kg/sq cm. The calculation of the unitary tension force has been accomplished by considering the value of the material band: $\tau_{0,1}$ = 5.25 kg/sq cm/cm. The thickness of the mockup from "Dinox-110" was 5.5 mm and the power by which the isochromatic table has been established was P = 18.7 kg. The maximum tension has appeared not in the mainly stressed middle section but in the solid section. The experiment with mockup Nr 2 has proved that the loss of the bearing capacity was due to the shearing of the solid section (see Figure 11). Regarding the bearing capacity, the loss has been produced at

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the mockup Nr 1 at P = 125 kg and at mockup Nr 2 at P = 100 kg. Other experiments have been conducted with a curved bar exerted to horizontal symmetric forces (Figure 15) and a frame exerted to a horizontal force. Plastic materials allow a study of a wide range of problems, regarding the kind of loss of the bearing capacity. Chromoplasticity makes the direct detection of plastic deformation zones possible which cause the rupture. The experimental results have been checked by theoretical calculations and photo-elastical experimentations. Chromoplastic experiments are very simple and can be accomplished without special devices, except the load arrangement.

There are: 22 photographs, 2 diagrams, 2 graphs and 6 references, 5 of which are Rumanian and 1 Russian.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU, S.; Dinca, F.

The behavior of a straight bar submitted to axial dynamic loads. p. 135. (STUDII SI CERCETARI DE MECANICA APLICATA. Vol. 8, No. 1, Jan/Mar. 1957, Bucuresti, Rumania)

SO: Monthly List of East European Accessions (EEAL) LC. Vol. 6, No. 12, Dec. 1957, Uncl.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU, S

1

647. Rautu, S., Calculation of vibration of frames, with successive approximation (in Rumanian), *Acad. Repub. pop. Rom. Comun.* 6, 2, 291-295, 1956.

Phys

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

Distr: 4F1

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✓4393. Routu, S., Calculation of vibrations by successive approximations (in Russian), *Acad. Repub. Pop. Romane, Rev. Mécan. appl.* 2, 2, 1957.

First part of the paper deals with the dynamic analysis of frames by means of the displacement method.

Second part shows the possibility of using successive approximations for calculating stresses due to dynamic loads. The convergence of the iteration process is demonstrated for any type of structure. The demonstration is also valid for the case of static loads.

Ga

Third part presents a new method for calculating the first frequency of free oscillations.

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Staff, Revue de Mecanique Appliquee
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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU, S.; PETCU, V.; BALAN, S.

Introduction of SDP-1 plastic mass in the study of constructions on small-scale models. p. 903

COMUNICARILE. Bucuresti, Rumania. Vol. 8, no. 9, Sept. 1958

Monthly list of European Accessions (EEAI) LC, Vol. 8, no. 8, Aug. 1959

Uncl.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001444

RAUTU, S.

Asupra Comportării Barei Drepte Sprijinită la Sarcini Dinamice Axiale. S. Răutu and Fl. Dincă. *Stud. Cerc. Mec. Aplic.*, Jan.-Mar., 1957, pp. 135-140. In Rumanian. Study of the behavior of a simply-supported rod subjected to axial dynamic stresses. 26

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014443