method of Ref 1 improves with increase of Z. The results of the present paper were found to agree with experimental values for $Z \leq 6$. The differences between the experimental and the Hartree (self-consistent field) energies for Z from 2 to 6 are given in Ref 6 as -0.0422 to -0.054. The present calculation gives -0.0464 in atomic units, with $e = \hbar = M = 1$. The author thanks V.L. Ginzburg for his advice. There are 12 references, 5 of which are Soviet, 3 American, 2 English, 1 German and 1 translation.

SUBMITTED: December 18, 1957

Card 2/2 1. Electrons 2. Atoms--Energy 2. Atoms--Mathematical analysis 3. Correlation functions

AUTHOR: Kirzhnits, D. A. SOV/56-34-6-32/51

TITLE: On the Behavior of the Distribution Function of a Many-Particle System Near the Fermi Surface (O povedenii funktsii raspredeleniya sistemy mnogikh chastits vblizi poverkhnosti Fermi)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 6, pp. 1625-1628 (USSR)

ABSTRACT: This paper investigates (in Hartree (Khartri) approximation) the distribution function in the region of the phase space in the neighborhood of the Fermi surface. It deals, concretely spoken, with a system of non-relativistical electrons in a stationary state at zero temperature. The author confines himself to the case where the occupation number depends only on the energy. It is shown that in the neighborhood of the Fermi surface (where $|p - p_0| \sim \sqrt{\xi}\, p_0$) the expression

$$f(\vec{r}, \vec{p}) = 2(2\pi)^{-3}\, \theta(p^2 - p_0^2(\vec{r})), \quad \theta(x) = 1/2(1 - x/|x|)$$

even in the quasiclassical case cannot be used. But it is possible to find an expression for f which can be applied also in the region $|p - p_0| \sim \sqrt{\xi}\, p_0$. It is advantageous to

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On the Behavior of the Distribution Function of a Many-Particle System Near the Fermi Surface

start from the operator expression for f in the Hartree (Khartri) approximation $f(\vec{r}, \vec{p}) = (2\pi)^{-3} 2\left\langle \Theta(p^2 - p_o^2(\vec{r})) \right\rangle_{\vec{p}}$ where it can be written $\left\langle \hat{a} \right\rangle_{\vec{p}} \equiv \exp(-i\vec{p}\vec{r})\hat{a} \exp(i\vec{p}\vec{r})$. for the arbitrary operator $\hat{a}$ The calculations are discussed step by step. In the region near the Fermi surface the rôle of the inhomogeneities becomes very important and therefore the correct expressions for the distribution function obtained in this paper is very different from the expression usually applied. By taking into account the nearest neighborhood of the Fermi surface the problem is complicated very much and it seems to be impossible to obtain a closed expression for f. There are 4 references, 3 of which are Soviet.

ASSOCIATION: Fizicheskiy institut im. P.N. Lebedeva, Akademii nauk SSSR (Physics Institute imeni P. N. Lebedev, AS USSR)

SUBMITTED: January 30, 1958

Card 2/2

SOV/56-35-5-21/56

24(5)
AUTHOR: Kirzhnits, D. A.

TITLE: Correlation Energy of an Inhomogeneous Electron Gas (Korrelyatsionnaya energiya neodnorodnogo elektronnogo gaza)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 5, pp 1198-1208 (USSR)

ABSTRACT: Gell-Mann and Brueckner (Brakner) (Ref 2) and others (Refs 1,3) calculated the correlation energy for multiple electron systems with uniform distribution (electron gas in the range of high pressures and low temperatures). As the homogeneous model considerably simplifies actual conditions, the author of this paper investigates the influence of a non-uniform distribution of particles on the electron correlation energy and compares the results obtained by Gell-Mann and others with those obtained for the inhomogeneous model. This influence was found to be so great that the corresponding expressions (Refs 1,2) are not applicable to real systems. The generalization of the main part of the electron correlation energy δE (Ref 2) of a crystal lattice, without taking interaction with lattice oscillations into account, is made for an inhomogeneous system at high pres-

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sures, low temperatures, and large nuclear charge values. Estimates of the correlation energy of uncompressed matter are given. The author finally thanks V. L. Ginzburg, V. P. Silin, Ye. L. Feynberg, and Ye. S. Fradkin for discussions, and L. V. Pariyskaya for carrying out numerical calculations. There are 4 figures and 9 references, 4 of which are Soviet.

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

SUBMITTED: May 21, 1958

24(5) SOV/56-35-6-34/44

AUTHOR: Kirzhnits, D. A.

TITLE: On the Limits of Applicability of the Quasiclassical Equation of State of Matter (O granitsakh primenimosti kvaziklassicheskogo uravneniya sostoyaniya veshchestva)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 6, pp 1545-1557 (USSR)

ABSTRACT: Among others, the Thomas (Tomas)-Fermi method is used for investigating the equation of state (connection between pressure, density, and temperature) of condensed matter; many authors have already studied the application of this method (e.g. Refs 1-3). The non-applicability of this method in the case of weak compression (in the range of low temperatures) as well as its improvement at higher temperatures has hitherto been dealt with only qualitatively in publications. It is therefore of interest to carry out a quantitative investigation extending beyond the limits of pressure- and temperature domains within which the method is still applicable with given accuracy; also the determination of the necessary correction to the quasiclassical equation of state is of interest. To do this is the aim of the present paper. When applying the

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Thomas-Fermi method to the equation of state, operations are carried out with a simplified model (Ref 4) consisting of a spherical cell which contains an immobile nucleus of the charge of Z and Z electrons. The exact quantum-mechanical solution of the problem within the framework of this model is replaced by an approximative investigation carried out by means of the Thomas-Fermi method in form of a quasiclassical approximation to the Hartree (Khartri)-Fok method. First, the initial conditions are mathematically formulated. Next, an expression is derived for pressure in Hartree approximation, and finally the equation of state in quasiclassical approximation according to the Thomas-Fermi model. The next chapters deal with the derivation of the quantum correction to pressure and with the exchange corrections to the equation of state. A formula is explicitly given for the total correction to pressure in consideration of exchange effects. Further, the ratio between quantum- and exchange corrections is investigated, and, finally, these two corrections are investigated for the case of nearly homogeneous distribution. It is shown that in all density- and temperature ranges the quantum- and exchange corrections of low order are negative to pressure. The cor-

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rection ratio never exceeds the value 1/3; for the region of the degenerated electron gas it is 2/9, and in the high temperature region it is 1/3. The boundary of the temperature- and density region, for which the contribution of the quantum correction to pressure is small and to which the Thomas-Fermi method is applicable, is given. For an assumed accuracy of $\delta_1 = 0.1$ the following is given for limit pressure: $P > 10^6 Z^{19/3}$ atm. In conclusion, the author thanks V. L. Ginzburg, Ye. L. Feynberg and Ye. S. Fradkin for discussions, and L. V. Pariyskaya for carrying out numerical computations. There are 4 figures and 11 references, 5 of which are Soviet.

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

SUBMITTED: July 17, 1958

24 (5)

AUTHOR: Kirzhnits, D. A. SOV/56-37-2-53/56

TITLE: The Energy of a Compressed Non-perfect Fermi Gas

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 2(8), pp 585-587 (USSR)

ABSTRACT: The author investigates a homogeneous degenerated Fermi gas, the particles of which are in interaction according to a close range law. The average distance between the particles is assumed to be small in comparison with the effective radius of the forces. Treatment of so simple a model is of interest for the problems of nuclear matter and astrophysics. The energy ϵ depends on the dimensionless "compressibility parameter" $\xi = ap_0 \gg 1$ and on the coupling constant $\alpha = V(0)/a$. $p_0 = (3\pi^2\rho)^{1/3}$ - the Fermi momentum, ρ - particle density. The kinetic energy of the non-relativistic gas is $3p_0^2/10$; the non-exchange part of the interaction energy in Hartree-Fock approximation is $\epsilon_1 = (\rho/2)\int V d\vec{r} \sim \alpha\xi p_0^2$, its exchange term: $\epsilon_2 = -(8\pi^3\rho)^{-1} d\vec{p}_1 d\vec{p}_2 (\vec{p}_1 - \vec{p}_2)$, $p_{1,2} < p_0$. This term in the case of small r depends on V. If V(0)

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is finite, $\varepsilon_2 = -V(0)/2 \sim \alpha p_0^2/\xi^2 \ll \varepsilon_1$ holds. For the purpose of describing the correlation energy the terms of second order in α (perturbation theory) are used. The well-known formula by Gell-Mann and Brueckner is simplified for $\alpha\xi \ll 1$, as well as for the more important case in which $\alpha\xi \gg 1$ (but $\alpha/\xi \ll 1$): $\varepsilon_3 = -4(1 - \ln 2)\pi^2 C \ln(\xi/\alpha) \sim \alpha^2 (p_0/\xi)^2 \ln\xi$. The results are discussed. Even for a highly compressed non-perfect gas the correlation energy is low and the Hartree-Fock approximation is satisfactory. In the following, the equation of state of such a gas and the cases when $\int V d\vec{r} < 0$ and $\int V d\vec{r} > 0$ are discussed. There is 1 reference.

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

SUBMITTED: May 25, 1959

KIRZHNITS, D.A.

Internal structure of superdense stars. Zhur.eksp.i teor.fiz. 38 no.2:503-508 F '60. (MIRA 14:5)

1. Fizicheskiy institut im. P.N.Lebedeva Akademii nauk SSSR.
(Stars)

KIRZHNITS, D., kand.fiz.-mat.nauk

White dwarfs. Znan.sila 35 no. 11:33-36 N '60. (MIRA 13:12)

(Stars)

KIRZHNITS, D.A.; FAYNBER, V.Ya.; FRADKIN, Ye.S.

Structure of Green's function of a photon. Zhur. eksp. i teor. fiz. 38 no.1:239-242 Jan '60. (MIRA 14:9)

1. Institut im. P.N.Lebedeva AN SSSR.
(Potential, Theory of) (Photons)

Kirzhnits, D. A.

82023
S/056/60/038/02/27/061
B006/B011

3.1560

AUTHOR: Kirzhnits, D. A.

TITLE: On the Inner Structure of Super-dense Stars

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 2, pp. 503 - 508

TEXT: The author investigated the problem of the state of matter in white dwarf stars (in which matter is usually treated as plasma due to the high density of 10^9 g/cm^3 and the existence of a relativistic degenerate electron gas). The special features of a condensed-state plasma phase transition are investigated, and considerations are made concerning the rate at which nuclear processes take place. For reasons of simplicity, matter in highly compressed stars is regarded as an ideal homogeneous electron gas (background), whose charge compensates that of positive nuclei. The author concluded that the interior of white dwarfs is in the condensed state, and it is shown that this state has a considerable influence upon the rate of nuclear processes (p-p reactions) and the

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chemical composition of the stars. The change in the kinetic mechanism of the process is especially marked, as compared with a plasma. A few problems concerning the hydrogen content are discussed by way of introduction. Studies made by Wildhack and Ya. B. Zel'dovich would make the hydrogen content appear as being some 10%, which seems impossible even in condensed white dwarfs. As is shown in the present paper, a hydrogen content of the order of some per cents (in the case of the plasma model $< 10^{-3}$%) is, however, possible. Theoretical considerations are based on the following experimental data: density $\varrho = 10^6 g/cm^3$, temperature 10^7 degrees, mean atomic number $Z = 10$. The paper proper consists of two parts. In the first one, the phase transition in super-dense matter is theoretically investigated by first seeking the density- and temperature range (in which the condensed phase is stable) for a substance in the condensed phase containing only one type of nucleus. It is found that the following condition must be satisfied for the existence of a condensed phase: $R/a_0 = 3.8 \cdot 10^{-2} \ll 1$, $R/A_0 = 1.4 \cdot 10^5 \gg 1$.

($R = (3\eta ZM/4\pi\varrho)^{1/3}$, M - proton mass, η - ratio between atomic weight

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and Z, $a_0 = \hbar^2/me^2$, $A_0 = \hbar^2/\eta MZ^3e^2$). It is further pointed out that in the case under consideration, condensation heat must be emitted during the star evolution. This energy source is of great importance in the theory of star evolution. Finally, the case is discussed in which a star containing protons in addition to nuclei with Z = 10, and it is shown that their concentration attains $\approx 1\%$. The following part of the paper under review studies the rate of the reaction $p+p = d+e^+ + \nu$, for which the following expression is given: $q' \sim \overline{\sigma' v}\, n^2$ (σ' - cross section, n - proton concentration). The rate of nuclear processes is found to be much lower (compared to that in a plasma), and the proton concentration can reach ten times the amount of a plasma. The author finally thanks Academician I. Ye. Tamm, V. L. Ginzburg, and I. S. Shklovskiy for interest displayed and advice given, as well as S. A. Kaplan and N. N. Pariyskiy for their discussions. There are 1 figure and 8 references: 4 Soviet, 1 German, and 3 American.

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On the Inner Structure of Super-dense Stars

82023
S/056/60/038/02/27/061
B006/B011

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

SUBMITTED: August 8, 1959

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83586
S/056/60/038/005/019/050
B006/B070

24.6510

AUTHORS: Vagradov, G. M., Kirzhnits, D. A.

TITLE: The Theory of Nuclear Matter 19

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 5, pp. 1499-1506

TEXT: The authors wanted to develop a simple method for the quantitative description of the ground state of nuclear matter. As usual, nuclear matter is considered to be an infinite, homogeneous system of protons and neutrons, in which only the nuclear forces act - strong, short-range repulsive (range of action c) and weak, long-range attractive forces. In the interactions of nucleons, two facts are of basic significance : the Pauli principle (virtual transitions inside the Fermi sphere are forbidden) and the low probability that three or more nucleons collide on account of the smallness of ρc^2, so that in collisions the pair correlations of nucleons play the principal role. In the introduction, the authors briefly discuss the method of Brueckner and others, which, however, appears to be too complicated for the present purpose. Also the work of Weisskopf and

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The Theory of Nuclear Matter

S/056/60/038/005/019/050
B006/B070

others, whose purpose was to simplify the mathematical apparatus, contains additional complications which are superfluous and may be eliminated, as the authors have shown. Following the considerations of Weisskopf and others (Ref. 2), the authors likewise start from the Hamiltonian $\hat{H} = \sum_i \hat{p}_i^2/2M + \sum_{i<j} v_{ij}$. The attractive forces v_{ij} are assumed to be of the Serber type. The authors then endeavour to determine the energy ε carried by one nucleon, as a function of the limiting momentum p_0. While the kinetic part of ε is simply given by $\varepsilon_1 = 3p_0^2/10\,M$, the interaction energy ε_2 is given by $\varepsilon_2 = \frac{p_0^2}{M}\left\{\frac{\gamma}{\pi} + \frac{6(11-2\ln 2)}{35\pi^2}\gamma^2 + (0.13 + \frac{1}{2\pi})\gamma^3 + \ldots\right\}$ The error $\delta_1\varepsilon_1$, due to neglect of the three-particle correlation, is calculated to be $\sim$2 Mev. This is true for the first case considered where the attractive potential v_a vanishes ($\gamma = \alpha p_0 = 0.59$, dilute Fermi gas). By use of the Hartree-Fok method, an expression for the interaction energy is obtained also for the second case where $v_a \neq 0$, (compressed Fermi gas). Here, $\delta_2\varepsilon$ is found to be $\sim$-1 Mev. In the following, the correction $\delta_3\varepsilon$

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S/504/61/016/000/001/003
D051/D113

AUTHOR: Kirzhnits, D.A.

TITLE: Contribution to the statistical theory of many particles

SOURCE: Akademiya nauk SSSR. Fizicheskiy institut. Trudy, v. 16, 1961. Nekotoryye voprosy teoreticheskoy fiziki, 3-49.

TEXT: The application of the Thomas-Fermi method in its quantum-mechanical interpretation by Dirac and the corrections to the method when the conditions of its application are disturbed, are examined. Within this framework, the study mainly concerns the problem of calculating the full energy of a non-compressed atom. Using a suitable expression for quantum correction, this energy could be calculated either by expanding it into a series according to the quantum parameter or by following the direct variational method used by N.D.Sokolov (ZhETF, 8, 365 [1938]). The second method, which is simpler and more correct, was preferred. The investigation was developed as follows: The Hartree-Fock equations were written in operator form by

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S/504/61/016/000/001/003
D051/D113

Contribution to the statistical theory ...

introducing an operator of occupation closely connected with the level occupation numbers and the distribution function. Some general properties of the distribution function were studied in the Hartree approximation; quantum corrections for density and energy of the relative order (for an atom) $Z^{-2/3}$ and $Z^{-1/3}$ were found. Studying exchange effect, it was shown that the mixed exchange-quantum correction has the relative order $Z^{-4/3}\ln Z$. Exchange and quantum corrections for the relativistic Thomas-Fermi model were found; the difficulty of the ratio $1/x^2$ was considered and the correlation effects for a Coulomb system, particularly for an atom, examined. The essential role of non-uniformity of the system was clarified. The relative order of correlation correction $Z^{-7/6}$ in the presence of a small numerical coefficient was studied and the full energy of an isolated neutral atom shell calculated. The discrepancy with experiment was reduced from 62-23% (Thomas-Fermi-Dirac method) to 13-5% (for Z=2÷54). In an appendix, a systematic exposition of the calculation rules, which govern the functions of non-commuting variables is given. There are 2 figures and 2 tables.

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Contribution to the statistical theory ... S/504/61/016/000/001/003
D051/D113

Abstractor's note: the paper is a dissertation for the degree of Candidate of Physics and Mathematics, defended at the Fizicheskiy Institut im. P.N.Lebedeva AN SSSR (Physics Institute imeni P.N.Lebedev, AS USSR) on April 29, 1957.

Card 3/3

KIRZHNITS, D., kand.fiziko-matematicheskikh nauk

Neutron stars. Znan.sila 36 no.3:36-38 Mr '61. (MIRA 14:3)
(Stars) (Neutrons)

KIRZHNITS, D.A.; SMOLYANSKIY, S.A.

Relativistic model of the field theory which admits an exact solution. Zhur.eksp.i teor.fiz. 41 no.1:205-208 Jl '61. (MIRA 14:7)

1. Institut im. P.N.Lebedeva AN SSSR.
(Quantum field theory)

KIRZHNITS, D.A.

Statistical theory of many particles. Trudy fiz. inst. 16:3-49 '61. (MIRA 15:2)

(Quantum theory)

S/056/62/043/004/026/061
B108/B186

AUTHORS: Vagradov, G. A., Kirzhnits, D. A.

TITLE: Statistical nuclear model accounting for correlations

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 4(10), 1962, 1301 - 1307

TEXT: A method previously proposed (ZhETF, 35, 1499, 1960) is used in considering strong correlation effects in the real interaction potential. The pair interaction potential is split into a sum of two potentials. To one of these (attraction) the Hartree-Fock approximation is applied, the other is treated in gas approximation. To account for inhomogeneity of nuclear matter, the kinetic energy is expanded in terms of an arbitrary function ϱ. In the case of heavy nuclei it is sufficient to consider only the first term which has the form $\int d\vec{r} f_0(\varrho(r))$. The same holds for the correlation energy. The function ϱ can be found by variation. So calculating the total nuclear energy leads to an expression in the form of Weizsäcker's formula: $E/A = U_{vol} + \varepsilon^2 U_{symm} + \frac{Z^2}{A^{4/3}} U_{Coul} + U_{surf}/A^{1/3}$. The

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coefficients in this formula are calculated by variation: $U_{surf} \approx 21$ Mev, $U_{symm} \approx 30$ Mev. U_{vol} was considered in the paper mentioned above. U_{Coul} coincides with its empirical value. There is 1 figure.

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

SUBMITTED: March 7, 1962 (initially),
May 9, 1962 (after revision)

KIRZHNITS, D.A.

Theory of nonlocally interacting fields. Part 2: The dynamic apparatus of the theory. Zhur. eksp. i teor. fiz. 45 no.2: 143-154 Ag '63. (MIRA 16:9)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.
(Field theory)

KIRZHNITS, David Abramovich; KALYUZHNAYA, T.P., red.; VLASOVA, N.A., tekhn. red.

[Field methods in the theory of many particles] Polevye metody teorii mnogikh chastits. Moskva, Gosatomizdat, 1963. 343 p. (MIRA 16:8)
(Quantum theory)

ACCESSION NR: AT4041499 S/2910/63/003/01-/0079/0092

AUTHOR: Alyamovskiy, V. N., Kirzhnits, D. A.

TITLE: Collective excited states of heavy atoms

SOURCE: AN LitSSR. Litovskiy fizicheskiy sbornik, v. 3, no. 1-2, 1963, 79-92

TOPIC TAGS: quantum mechanics, excited state, collective excited state, heavy atom, heavy atom excitation, excitation spectrum, electron hole, plasmon, quantum field theory, electron density

ABSTRACT: The energy spectrum of a weakly coupled, multi-particle system contains single-particle levels as well as levels corresponding to the simultaneous excitation of a large number of levels. Single-particle excitation can be treated as the appearance of a particle-hole pair which are not coupled, while a collective excitation state (plasmon) corresponds to the coupled particle-hole creation. The wave function of such a system can be written by superposition of the wave function of the single-particle state. Formulation of the general conditions for the existence of plasmon shows that these are not satisfied

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ACCESSION NR: AT4041499

by a heavy ($Z \gg 1$) atom due to the fact that the atom is a bounded and inhomogeneous system. Assuming that plasmon can exist in an atom locally, i.e. where there is a large concentration of particles, the quantum field theory is used to study its characteristics. It is shown that no wave function exists which can be assigned to the plasmon. This means that even if, in the energy sense, plasmon can be treated as an independent quasi-particle, this cannot be done when its internal structure is considered. The region of $\hbar\omega$ in which the plasmon levels can exist is determined and is shown in Fig. 1 of the Enclosure. This assumes a uniform electron density function and the notation used is as follows: $y = k/p_0$ (k = plasmon wave number, $p_0 = 0.78\hbar\, Z^{2/3}/a_0$ is the maximum Fermi momentum, and a_0 = Bohr radius), $\xi = w/w_L$ (w_L = 12.1Z electron volts). For Z = 44, $y_{cr} = 0.3$, $\xi_{cr} = 1.66$ and for z = 85, $y_{cr} = 0.25$, $\xi_{cr} = 1.71$, which shows that the w-region is relatively narrow. It is also shown that the spectrum of the collective excitation of a realistic atom reduces to a single energy level which corresponds to a single p-state. The energy of this state is 17 Z ev which, for heavy atoms, is of the order of 1 kev. "The authors are indebted to Ye.L. Feynberg for his critique of several problems considered in this work." Orig. art. has: 5 figures and 31 formulas.

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ACCESSION NR: AT4041499

ASSOCIATION: Fizicheskiy institut im.. P. N. Lebedeva Akademii Nauk SSSR.(Institute of Physics, Academy of Sciences,SSSR)

SUBMITTED: 00 ENCL: 01

SUB CODE: GP NO REF SOV: 005 OTHER: 004

Card 3/4

ACCESSION NR: AT4041499 ENCLOSURE: 01

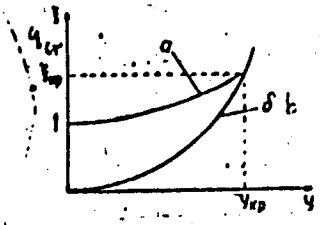

Fig. 1. Plasmon energy region: $0 < y < y_{cr}$, $1 < \zeta < \zeta_{cr}$:

a) Collective branch

b) Upper boundary of the single-particle spectrum.

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KIRZHNITS, D.A.

Field theory with nonlocal interaction. Part 3: Diagram technique. Zhur. eksp. i teor. fiz. 45 no.6:2024-2037 D '63. (MIRA 17:2)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

ACCESSION NR: AP4012571 S/0056/64/046/001/0397/0398

AUTHORS: Ginzburg, V. L.; Kirzhnits, D. A.

TITLE: Superconductivity of electrons in surface levels

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 397-398

TOPIC TAGS: superconductivity, surface superconductivity, surface electron, surface electron state, surface electron level, Cooper effect, Cooper pairs, metal superconductivity, dielectric superconductivity

ABSTRACT: The question is raised whether the Cooper phenomenon (Phys. Rev., v. 104, 1957, 1189) is possible for surface electrons (electrons at surface levels) which, as pointed out by I. Ye. Tamm (Phys. Zs. Sowjetunion, v. 1, 1932, 733), can be localized on crystal surfaces. It is pointed out that an interaction Hamiltonian can be formulated also for the two-dimensional case, that a negative value for the interaction constant cannot be excluded, and that the electrons then pass into a superconducting state. The possible existence of surface superconductivity is also considered for dielectrics. The effect of a magnetic field on surface conductivity is qualitatively considered. Orig. art. has: 3 formulas.

Card 1/2

ACCESSION NR: AP4012571

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

SUBMITTED: 26Nov63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: PH NO REF SOV: 006 OTHER: 002

Card 2/2

ACCESSION NR: AP4019245 S/0056/64/046/002/0755/0763

AUTHORS: Kirzhnits, D. A.; Polyachenko, V. L.

TITLE: Possibility of macroscopic manifestations of violation of microscopic causality

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 755-763

TOPIC TAGS: relativity, gravitation, cosmology, microscopic causality condition, superluminal signal, special relativity, superluminal sound, gravitational collapse, noncausal theory

ABSTRACT: The possible appearance of superluminal signals in the kinematics of special relativity is discussed. Conditions which the particle mass must satisfy in order for such signals to actually arise are determined, and the propagation of superluminal sound, which acquires a macroscopic character in strongly compressed matter, is described by means of a time-like mass tensor. A field-theoretical model which leads to an unlimited increase in the ratio of the pressure to the energy density and by the same token to an increase in the ratio of the velocity of sound to the velocity of light is

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ACCESSION NR: AP4019245

considered. It is established that sufficiently strong violation of microscopic causality leads to an elimination of the gravitational collapse (to contraction of a body of large mass or of a world to a point). The paper contains an analysis of the principal feasibility of constructing a non-causal theory and of a few macroscopic effects due to non-causality. "The authors are deeply grateful to I. Ye. Tamm and V. L. Ginzburg for reviewing the manuscript and for valuable remarks, to A. D. Sakharov and Ye. L. Feynberg for a discussion of the work, to Ya. B. Zel'dovich for stimulating criticism, and to T. A. Eminadze for discussions which have led to the writing of this paper." Orig. art. has: 22 formulas.

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

SUBMITTED: 25Jul63 DATE ACQ: 27Mar64 ENCL: 00

SUB CODE: PH NO REF SOV: 010 OTHER: 002

Card 2/2

LEZNOV, A.N.; KHZHNITS, D.A.

Field theory with nonlocal interaction. Part 4. Problems of convergence, causality, and gauge invariance. Zhur. eksp. i teor. fiz. 48 no.2:622-631 F '65. (MIRA 18:11)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.

L 15664-66 EWT(m)/T

ACC NR: AP6000213 SOURCE CODE: UR/0056/65/049/005/1544/1555

AUTHOR: Kirzhnits, D. A.

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

TITLE: Nonuniqueness of the solution of the scattering problem

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 5, 1965, 1544-1555

TOPIC TAGS: asymptotic method, dispersion equation, particle interaction, scattering amplitude, relativistic particle

ABSTRACT: The author compares the dynamical, axiomatic, and dispersion method, as applied to the model of scattering of nonrelativistic particles with a point interaction, from the point of view of the uniqueness of the solutions that they provide. At the same time, the nature of the analytic restrictions that appear in each of these methods, the causes of the appearance of extra solutions, and other factors are analyzed. The number of solutions of the corresponding

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L 15664-66

ACC NR: AP6000213

4

equations are determined, along with the analytic properties of the scattering amplitude and the reasons for the appearance of extra solutions. Instead of using the usual asymptotic formulations, the author changes over to equations that contain differentiation with respect to the charge, such as used in nonlocal theory. The quasi-local terms of the axiomatic method are then determined. The solutions of the resulting equations in all the methods are discussed, along with an additional solution that arises in the axiomatic method. The results are summarized in the form of a table. The extension of the results to relativistic calculations is briefly discussed. Author thanks I. Ye. Tamm for interest in the work, V. Ya. Faynberg and Ye. S. Fradkin for many discussions, and B. L. Ioffe for a discussion of a number of questions. Orig. art. has: 27 formulas and 1 table.

SUB CODE: 20,12/ SUBM DATE: 03Jun65/ ORIG REF: 010/ OTH REF: 006

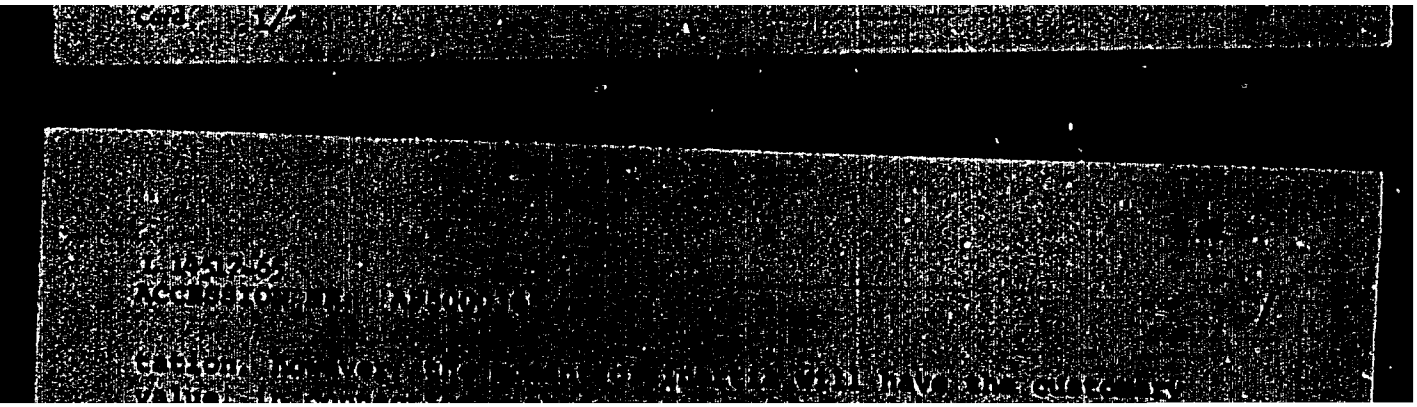
QC

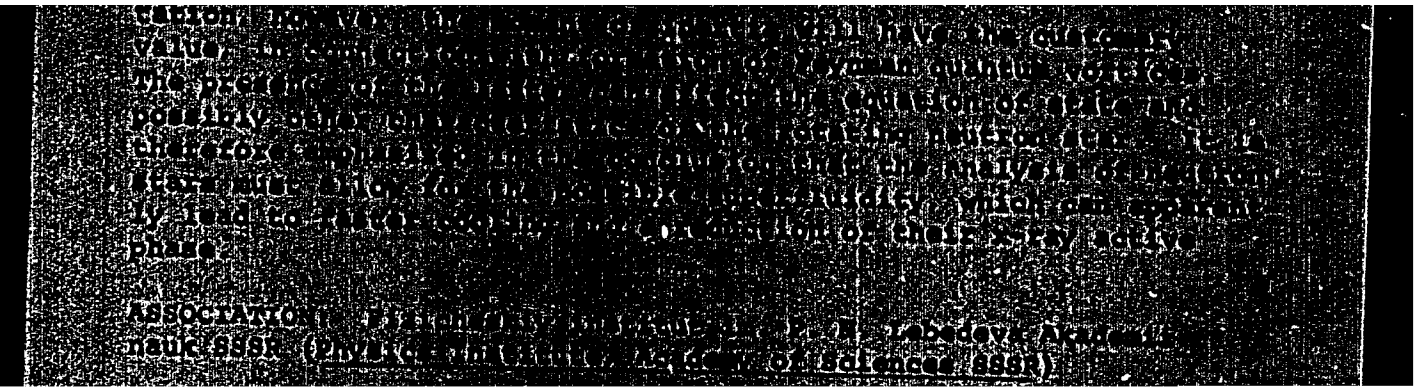
Card 2/2

KIRZHNITS, D.A.

Nonuniqueness of the solution to the scattering problem.
Zhur.eksp. i teor.fiz. 49 no.5:1544-1555 N '65.
(MIRA 19:1)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.





Card 1/2

L 11948-66 EWT(d)/EWT(l)/EWT(m)/EPF(n)-2/EWP(t)/EWP(b) IJP(c) JD/WW/GG

ACC NR: AP6000745 SOURCE CODE: UR/0386/65/002/009/0442/0445

AUTHOR: Kirzhnits, D. A.; Maksimov, Ye. G.

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

TITLE: Critical temperature of thin superconducting films

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 9, 1965, 442-445

TOPIC TAGS: superconductivity, critical point, nonlinear equation, metal film

ABSTRACT: The authors point out in the introduction that calculations for inhomogeneous superconducting systems are greatly hampered by the nonlinearity of the superconductivity-theory equations and most available results pertain to the case of weakly inhomogeneous superconducting systems, the scale of inhomogeneity in which is large compared with the coherence length ξ_0 or with the mean free path l. On the other hand, greater interest is attached from the point of view of experimental confirmation of the existence of the surface superconductivity effect (V. L. Ginzburg and D. A. Kirzhnits, ZhETF v. 46, 397, 1964; V. L. Ginzburg, ibid. v. 47, 2318, 1964) to the opposite case, that of superconductors with small inhomogeneity scale. It turns out that such systems lend themselves to calculations if they are bounded in those directions in which they are inhomogeneous; more accurately, if the corresponding dimensions are small compared with ξ_0 and l. They consider a typical example of "pure" [illegible] with an interaction parameter $\lambda(z)$ which is variable over the

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L 11948-66

ACC NR: AP6000745

thickness, and determine the critical temperature as a whole. They also present calculations for the surface amplification of superconductivity. A common feature of the obtained expressions is the linear-fraction character of the variation of ln T_0 with the film thickness d, similar to the variation observed in the experimental data for aluminum films with oxide coatings. A more detailed comparison with these data calls for reliable estimates of the thickness of the surface layer d_s and the mean free path l. Authors are grateful to V. L. Ginzburg, R. O. Zaytsev, and V. V. Shaidt for numerous discussions. Orig. art. has: 8 formulas.

SUB CODE: 20/ SUBM DATE: 13Sep65/ ORIG REF: 002/ OTH REF: 004

Card 2/2

KAZ EMIT', D.A.; MAKSIMOV, Ye.G.

Critical temperature of thin superconducting films. Fiz. i
red. Chur. eksper. i teoret. fiz. 2 no.9:442-445 N '65.
(MIRA 18:12)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR. Submitted
September 13, 1965.

L 36231-66 EWT(m)/T

ACC NR: AP6024519 SOURCE CODE: UR/0386/66/004/002/0068/0071

21
26
B

AUTHOR: Kirzhnits, D. A.; Liyshits, M. A.

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

TITLE: Contribution to the theory of nonrenormalizable interactions 19

SOURCE: Zh eksper i teor fiz. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 2, 1966, 68-71

TOPIC TAGS: particle scattering, Schroedinger equation, perturbation theory

ABSTRACT: To check whether the difficulties in the theory of nonrenormalizable interactions (NRI) is due to inability to solve the corresponding dynamic equations outside the framework of perturbation thoery or whether these difficulties demonstrate that the equations themselves are unsuitable, the authors use a method previously developed by one of them (Kirzhnits, ZhETF v. 49, 1544, 1965) to analyze the scattering of two nonrelativistic particles in an axiomatic differential (with respect to charge) formulation. The scattering matrix element of the interaction Lagrangian is chosen in the in-representation and the scattering phase shift is determined from an equation derived by L. D. Landau (in: Theoretical Physics in the Twentieth Century, Interscience, 1960, p. 245). Solutions for this equation, which are not derivable from the Schroedinger equation, are found to exist and are obtained. It is shown that a similar situation arises in relativistic scattering with four-fermion interaction,

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Card 2/2

L 41616-66 EWT(1) IJP(c) AT

ACC NR: AP6017863 SOURCE CODE: UR/0053/66/089/001/0039/0047

AUTHOR: Kirzhnits, D. A.; Lozovik, Yu. Ye. 62

ORG: Physics Institute im. P. N. Lebedev, AN SSSR (Fizicheskiy institut AN SSSR) B

TITLE: Plasma oscillations of the electron shell of the atom

SOURCE: Uspekhi fizicheskikh nauk, v. 89, no. 1, 1966, 39-47

TOPIC TAGS: plasma oscillation, electron shell, nuclear shell model, nuclear collision, compound nucleus, oscillator strength

ABSTRACT: This is a review article dealing with the present status of the theory of plasma (collective) oscillations of the atomic shell (atomic plasmon) and the part that it plays in various atomic reactions brought about by electron-atom or atom-ion collisions and by interactions between electromagnetic radiation and the atom. The article reveiws the most recent data on the spectrum of the oscillations (natural frequency, damping, and multipole order), the characteristics describing the probability of excitation of the plasma oscillations (oscillator strengths), and the degree and character of participation of the plasmon in atomic reactions. Many still unanswered questions in connection with all these topics are pointed out and discussed. A microscopic description of plasma oscillations is formulated in terms of the dielectric constant of the atom. Particular attention is paid to a determination of the damping of the plasma oscillations and the ratio of the damping to the frequency. The relation between plasma oscillations and direct nuclear reactions as well as reactions

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L 41616-66

ACC NR: AP6017863 O

proceding via a compound nucleus is discussed. An examination of the available experimental data shows them to be insufficient for unambiguous conclusions, and further experiments are needed, especially on photoatomic reactions with heavy atoms at energies on the order of several kev. Orig. art. has: 7 formulas.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 011/ OTH REF: 015

Card 2/2

L 44704-66 EWT(1)/EWT(m) EWP(t)/ETI LJP(c) WW/JD/GG
ACC NR: AP6031333 SOURCE CODE: UR/0386/66/004/003/0086/0090

AUTHOR: Kirzhnits, D. A.; Nepomnyashchiy, Yu. A.

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

TITLE: Instability of Fermi systems and specific heat of liquid He^3

SOURCE: Zh. eksper. i teoret. fiz. Pis'ma v redaktsiyu. Prilozheniye v. 4, no. 3, 1966, 86-90

TOPIC TAGS: liquid helium, critical point, superfluidity, second order phase transition

ABSTRACT: The authors attempt to explain the disparity between low-temperature data on the specific heat of He^3 and the predictions of the Fermi-liquid theory by assuming that at some still-unattained temperature T_c the system experiences a second-order phase transition, as a result of which the specific heat has a peak of width ΔT near T_c. The anomaly of the specific heat of He^3 is explained on the basis of the fact that the long-range attraction forces are capable also of leading to a phase transition of an essentially different nature, with a value of $\Delta T/T_c$ which is assuredly larger. This calls for a rearrangement of the system not in the "particle-particle" channel, as in the case of superfluidity, but in the "particle-hole" channel; the system goes in this case into a unique spatially-inhomogeneous state. Thus the anomaly under discussion is, so to speak, a certain "precursor" of such a transition. The

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L 44704-66

ACC NR: AP6031333

main premise of the authors' derivations is the instability (against small density variations) of the translation-invariant Green's function, which corresponds in this case not to the minimum energy, but to a stationary point. Since $\Delta T/T_c$ is not small if the proposed explanation is correct, it is necessary to go beyond the framework of the zeroth approximation and to take into account polarization diagrams describing the density fluctuations. Such a calculation is now under way and a detailed exposition of the problems touched upon will be published elsewhere. The authors thank V. L. Ginzburg and the participants of the seminar under his direction for numerous useful discussions. Orig. art. has: 1 figure and 4 formulas.

SUB CODE: 20/ SUBM DATE: 23May66/ ORIG REF: 006/ OTH REF: 006

hs

Card 2/2

ACC NR: AP7005128 SOURCE CODE: UR/0126/66/022/004/0520/0528

AUTHOR: Kirzhnits, D. A.; Maksimov, Ye. G.

ORG: Physics Institute im. P. N. Lebedev (Fizicheskiy institut)

TITLE: Thermodynamic behavior of thin superconducting films

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 4, 1966, 520-528

TOPIC TAGS: thermodynamic characteristic, superconductivity, thermodynamic analysis, electron distribution

ABSTRACT: The calculation of thin films, like that of any other inhomogeneous system, is greatly complicated by the nonlinearity of superconductivity equations. Hence most previous studies pertain to the case of weakly inhomogeneous superconductors whose inhomogeneity scale is large compared with the ordering parameter ζ_0 or the free-path length l. The article deals with an opposite case, namely, that of films whose thickness is low compared with ζ_0 but, of course, high compared with the mean distance between particles. "Pure films" ($l \gg \zeta_0$) with an interaction constant that varies over their thickness are considered, on as-

Card 1/2 UDC: 537.312.62

ACC NR: AP7005128

suming constancy of the characteristics of the normal properties of the substance (effective mass, etc.). The thermodynamic properties of such films are shown to be identical with those of homogeneous bulky specimens (provided that the interaction constant is adjusted to its mean over the film thickness). Some additional solutions of superconduction equations arise, however, owing to film-boundary effects and the inhomogeneity of distribution of electrons across the film. The stability of these additional solutions is relative rather than absolute. The large gradient terms predicted by the Ginzburg-Landau theory (Kirzhnits, D. A., Maksimov, Ye. G. ZhETF, Pis'ma v redaktsiyu, 1965, 2, 442), which would disturb the coincidence between the thermodynamic potentials of the film and the homogeneous specimen, p lay only an insignificant role in this case, since the films are sufficiently thin ($\sim 10^{-6}$ cm). "Thanks are due to V. L. Ginzburg, B. T. Geylikman and the participants in their seminars for discussion of this project and valuable comments." Orig. art. has: 25 formulas.

SUB CODE: 20, 11/ SUBM DATE: 10Feb66/ ORIG REF: 006/ OTH REF: 002

Card 2/2

KIRZNER, I.B.

Application of the method of electromechanical analogies to the theory of galvanometry taking into account and not taking into account the interaction of the electric and mechanical systems. Geofiz. issl. i probl. neftegaz. iuga Sib. plat. no.2:224-227 '62. (MIRA 15:8)

(Galvanometer—Electromechanical analogies)

PROCESSES AND PROPERTIES INDEX

10

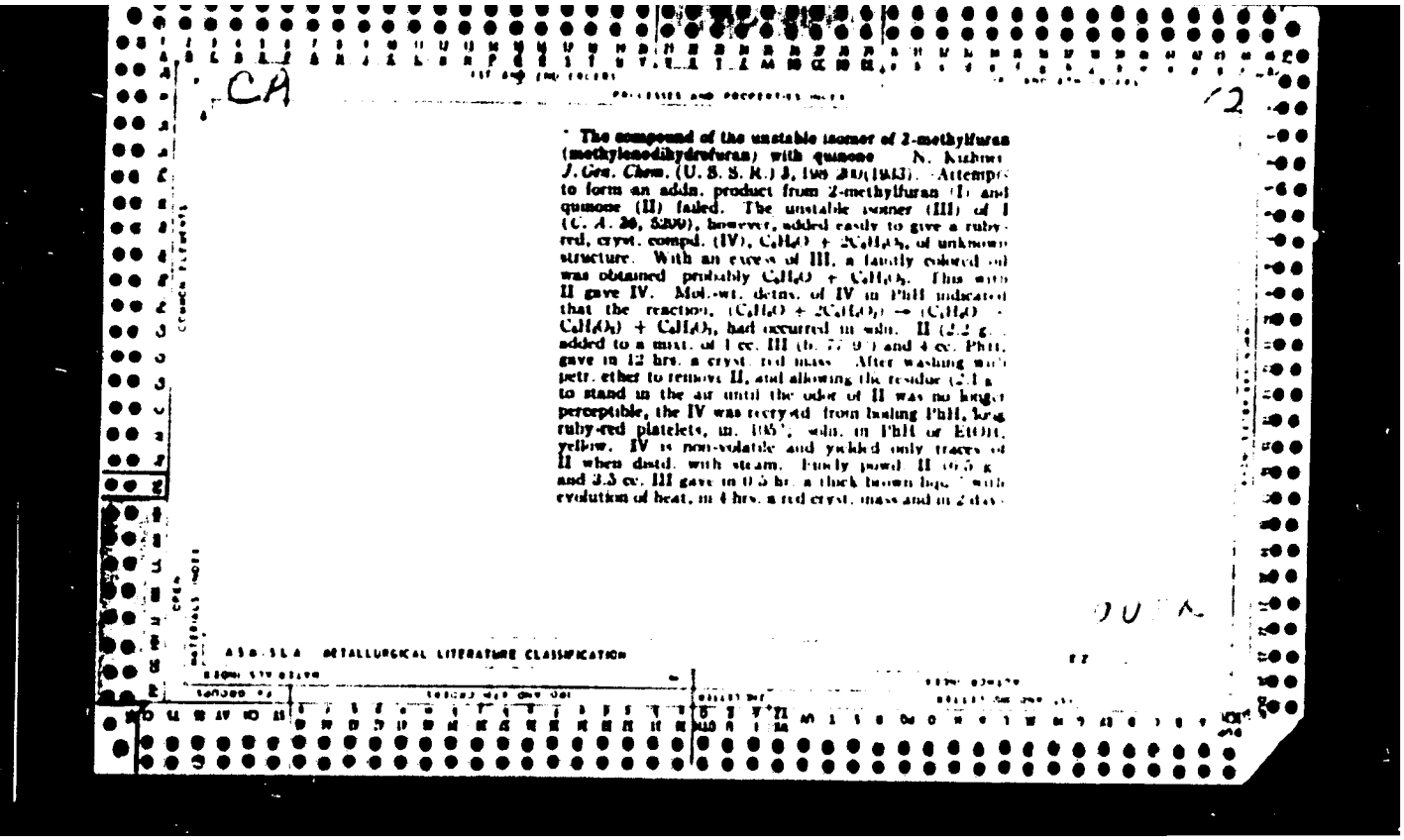
Syntheses of Fast Violet B, its isomer and analogs. N. Kizhner and V. Krasnova
Anilinokrasochnaya Prom. 3, 179-84(1933).—Com. Fast Violet B base (I) (I. G.), freed
from a little NaCl by crystn. from alc., m. 180° and analyzes for $C_{15}H_{16}N_2O_2$. By the
method of degradation it was found to be $H_2N(BzNH)(MeO)C_6H_2Me$, presumably the
5,2,4-deriv. (II), which when synthesized proved to be identical in chem., phys. and
tinctorial properties with I. The influence of isomerism on the color was studied by
synthesizing 1,3,4,6-$MeC_6H_2(NHBz)(OMe)NH_2$ (III) and 1,3,4,6-$MeC_6H_2(NHBz)$-
$(OEt)NH_2$ (IV), which when diazotized and coupled with Naphthol AS produced dyeings
of only faintly more bluish tint. By substituting Cl for the Me group and 2 Cl for
the Me and OMe groups in II were obtained, resp., 1,3,4,6-$ClC_6H_2(NHBz)(OMe)NH_2$
(V) and 1,3,4,6-$ClC_6H_2(NHBz)(Cl)NH_2$ (VI), V giving with Naphthol AS red-violet

OVER

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

and VI bluish red dyeings. Methods for the prepn. of the dyes and some intermediates are not described in the literature or patents. *Prepn. of* II (I). 1,2,4-$MeC_6H_3(NH_2)OMe$ (VII) (Lyons and Smith, *C. A.* 21, 1637) was converted to 1,2,4-$MeC_6H_3(NHAc)OMe$ (VIII), m. 95.5°, with 23-g. yield by mixing 27.4 g. (0.2 mol.) VII in 100 cc. 100% AcOH with 60 g. Ac_2O, letting the mixt. stand 12 hrs. at room temp., pouring on ice water and filtering; 14 g. VIII in 60 cc. concd. H_2SO_4 nitrated at 3° gave 15 g. 1,2,4,5-$MeC_6H_2(NHAc)(OMe)NO_2$ (IX), m. 130°; 20 g. IX sapond. with 240 cc. 5% NaOH produced 10 g. 1,2,4,5-$MeC_6H_2(NH_2)(OMe)NO_2$ (X), m. 160°. 1,2,4,5-$MeC_6H_2(NHBz)(OMe)NO_2$ (XI), m. 197°, resulted from adding 18 g. BzCl at 20° to a mixt. of 12 g. X, 100 cc. Et_2O and 120 cc. 20% Na_2CO_3, stirring the mixt. 5 hrs., then letting it stand 12 hrs., evapg. the Et_2O, filtering off the ppt. and drying. 8 g. II, m. 180°, was obtained by adding 16 g. Zn dust to a mixt. of 8 g. XI, 80 cc. alc. and 240 cc. 5% HCl in a boiling water bath, filtering the hot mixt., letting the filtrate cool, filtering off the HCl salt of II, decompg. it with 4% NaOH, filtering, washing and drying. II gives with Ac_2O an Ac deriv., m. 240°. *Prepn. of* III. 1,3,4,6-$MeC_6H_2(NH_2)(OMe)NO_2$, m. 132° (Limpach, *Ber.* 22, 790(1889)) (30 g.), produced 27.5 g. Bz deriv., m. 123°, 10 g. of which, reduced with Zn dust, gave 8 g. III, m. 176°. *Prepn.* of IV. 1,3,4-$MeC_6H_3(NH_2)OEt$ was acetylated, then nitrated (m. 155°) and sapond. to 1,3,4,6-$MeC_6H_2(NH_2)(OEt)NO_2$ (XII), m. 93°; 8 g. XII gave 11.5 g. Bz deriv., m. 158°, 10 g. of which, when reduced, gave 6 g. IV, m. 120°. From 18 g. 1,3,4,6-$ClC_6H_2(NH_2)(OMe)NO_2$, m. 132° (Ger. pats. 121,304, 137,956, 151,080) was obtained 23 g. Bz deriv., m. 142°, 14 g. of which produced on reduction 11 g. V, m. 152.5°. VI, m. 179.5° (Brit. pat. 361,909, *C. A.* 27, 1184), was prepd. from 1,3,4,6-$ClC_6H_2(NH_2)(Cl)NO_2$, m. 155.5° (*Ber.* 38, 3514(1905)), by benzoylating (m. 151°) and then reducing the Bz deriv. All products were purified by crystg. from hot or cold alc.

Chas. Blanc



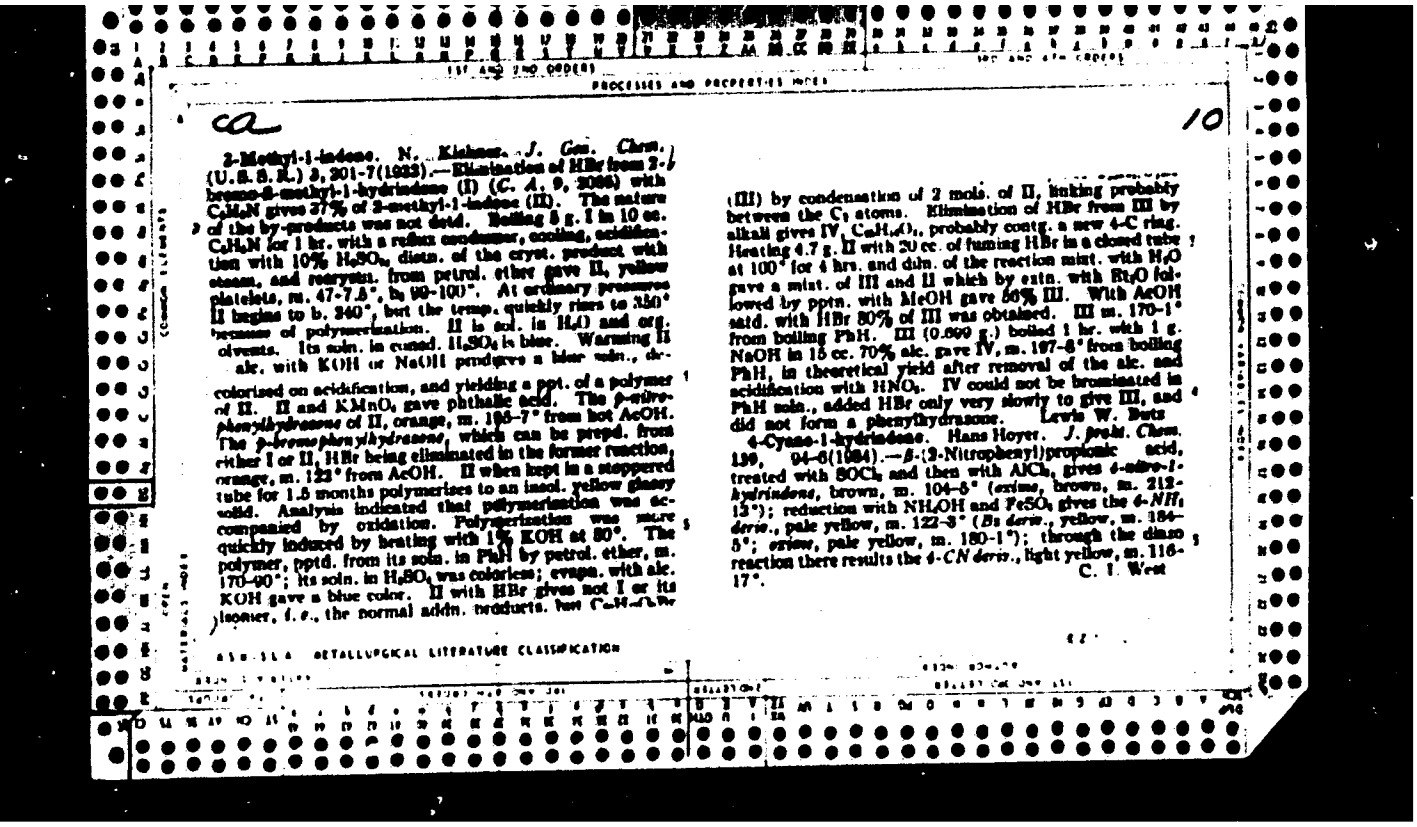
CA

12

The compound of the unstable isomer of 2-methylfuran (methylenedihydrofuran) with quinone. N. Kizhner. *J. Gen. Chem.* (U. S. S. R.) 3, 199-210 (1933). Attempts to form an addn. product from 2-methylfuran (I) and quinone (II) failed. The unstable isomer (III) of I (C. A. 26, 5200), however, added easily to give a ruby-red, cryst. compd. (IV), $C_4H_6O + 2C_6H_4O_2$, of unknown structure. With an excess of III, a faintly colored oil was obtained probably $C_4H_6O + C_6H_4O_2$. This with II gave IV. Mol.-wt. detns. of IV in PhH indicated that the reaction, $(C_4H_6O + 2C_6H_4O_2) \rightarrow (C_4H_6O + C_6H_4O_2) + C_6H_4O_2$, had occurred in soln. II (2.2 g.) added to a mixt. of 1 cc. III (b. 77-9°) and 4 cc. PhH gave in 12 hrs. a cryst. red mass. After washing with petr. ether to remove II, and allowing the residue (2.1 g.) to stand in the air until the odor of II was no longer perceptible, the IV was recryst. from boiling PhH, long ruby-red platelets, m. 105°, sol. in PhH or EtOH, yellow. IV is non-volatile and yielded only traces of II when distd. with steam. Finely powd. II (0.5 g.) and 3.5 cc. III gave in 0.5 hr. a thick brown liquid with evolution of heat, in 4 hrs. a red cryst. mass and in 2 days

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

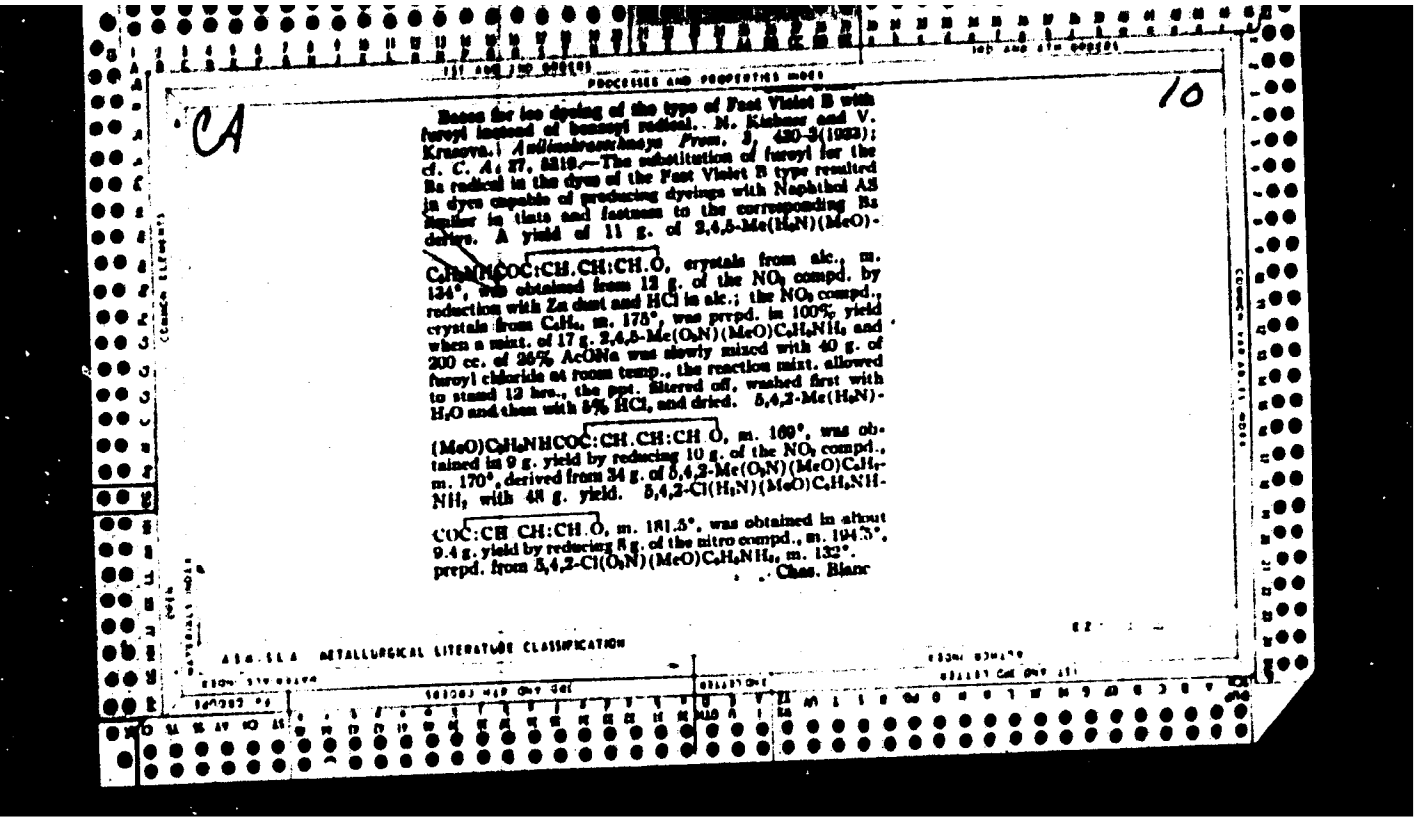
a solid product which after prolonged evacuation to remove II gave 8.5 g. IV (theoretical 8.97 g.). Addn of petr. ether to a soln. of 1 g. II in 2 cc. III and 2.5 cc. PhH gave a thick brown oil, which with more II gave IV. IV in EtOH acidified with HCl liberates I, from KI equiv to 1 mol. II. IV is dissolved by FeCl$_3$ soln. with liberation of II. With SO$_2$ or by boiling with 5% H$_2$SO$_4$, IV gives hydroquinone. III combines also with toluquinone, but a cryst. substance could not be obtained. Toluquinone (2.4 g.) and 1 cc. III gave after several hrs. an orange soln. which became reddish orange on the 2nd day. Addn of petr. ether to this soln. gave a reddish orange oil which could not be cryst'd. Lewis W. Butz



ca 10

2-Methyl-1-indone. N. Kishner. *J. Gen. Chem.* (U.S.S.R.) 3, 201-7(1933).—Elimination of HBr from 2-bromo-3-methyl-1-hydrindone (I) (*C. A.* 9, 2066) with C_5H_5N gives 37% of 2-methyl-1-indone (II). The nature of the by-products was not detd. Boiling 5 g. I in 10 cc. C_5H_5N for 1 hr. with a reflux condenser, cooling, acidification with 10% H_2SO_4, distn. of the cryst. product with steam, and recryst. from petrol. ether gave II, yellow platelets, m. 47-7.5°, b. 90-100°. At ordinary pressures II begins to b. 240°, but the temp. quickly rises to 350° because of polymerization. II is sol. in H_2O and org. solvents. Its soln. in cons. H_2SO_4 is blue. Warming II alc. with KOH or NaOH produces a blue soln., decolorized on acidification, and yielding a ppt. of a polymer of II. II and $KMnO_4$ gave phthalic acid. The *p-nitrophenylhydrazone* of II, orange, m. 196-7° from hot AcOH. The *p-bromophenylhydrazone*, which can be prepd. from either I or II, HBr being eliminated in the former reaction, orange, m. 122° from AcOH. II when kept in a stoppered tube for 1.5 months polymerises to an insol. yellow glassy solid. Analysis indicated that polymerization was accompanied by oxidation. Polymerization was more quickly induced by heating with 1% KOH at 80°. The polymer, ppt'd. from its soln. in PhH by petrol. ether, m. 170-90°; its soln. in H_2SO_4 was colorless; evapn. with alc. KOH gave a blue color. II with HBr gives not I or its isomer, *i.e.*, the normal addn. products, but $C_{10}H_{11}OBr$ (III) by condensation of 2 mols. of II, linking probably between the C_3 atoms. Elimination of HBr from III by alkali gives IV, $C_{20}H_{18}O_2$, probably contg. a new 4-C ring. Heating 4.7 g. II with 20 cc. of fuming HBr in a closed tube at 100° for 4 hrs. and dilg. of the reaction mixt. with H_2O gave a mixt. of III and II which by estn. with Et_2O followed by pptn. with MeOH gave 50% III. With AcOH satd. with HBr 80% of III was obtained. III m. 170-1° from boiling PhH. III (0.600 g.) boiled 1 hr. with 1 g. NaOH in 15 cc. 70% alc. gave IV, m. 197-8° from boiling PhH, in theoretical yield after removal of the alc. and acidification with HNO_3. IV could not be brominated in PhH soln., added HBr only very slowly to give III, and did not form a phenylhydrazone. Lewis W. Butz

4-Cyano-1-hydrindone. Hans Hoyer. *J. prakt. Chem.* 139, 94-6(1934).—*β*-(3-Nitrophenyl)propionic acid, treated with $SOCl_2$ and then with $AlCl_3$, gives *4-nitro-1-hydrindone*, brown, m. 104-5° (*oxime*, brown, m. 212-13°); reduction with NH_4OH and $FeSO_4$ gives the *4-NH₂ deriv.*, pale yellow, m. 122-3° (*Bz deriv.*, yellow, m. 184-5°; *oxime*, pale yellow, m. 180-1°); through the diazo reaction there results the *4-CN deriv.*, light yellow, m. 116-17°. C. I. West

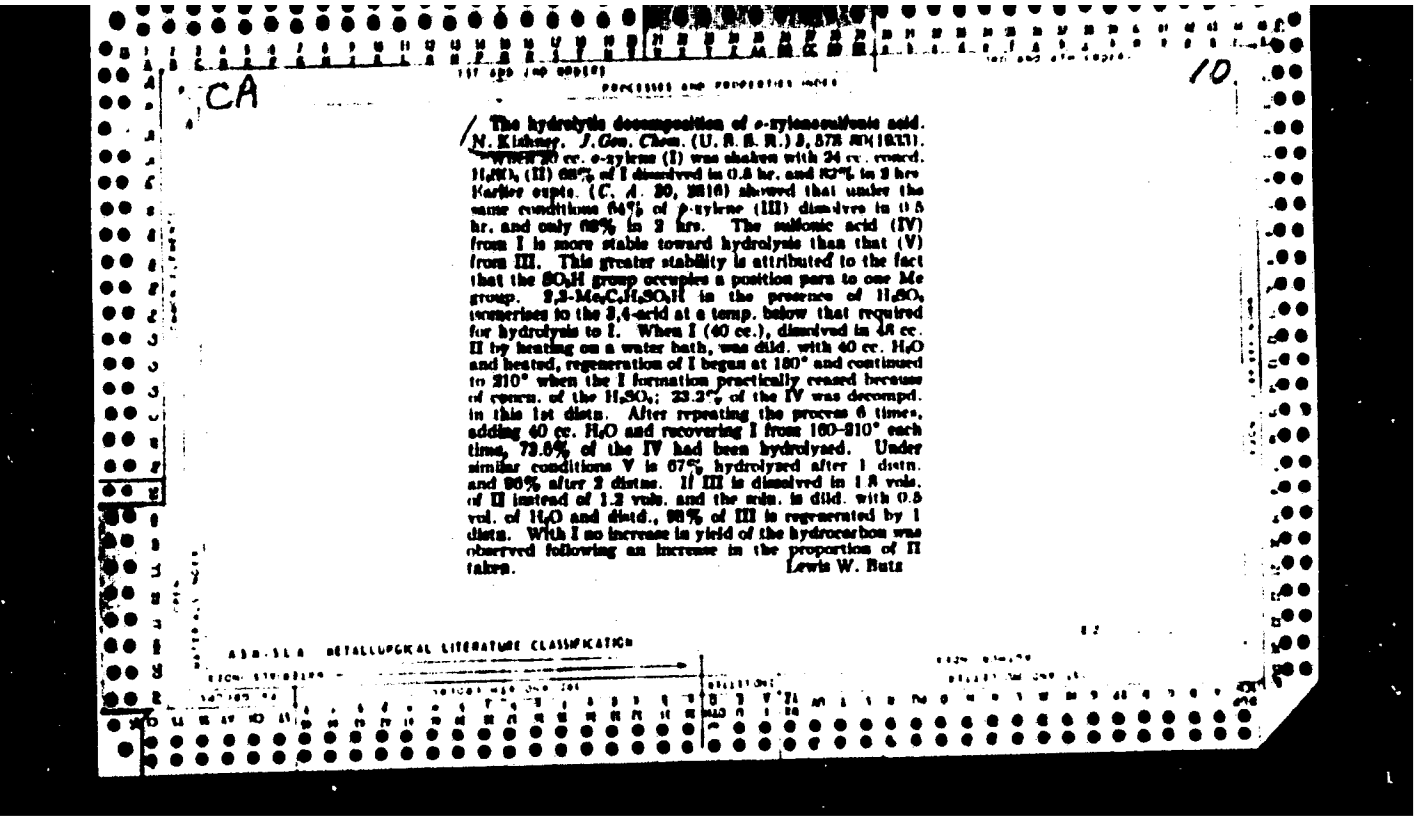


CA

10

Bases for ice dyeing of the type of Fast Violet B with furoyl instead of benzoyl residue. M. Kirkacz and V. Krasova. *Anilinokrasochnaya Prom.* 3, 420-3(1933); cf. C. A. 27, 5819.—The substitution of furoyl for the Bz radical in the dyes of the Fast Violet B type resulted in dyes capable of producing dyeings with Naphthol AS similar in tints and fastness to the corresponding Bz deriv. A yield of 11 g. of 2,4,5-Me(H$_2$N)(MeO)-$C_6H_2NHCOC:CH.CH:CH.O$, crystals from alc., m. 134°, was obtained from 12 g. of the NO$_2$ compd. by reduction with Zn dust and HCl in alc.; the NO$_2$ compd., crystals from C_6H_6, m. 175°, was prepd. in 100% yield when a mixt. of 17 g. 2,4,5-Me(O$_2$N)(MeO)$C_6H_2NH_2$ and 200 cc. of 20% AcONa was slowly mixed with 40 g. of furoyl chloride at room temp., the reaction mixt. allowed to stand 12 hrs., the ppt. filtered off, washed first with H_2O and then with 5% HCl, and dried. 5,4,2-Me(H$_2$N)-(MeO)$C_6H_2NHCOC:CH.CH:CH.O$, m. 160°, was obtained in 9 g. yield by reducing 10 g. of the NO$_2$ compd., m. 170°, derived from 34 g. of 5,4,2-Me(O$_2$N)(MeO)C_6H_2-NH$_2$, with 48 g. yield. 5,4,2-Cl(H$_2$N)(MeO)C_6H_2NH-$COC:CH.CH:CH.O$, m. 181.5°, was obtained in about 9.4 g. yield by reducing 8 g. of the nitro compd., m. 194.5°, prepd. from 5,4,2-Cl(O$_2$N)(MeO)$C_6H_2NH_2$, m. 132°.

Chas. Blanc



CA

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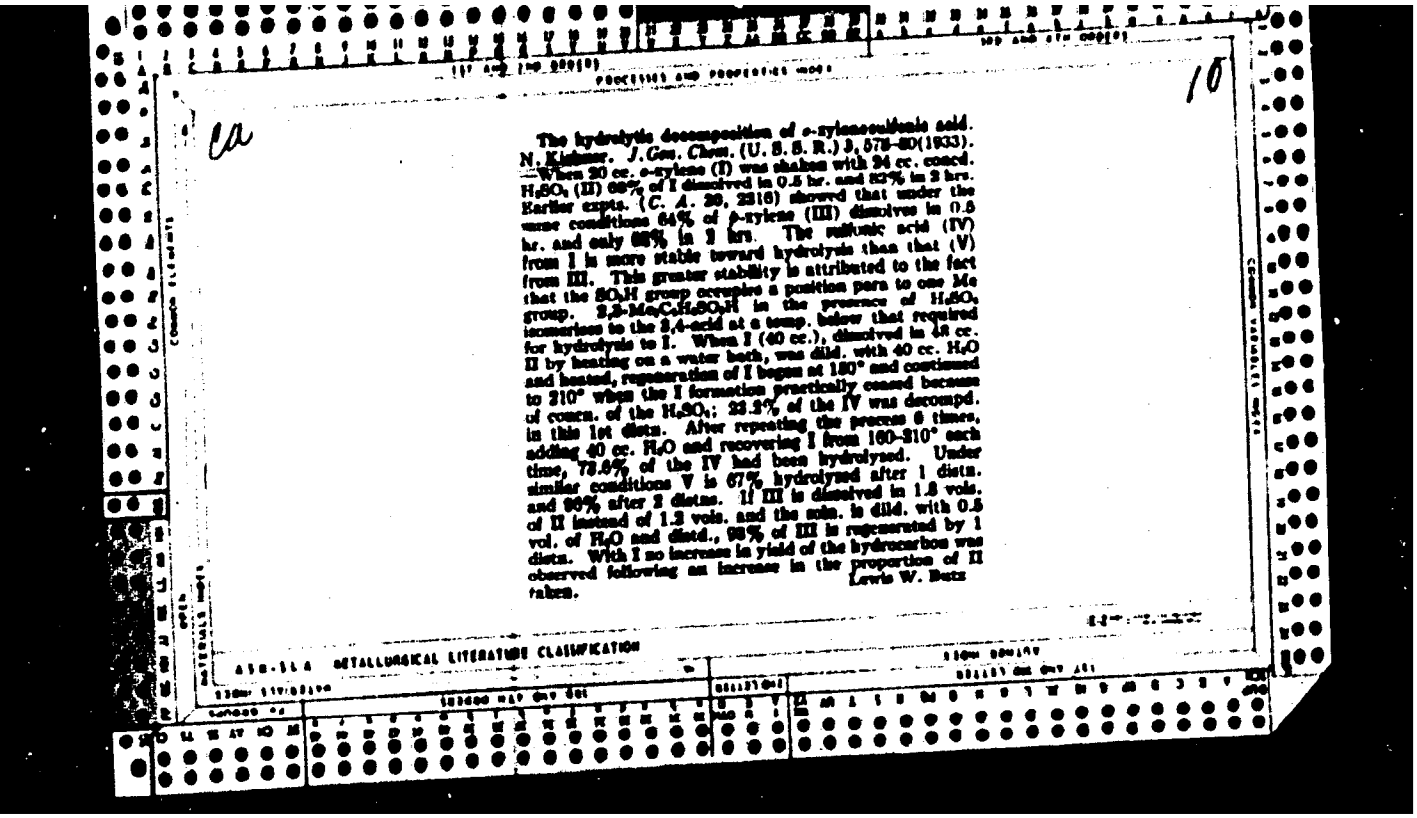
The hydrolytic decomposition of *o*-xylenesulfonic acid. N. Kitaev. *J. Gen. Chem.* (U. S. S. R.) 3, 578 (1933). [illegible] cc. *o*-xylene (I) was shaken with 24 cc. concd. H_2SO_4 (II) 68% of I dissolved in 0.5 hr. and 82% in 2 hrs. Kurbov expts. (*C. A.* 30, 3816) showed that under the same conditions 64% of *p*-xylene (III) dissolves in 0.5 hr. and only 68% in 2 hrs. The sulfonic acid (IV) from I is more stable toward hydrolysis than that (V) from III. This greater stability is attributed to the fact that the SO_3H group occupies a position para to one Me group. 2,3-$Me_2C_6H_3SO_3H$ in the presence of H_2SO_4 isomerizes to the 3,4-acid at a temp. below that required for hydrolysis to I. When I (40 cc.), dissolved in 48 cc. II by heating on a water bath, was dild. with 40 cc. H_2O and heated, regeneration of I began at 180° and continued to 210° when the I formation practically ceased because of concn. of the H_2SO_4; 23.2% of the IV was decompd. in this 1st distn. After repeating the process 6 times, adding 40 cc. H_2O and recovering I from 160–210° each time, 79.6% of the IV had been hydrolyzed. Under similar conditions V is 67% hydrolyzed after 1 distn. and 90% after 2 distns. If III is dissolved in 1.8 vols. of II instead of 1.2 vols. and the soln. is dild. with 0.5 vol. of H_2O and distd., 98% of III is regenerated by 1 distn. With I no increase in yield of the hydrocarbon was observed following an increase in the proportion of II taken.

Lewis W. Butz

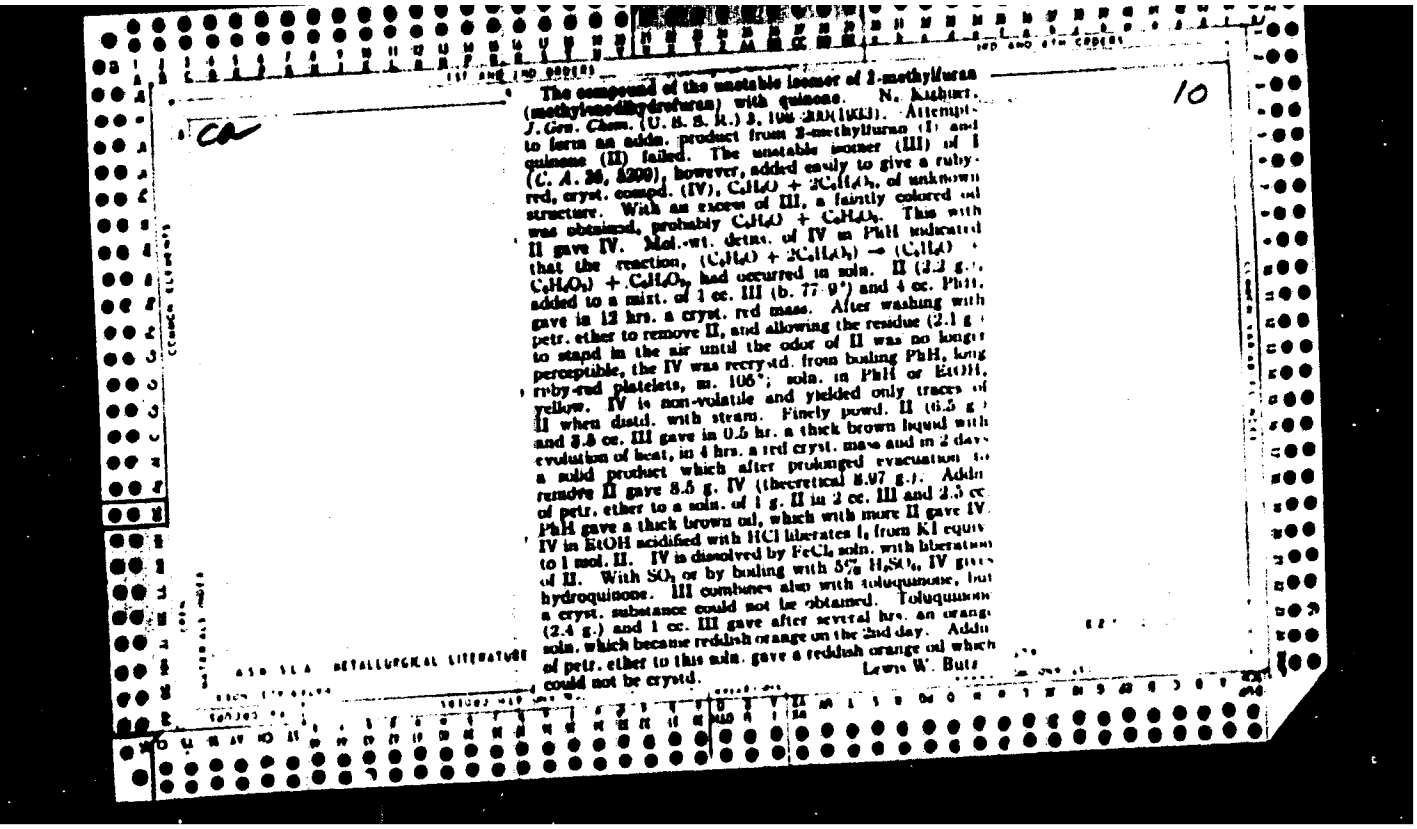
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



10

The hydrolytic decomposition of o-xylenesulfonic acid. N. Kishner. *J. Gen. Chem.* (U. S. S. R.) 3, 578-80(1933). When 20 cc. o-xylene (I) was shaken with 24 cc. concd. H_2SO_4 (II) 68% of I dissolved in 0.5 hr. and 82% in 2 hrs. Earlier expts. (*C. A.* 20, 2316) showed that under the same conditions 64% of p-xylene (III) dissolves in 0.5 hr. and only 68% in 2 hrs. The sulfonic acid (IV) from I is more stable toward hydrolysis than that (V) from III. This greater stability is attributed to the fact that the SO_3H group occupies a position para to one Me group. 2,3-$Me_2C_6H_3SO_3H$ in the presence of H_2SO_4 isomerizes to the 3,4-acid at a temp. below that required for hydrolysis to I. When I (40 cc.), dissolved in 48 cc. II by heating on a water bath, was dild. with 40 cc. H_2O and heated, regeneration of I began at 180° and continued to 210° when the I formation practically ceased because of concn. of the H_2SO_4; 33.3% of the IV was decompd. in this 1st dista. After repeating the process 6 times, adding 40 cc. H_2O and recovering I from 160-210° each time, 73.6% of the IV had been hydrolyzed. Under similar conditions V is 67% hydrolyzed after 1 dista. and 96% after 2 distns. If III is dissolved in 1.5 vols. of II instead of 1.2 vols. and the soln. is dild. with 0.5 vol. of H_2O and distd., 98% of III is regenerated by 1 dista. With I no increase in yield of the hydrocarbon was observed following an increase in the proportion of II taken.

Lewis W. Butz



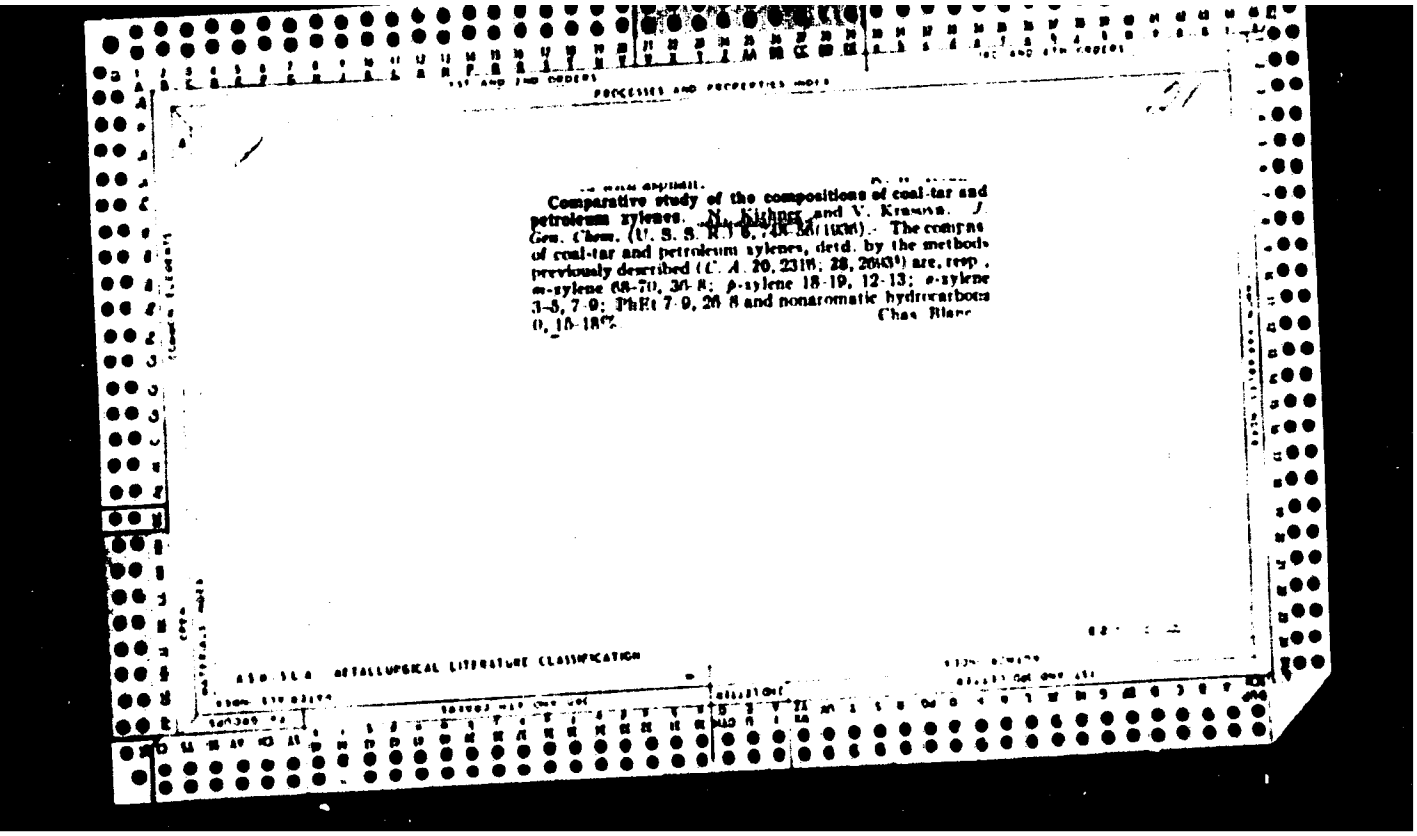
The compound of the unstable isomer of 2-methylfuran (methylmaleic dehydrofuran) with quinone. N. Kizhner. *J. Gen. Chem.* (U. S. S. R.) 3, 1063-8(1933). Attempts to form an addn. product from 2-methylfuran (I) and quinone (II) failed. The unstable isomer (III) of I (*C. A.* 26, 5299), however, added easily to give a ruby-red, cryst. compd. (IV), $C_4H_4O + 2C_6H_4O_2$, of unknown structure. With an excess of III, a faintly colored oil was obtained, probably $C_4H_4O + C_6H_4O_2$. This with II gave IV. Mol.-wt. detns. of IV in PhH indicated that the reaction, $(C_4H_4O + 2C_6H_4O_2) \rightarrow (C_4H_4O + C_6H_4O_2) + C_6H_4O_2$, had occurred in soln. II (3.2 g.) added to a mixt. of 1 cc. III (b. 77-9°) and 4 cc. PhH gave in 12 hrs. a cryst. red mass. After washing with petr. ether to remove II, and allowing the residue (2.1 g.) to stand in the air until the odor of II was no longer perceptible, the IV was recryst. from boiling PhH, long ruby-red platelets, m. 105°; sols. in PhH or EtOH, yellow. IV is non-volatile and yielded only traces of II when distd. with steam. Finely powd. II (6.5 g.) and 3.5 cc. III gave in 0.5 hr. a thick brown liquid with evolution of heat, in 4 hrs. a red cryst. mass and in 2 days a solid product which after prolonged evacuation to remove II gave 8.5 g. IV (theoretical 8.97 g.). Addn. of petr. ether to a soln. of 1 g. II in 2 cc. III and 2.5 cc. PhH gave a thick brown oil, which with more II gave IV. IV in EtOH acidified with HCl liberates I_2 from KI equiv. to 1 mol. II. IV is dissolved by $FeCl_3$ soln. with liberation of II. With SO_2 or by boiling with 5% H_2SO_4, IV gives hydroquinone. III combines also with toluquinone, but a cryst. substance could not be obtained. Toluquinone (2.4 g.) and 1 cc. III gave after several hrs. an orange soln. which became reddish orange on the 2nd day. Addn. of petr. ether to this soln. gave a reddish orange oil which could not be cryst.

Lewis W. Butz

KIRZNER, N.A.

The influence of a substituent in the nucleus on the sensitiveness to light of phenyldiazonium chloride. V. I. Lvashenko and N. A. Kirzner. *[illegible] Prom.* 4, 272-6(1934); cf. Yamamota, C. A. 27, 2[illegible]. — The comparative photolysis of PhN_2Cl and o-, p- and m-substituted PhN_2Cl was carried out under exactly similar conditions by exposing the diazo solns. for 3 hrs. to the action of daylight and the light of a Hg vapor lamp. All tests were made in the same glass and quartz flasks at 0-1.5° by outside cooling at the bottom and stirring with a CO_2 current, and collecting the discharged N_2. The preliminary tests with $PhNH_2$ and monosubstituted $PhNH_2$ show that the substitution in the m-position either increases the stability to light of $PhNH_2$ or has no influence, while that in the o- and p-positions decreases it, except the OEt in the p-position, which has no effect. The tests in a glass flask or with daylight affected only the abs. values of photolysis, the relative values being unchanged. The effect of 2 substitution groups in PhN_2Cl on its sensitiveness to light requires further study.

Chas. Blanc



Comparative study of the compositions of coal-tar and petroleum xylenes. N. Kiltner and V. Krasova. J. Gen. Chem. (U. S. S. R.) 6, [illegible] (1936). The compns. of coal-tar and petroleum xylenes, detd. by the methods previously described (C. A. 30, 2319; 28, 2663[9]) are, resp., *m*-xylene 68-70, 30-8; *p*-xylene 18-19, 12-13; *o*-xylene 3-5, 7-9; PhEt 7-9, 26-8 and nonaromatic hydrocarbons 0, 15-18%.

Chas. Blanc

KIRZNER, N. A.

Structure of dihydroindanthrene and of its disulfate. V. D. Lyashenko and N. A. Kirzner (Leningrad Research Inst. Voroshilova). *J. Gen. Chem.* (U.S.S.R.) 16, 583-92(1946).—The fine structure of indanthrene is characterized by the presence of a resonant system which connects, by H bonds, the pyrazine ring with the two carbonyls of both anthraquinone residues. For this reason its chem. properties, which are functionally dependent on the pyrazine and anthraquinone nuclei, are concealed and may be revealed only under rather drastic conditions. In the reduction of the compd. the addn. of 2 H occurs to 2 carbonyls which are in different anthraquinone rings; this accounts for the undisturbed state of stability of the med. more energetic hydrogenation leads to formation of bis-(anthrahydroquinono)dihydropyrazine. Dihydroindanthrene (prepd. conventionally by reduction of indanthrene by hydrosulfite in alk. soln.) was pptd. by acidification with 20% H_2SO_4, and dried by heating with $PhCl$ in vacuo; the dry product was sulfated in pyridine (German patent 424,981) and the disulfate was pptd. from aq. soln. by acidification and purified through the triethanolamine salt. A *2-aminoanthrahydroquinone-9,10-disulfate* (15 g.) was oxidized in alk. soln. according to Ger. pat. 470,800; after removal of the excess oxidizing agent, the soln. of the tetrasulfate was acidified, yielding a red-violet ppt. of *dihydroindanthrenedisulfate;* if, however, the soln. is not acidified but concd. and treated with KCl (German patent 574,190) there are obtained yellow crystals of *tetra-K (bisanthrahydroquinono-1,2)pyrazinetetrasulfate,* which is readily converted into the above disulfate by dil. acids. The tetrasulfate was also obtained by adding 25 g. Fe filings and 22 g. dianthraquinonazine to 20 g. SO_3 in 250 g. dry pyridine in a N atm., heating 1-2 hrs. to 75°, followed by treatment with an ice-KOH mixt., again heating to 40°, and concg. in vacuo after filtration. K tetrasulfate (20 g.) in 100 cc. water was treated with 80 g. 20% KOH and 8 g. hydrosulfite 15 min. at 40°, then with 40 g. KCl, and cooled to 5°, yielding a green ppt. (unstable in air) which was a mixt. of *tetra-K bis(anthrahydroquinone)dihydropyrazinetetrasulfate* and its *quinhydrone type compd.* with *bis-(anthrahydroquinone)pyrazinetetrasulfate;* this gave in water a dark brown soln. which changed to yellow-brown on contact with air and on acidification in contact with air changed to green, then to red, with simultaneous pptn. of a red-violet ppt. of dihydroindanthrenedisulfate.

G. M. Kosolapoff

KIRZNER, N. A. PA 19/49T18

USSR/Chemistry - Diazo Compounds, Structure
Chemistry - Diazo Compounds, Conversion

Aug 48

"Problem of the Structure and Conversion of Diazo Compounds: VIII, Acid and Base Properties of Diazo Compounds," I. V. Grachev, N. A. Kirzner, State Ord of Red Banner of Labor Inst of Applied Chem 12 pp

"Zhur Obshch Khimii" Vol XVIII (LXXX), No 8

Executed acidimetric titration of various diazo compounds using glass electrode. Comparison of observed pH values with those calculated for solutions of organic salts of general formula (ArN_2) + (ArN_2) - confirmed hypothesis of I. V. Grachev and B. A. Paray-Koshits on amphoteric properties of diazohydrate and enabled conclusions on structure of organic salts. Shows that all salts in diazo-compound series are formed from two bases (hydrate of diazonium oxide and hydrate of diazo oxide) and from two acids (diazo and nitrosaminic). Establishes method to determine dissociation constants of these bases and acids from data of acidimetric titration of diazo compound and performs such determination for various compounds. Establishes that effect of substitutes in nucleus of diazo compound is of a regular character and that there is a mathematical relationship of the type $K = n K^m$ between dissociation constant of a^b primary aromatic amine K_b and basic or acid dissociation constant of diazo compound (K), where m and n are constants. Establishes mathematical relationship between dissociation constants of diazo compound. These relations enable prediction of properties of diazo compounds, e.g., basicity

KIRZNER, N. A.

USSR/Chemistry - Diazo Compounds Isomerism Jul 49

"The Structures and Conversions of Diazo Compounds: IX, The Direction and Rate of Tautomerism in the Diazo Compound Series," I. V. Grachev, N. A. Kirzner, State Ord of Labor Red Banner Inst of Applied Chem, Kpp

"Zhur Obshch Khim" Vol XIX, No 7

Equilibria of diazonium structures in acid media, diazoi structures in neutral media, and nitrosamino structures in alkaline media were displaced in accordance with the Le Chatelier principle of spontaneous conversion of sodium diazoate into sodium nitrosaminate and diazodiazoate into diazonitrosaminate are examples of conversion of a salt of a weak acid into a salt of a stronger acid, and are reactions of the first order. Spontaneous conversion of nitrosamino acid into diazonitrosaminate is an example of conversion of an acid into a less strongly dissociated acid, and again is a reaction of the first order. Conversion of diazonitrosaminate or nitrosamino acid into diazonium chloride by means of hydrochloric acid is a pseudo-monomolecular reaction. The interconversions of p-sulfodiazobenzene are fundamentally the same as those of other diazo-compounds, e.g., nitrodiazobenzenes. Submitted 25 Mar 48.

PA 2/50T39

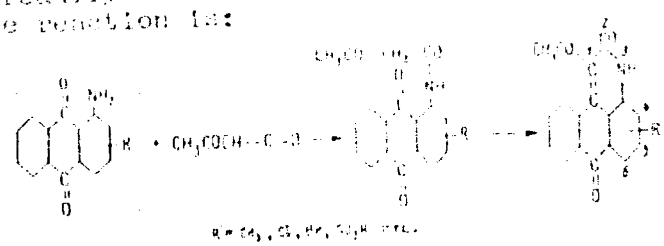
[illegible] [illegible]

AUTHORS: [illegible], N. A., [illegible], [illegible], N. A.

TITLE: Reaction of Amines of Anthraquinone Series With Diketene

PERIODICAL: Zhurnal obshchey khimii, [illegible], Vol [illegible], Nr [illegible], pp [illegible] (USSR)

ABSTRACT: 1-Aminoanthraquinone and its derivatives react with diketene to yield acetoacetyl derivatives of aminoanthraquinone. The more basic the amine, the more readily the reaction takes place. The scheme of the reaction is:



Card 1/2

[redacted]

1,5-di(acetoacetylamino)-anthraquinone (yield 83%), mp 226-227°; 1,7-diacetylanthrapyridone, does not melt at 330°; 1,8-di(acetoacetylamino)-anthraquinone (yield 69.4%) mp 172°; 1-acetyl-N-methylanthrapyridone (yield 78%), mp 287-288° (decomp); 1-acetyl-N-methyl-6-bromanthrapyridone (yield 75%), mp 242°; 1-acetyl-N-phenylanthrapyridone (yield 38%), mp 241-242°; 1-acetyl-N-methyl-6-phenylaminoanthrapyridone (yield 79%), mp 213°. Acetoacetyl and anthrapyridone derivatives can be used as dyes for acetate fabrics, or as intermediate products in synthesis of more complex dyes. There are 12 references, 5 Soviet, 4 German, 1 U.K., 1 U.S., 1 French. The 2 U.S. and U.K. references are: Kaslow, C. E., Sommer, N. B., J. Chem. Soc., 91, 1938 (1907); Am. Patent 2501099.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000722730003-7"

Reaction of Amines of Anthraquinone Series With Diketene

78276
SOV/79-30-3-30/69

ASSOCIATION: Lensovet Leningrad Technological Institute (Leningradskiy tekhnologicheskiy institut imeni Lensoveta)

SUBMITTED: March 14, 1959

Card 4/4

GLOTOV, V.N.; Prinimali uchastiye: VLADIMIROVICH, M.T.; IVANNIKOV, A.Ye.; KIRZNER, N.A.; SOSIPATROV, V.A.; ZHELEZKOVA, M.I.

Microcrushing of pigments and fillers with the "Microatomizer" apparatus. Lakokras.mat.i ikh prim. no.6:57-60 '62. (MIRA 16:1)
(Paint industry--Equipment and supplies)

KIRZHER, N.A.; OSTROUMOVA, T.S.

Using the decrepitation method for the bleaching of barite. Lakokras. mat. i ikh prim. no.3:23-25 '63. (MIRA 16:9)
(Barite) (Bleaching) (Paint)

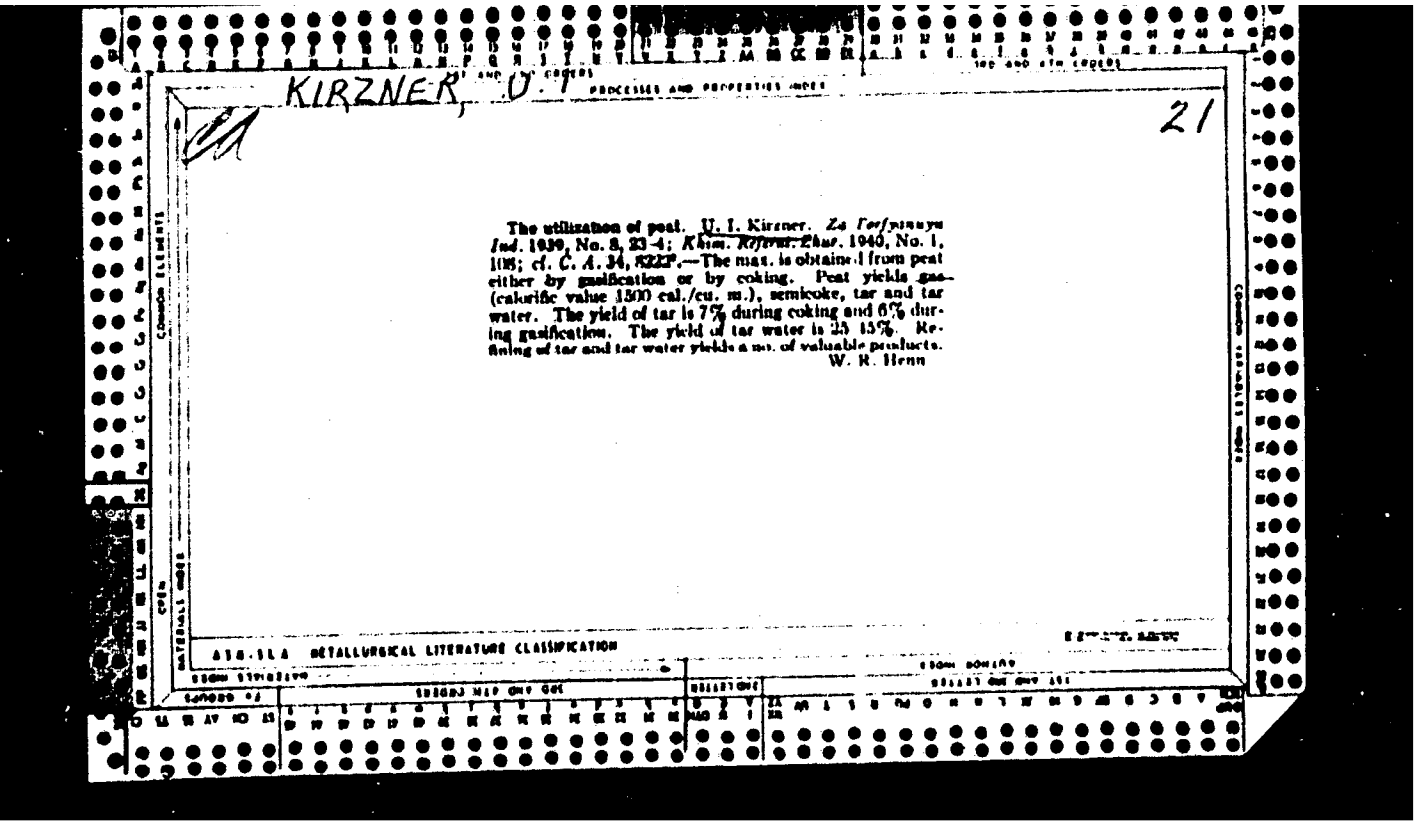
GORBENKO, I.; KIRZNER, O.

Defects of the 1949 type of grain elevator. Muk.-elev.prom. 21 no.5: 14-15 My '55. (MLRA 8:9)
(Grain elevators)

LOKTEV, N., kand.tekhn.nauk; KIRZNER, O., inzh.

"Grain drying" by M.A. Skorovarov. Reviewed by N. Loktev, O.Kirzner. Muk.-elev. prom. 26 no. 12:29 D '60. (MIRA 13:12)

1. Nauchno-issledovatel'skiy institut mekhanizatsii i elektrifikatsii sel'skogo khozyaystva Kazakhskoy Akademii sel'skokhozyaystvennykh nauk.
(Grain--Drying)



KIRZNER, U. I.

21

The utilization of peat. U. I. Kirzner. *Za Torfyanuyu Ind.* 1939, No. 8, 33–4; *Khim. Referat. Zhur.* 1940, No. 1, 108; cf. *C. A.* 34, 8222⁸.—The mat. is obtained from peat either by gasification or by coking. Peat yields gas (calorific value 1500 cal./cu. m.), semicoke, tar and tar water. The yield of tar is 7% during coking and 6% during gasification. The yield of tar water is 25–35%. Refining of tar and tar water yields a no. of valuable products.
W. R. Henn

ATS-SLA METALLURGICAL LITERATURE CLASSIFICATION

KIRZNIER, D.I., prof.; SURMILO, G.W., prof.; KRZYZANOWSKI, Stanislaw, mgr.,inz.

Prime cost calculation for dressing useful minerals. Przegl gorn 17 no.9:491-493 S '61.

KIRZON, M.V.; KOL'S, O.R.; TSUKERMAN, A.M.

Further investigation on the novocain stimulating and blocking of nervous conduction and the products of its disintergration in the organism. Vest. khir. 71 no.2:74 1951. (CIML 20:8)

KIRZON, M. V.

KIRZON, M.V.; KOL'S, O.R.; TSUKERMAN, A.M.

Stimulating effect of novocaine on interorceptors. Trudy AMN SSSR 24 no.2:82-99 '53. (MLRA 7:7)
(PROCAINE, effects,
*on interoceptive appar. of various organs in frog)

KIRZON, M. V.

Chemical Abst.
Vol. 48 No. 3
Feb. 10, 1954
Biological Chemistry

(4)

Effect of carnosine and anserine on the work of isolated frog muscle. V. B. Severin, M. V. Kirzon, and T. M. Kalitsova. *Doklady Akad. Nauk S.S.S.R.* 91, 691-4 (1953); cf. *Referaty nauch. Rabot Akad. Med. Nauk S.S.S.R.* 1, 22(1947).—Preliminary results indicate that addn. of carnosine or anserine to the soln. used for perfusion of isolated frog muscle greatly increases the work function of the muscle both in intensity and in duration. This is clearly shown by the liberation of a greater amt. of lactic acid, besides the purely mech. recordings, which give concordant results. The main source of muscular contraction energy is the glycolytic cleavage of carbohydrates which leads to lactic acid.
G. M. Kosolapoff

KIRZON M.V.

Country : USSR
Category : Human and Animal Physiology.
Nerve and Muscle Physiology.
Abs. Jour. : Ref Zhur-Biol., No 23, 1958, 106745

Author : Kirzon, M. V.; Pshennikova, M. G.
Institut. :
Title : The Spreading along the Nerve of Non-Impulse Influences Originating from the Area of X-rays' Action.

Orig Pub. : Biofizika, 1957, 2, No 6, 686-697

Abstract : A nerve sector (8-9 mm long) of a common nerve and muscle specimen of a frog was subjected to a 400-450 r/m X-ray radiation, lasting 5, 10, and 20 minutes. Changes in nerve excitability and conductivity were recorded by usual myographic methods. The electrodes which were used as stimulants, were placed proximally and distally to the irradiated nerve sector. Progressive diminution of conductivity was observed in the irradiated sector. Two influence phases of

Soil Biology Faculty, Moscow State U.

T

KIRZON, M.V.

KIRZON, M.V.; KLIMOVITSKIY, V.Ya.

So-called "spontaneous" excitations of the central nervous system [with summary in English] Biofizika 3 no.1:108-110 '58. (MIRA 11:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova, Institut biologicheskoy fiziki AN SSSR, Moskva.
(NERVOUS SYSTEM) (ELECTROPHYSIOLOGY)

KIRZON, M.V.

17(1) SOV/30-59-4-36/51

AUTHOR: Naumov, S. A., Candidate of Biological Sciences

TITLE: Problems of Ecological Physiology (Problemy ekologicheskoy fiziologii)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 4, pp 121-125 (USSR)

ABSTRACT: The All-union Conference held by the Institut fiziologii im. I. P. Pavlova (Physiological Institute imeni I. P. Pavlov) in Leningrad between January 12th and January 17th dealt with these problems. Altogether 58 reports were delivered, e.g. A. D. Slonim spoke about "Essential Trends of Research of the Ecological-physiological Specialization in Mammals"; D. A. Biryukov on "Ecological Factors in Animal Physiology"; I. D. Strel'nikov on "the Ecological Heat Balance in Several Invertebrates (Insects) and Vertebrates (Reptiles and Mammals)"; I. A. Arshavskiy spoke about "the Comparative Ontogenetic Characteristics of Several Physiological Features in Rabbits and Hares in Connection With Particularities of Their Ecology"; Ye. M. Kreps, N. A. Verzhbinskaya and A. A. Smirnov reported on "Physiological Characteristics of Various Isoenzymes of Species of Crabs in Dependence of Their Conditions of Life"; Ye. I. Orlov spoke about "the Behavior and Survival of "Iksodovyye kleshchi" (mites) In the Case of Irrigation and Flooding of the Irrigated Regions"; N. P. Naumov spoke about "the Internal Structure of Higher Vertebrates and Some Problems of Their Investigation by Ecological-physiological Methods"; I. Ya. Polyakov dealt with "the Morpho-physiological Variability of the Population of Rodents Under the Effect of Ecological Conditions"; N. I. Kalabukhov, N. A. Morkilevich and N. A. Petrosyan spoke about "Several Ecological-physiological Characteristics of Various Species and Geographical Populations of a Type of Sandstone"; M. V. Kirzon, N. P. Naumov, N. M. Dukel'skaya and L. V. Boriaev reported on "the Ecological and Physiological Trend of the Investigation of the Effect of Rat Poisons". In their resolution the members of the Conference underlined the great importance of ecological physiology and indicated the most important ways of further research in this field. Special attention was paid to the increased research work carried out by ecologists, zoologists, physiologists and biochemists.

Card 1/2

Card 2/2

KIRZON, M.V.; BORISOVA, L.B.

Pathophysiological mechanism of poisoning by diftoran, sodium fluoroacetate, and ethylenefluorhydrin in rodents. Vest. Mosk. un. Ser. 6: Biol., pochv. 16 no.4:14-25 Jl-Ag '61. (MIRA 14:7)

1. Kompleksnaya laboratoriya po izucheniyu sredstv i sposobov bor'by s vrednymi zhivotnymi i boleznyami rasteniy. Moskovskogo gosudarstvennogo universiteta.

(RODENTICIDES)
(FLUORINE ORGANIC COMPOUNDS)

KIRZON, M.V.; DUKEL'SKAYA, N.M.; BORISOVA, L.B.; SIMKIN, G.N.

Specific differences of the process of diftoran poisoning in animals. Vest. Mosk. un. Ser. 6: Biol., pochv. 16 no.4:26-33 Jl-Ag '61. (MIRA 14:7)

1. Kompleksnaya laboratoriya po izucheniyu sredstv i sposobov bor'by s vrednymi zhivotnymi i boleznyami rasteniy Moskovskogo gosudarstvennogo universiteta.

(FLUORINE ORGANIC COMPOUNDS)
(RODENTICIDES)

KIRZON, M.V.; MINEYEV, Yu.V.; BURMISTROV, Yu.M.

Change in the impedance of a frog nerve trunk under the action of visible light. Biofizika 7 no.3:306-310 '62. (MIRA 15:8)

1. Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta imeni Lomonosova.
(ELECTROPHYSIOLOGY) (LIGHT--PHYSIOLOGICAL EFFECT) (NERVES)

KIRZON, M.V.; ALLIK, T.A.; SHESTAKOV, S.V.

Biochemical characteristics of the skeletal muscles of frogs at different stages of fatigue following single stimulations of the nerve. Biul. eksp. biol. i med. 54 no.9:29-34 S '62. (MIRA 17:9)

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ALLIK, T.A.; KIRZON, M.V.

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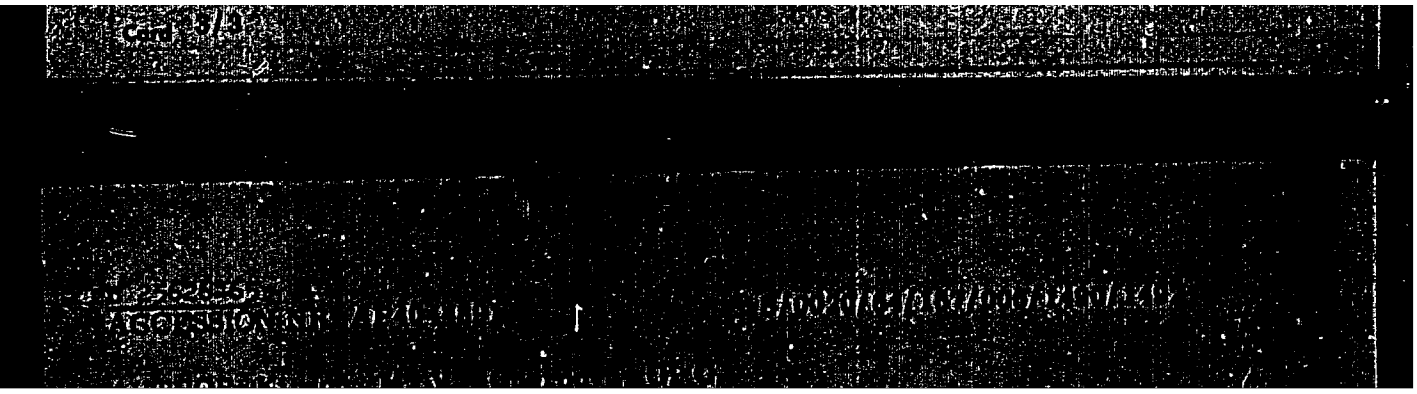

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Change in the nature of respiration under excessive pulmonary pressure following unilateral and bilateral vagotomy. Nauch. dokl. vys. shkoly; biol. nauki no.1:46-50 '66.

(MIRA 18:2)

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KAMENSKAYA, M.A.; KIRZON, M.V.

Significance of the summation process for the development of carnosine effect on the skeletal muscle in fatigue. Nauch. dokl. vys. shkoly; biol. nauki no.2:43-48 '65.

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Role of the afferent pulsation from the respiratory musculature in the respiration control under excessive intrapulmonary oxygen pressure. Nauch.dokl.vys.shkoly; biol.nauki no.3:64-67 '65.
(MIRA 18:8)

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Sympathetic effect on the skeletal muscle and neuromuscular synapse as related to the frequency of tetanic stimulation. Dokl. AN SSSR 162 no.2:[illegible]75 My '65. (MIRA 18:5)

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Effect of density stimulation of the [illegible] activity recorded in the common nerve trunk in [illegible]. Fiziol. zhur. biol. i med. 60 no.2:10-15 F '65. (MIRA 18:11)

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L 27634-66 EWT(1) SCTB DD

ACC NR: AP6018427 (A, N) SOURCE CODE: UR/0325/65/000/003/0064/0067

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ORG: Department of Animal Physiology, Moscow State University im. M. V. Lomonosov (Kafedra fiziologii zhivotnykh Moskovskogo gosudarstvennogo universiteta)

TITLE: Role of afferent pulsation from the respiratory musculature in respiratory regulation during excessive intrapulmonary oxygen pressure

SOURCE: Nauchnyye doklady vysshey shkoly. Biologicheskiye nauki, no. 3, 1965, 64-67

TOPIC TAGS: biologic respiration, cat, neurophysiology

ABSTRACT: Experiments were performed on narcotized cats whose spinal cord was exposed between C_6 and T_{10}. From 7 to 10 pairs of dorsal roots were severed at the C_7-T_9 level and then the spinal cord was half severed (dorsal column) at C_7. In the second series of experiments the reverse order was taken in severing the nerves. It was found that dorsal root afferent pulsation from the respiratory musculature during excessive (30 mm of mercury) intrapulmonary oxygen pressure affected both the bulbar respiratory center and the motoneurons of the spinal cord. But dorsal root deafferentation did not yield the expected change in the duration of apnea. Orig. art. has: 2 figures. [JPRS]

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L 38453-66

ACC NR: AP6024402 SOURCE CODE: UR/0219/66/062/007/0030/0034

AUTHOR: Chernova, G. G.; Kirzon, M. V.; Mass, A. M.

ORG: Department of Animal Physiology, Moscow State University (Kafedra fiziologii zhivotnykh Moskovskogo gosudarstvennogo universiteta)

TITLE: Respiratory afferent dorsal root impulsation during excess intrapulmonary oxygen pressure

SOURCE: Byulleten' eksperimental'noy biologii i meditsiny, v. 62, no. 7, 1966, 30-34

TOPIC TAGS: human physiology, respiratory physiology, pressure breathing, neurophysiology, ~~excess pressure apnea, apnea~~

ABSTRACT: Reflex apnea occurring in response to the onset of increased intrapulmonary pressure (≥ 5 mm Hg) results from inhibition of the respiratory center by afferent pulses from the vagus nerve. Its duration is affected by afferentation from the subcarotid zone, but not by afferentation from the dorsal nerve roots. Afferent impulsation in the dorsal nerve roots at the thoracic level during excess-pressure apnea was studied in nembutal-anesthetized (30 mg/kg intraperitoneally) cats. Intrapulmonary O_2 pressures of 5, 10, 20, and 30 mm Hg were used. After laminectomy from T_3 to T_7, dorsal roots were resected at the point of insertion into the spinal cord and the ends teased into thin bundles of fibers from which impulsation was recorded

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with bipolar leads. Under normal respiratory conditions, afferent impulsation (currents of 50 to 200 μv in four or more afferent units of a bundle) was recorded in the dorsal roots (during inspiration in 21, expiration in 7, and continuously in 12 of 40 animals). During excess intrapulmonary pressure, total electrical activity in the dorsal roots increased, not with passive stretching of the rib cage due to internal pressure, but with active contraction of the intercostal muscles while the rib cage was stretched. Evidently this activity originates with muscle spindles capable of responding not only to tension but also to γ-activated muscle contraction, which is probably a more decisive factor during excess intrapulmonary pressure than stretching. This increase in total electrical activity in dorsal root fibers during inspiration is due both to more frequent discharge of active afferent units and to the participation of new units, either high-threshold spindles or tendon receptors. No dorsal root activity was seen during apnea. The reason for this is unclear, unless muscle spindles do not respond to extreme passive tension on the muscle alone. It is known that many expiratory discharges in dorsal root fibers result from the activity of spindles located in and responding to stretching of inspiratory muscles. If this is true of the expiratory units recorded in this study, then both the disappearance of their activity during excess intrapulmonary pressure and the absence of inspiratory activity during apnea are due to extreme stretching. Orig. art. has: 2 figures. [DP]

SUB CODE: 06/ SUBM DATE: 31Dec64/ ORIG REF: 007/ OTH REF: 011/ ATD PRESS: 5047