ideally coherent plastic materials with a low degree of internal friction. However, in the case of soils with internal interlinking and with internal friction the value of this coefficient is lower. However, in the case of a small angle of internal friction it applies that $\alpha = 0{,}18$. The testing of coherent clayish soils by means of the ball-impression method offers the possibility of studying the reduction of interlinking forces (in the cases of a stress which is constant with respect to time) because of the relaxation of tensions. Furthermore, the following important characteristics can be determined by means of the ball-indentation test: the exterior stress on the soil, the parameters of plasticity, the coefficient of the plastic lateral broadening, etc. A diagram shows the curve for the modification with respect to time of interlinking forces in a coherent clayish soil, which was plotted on the basis of the results obtained by the ball-indentation test. The reduction of interlinking forces is due mainly to the tough resistance against a relative displacement of the solid particles and their aggregates (which are under the influence of water-adsorption bindings) and to the gradual destruction of the structure and cementation binding of the soils. An important characteristic for the evaluation of the carrying capacity of coherent soils is the amount of continuous interlinking, which can also be determined by the method of the ball-indentation test.

INSTITUTION: Institute for Frost Research "V.A.OBRUCEV" of the Academy of Science in the USSR.

Dokl.Akad.Nauk 111, fasc.6, 1193-1196 (1956) CARD 2 / 2 PA - 1999

for perfectly coherent (plastic) soils with interlinkage alone are given. Furthermore, p_{lim} is specialized for rectangular, quadratic, and circular fundaments. Interlinkage can be investigated by the method of an indentation made by means of a spherical stamper as suggested by N.A.CYTOVIC (Materialy po laboratornym issledovanijam merslych gruntov (Material concerning the Investigation of Frozen Soils), published by the Academy of Science in the USSR, 1954). This method makes it possible to take the rheologic properties of the soil into account. The amount of c is determined from the penetration depth s of a sphere with the diameter D under the constant stress by means of the following formula: c = P/5,56×Ds. However, the value of c determined by the aforementioned method characterizes interlinkage in a pure form only in the case of plastic soils without friction. Resistance against the penetration of a spherical stamper can, however, be considered to be a complex characteristic for the total resistance against the displacement of coherent soils. The application of such a generalized characteristic is all the more useful as the separate determination of the parameters c and φ (here φ denotes friction) is rather complicated. However, determination of the equivalent interlinkage by the method of the ball-indentation test is very simple and can be carried out in the laboratory or immediately in a field. In this way it is possible to determine the physical properties of the soil throughout the entire depth of the area to be investigated.

INSTITUTION: Institute for Frost Research "V.A.OBRUCEV" af the Academy of Science in the USSR.

TSYTOVICH, N.A.; MERSESOVA, Z.A.; BOZHENOVA, A.P.; TATYUNOV, I.A.; DOSTOVALOV, B.N.; SHUMSKIY, P.A.; BAKULIN, F.G.; SAVEL'YEV, B.A.; ZHUKOV, V.F.; MARTYNOV, G.A.; VYALOV, S.S.; SHUSHERINA, Ye.P.

Physical phenomena and processes in freezing, frozen, and thawing soils; general comments. Mat. po lab. issl. merzl. grunt. no.3:7-114 '57. (MIRA 10:11)

(Frozen ground)

PEKARSKAYA, N.K.; TSYTOVICH, N.A.

Friction and cohesion in the overall resistance of frozen soils to shear during a rapid increase of load. Mat. po lab. issl. merzl. grunt. no.3:255-273 '57. (MIRA 10:11)
(Soil mechanics) (Frozen ground)

TSYTOVICH, N.A.

SHUSHERINA, Ye.P.; TSYTOVICH, N.A.

Experiments in studying the effect of freezing and subsequent thawing on the stability of clay soils. Mat. po lab. issl. merzl. grunt. no.3:280-288 '57. (MIRA 10:11)
(Soil mechanics) (Clay) (Frozen ground)

TSYTOVICH, N. A.; FERRONSKII, V.

The use of radio-active radiation in the testing of soil for building purposes. Tr. from the Russian. p. 225. (Inzenyrske Stavby, Vol. 5, No. 5, May 1957, Praha, Czechoslovakia)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 8, Aug 1957. Uncl

Tsytovic H, N. A.

10(4); 21(5); 24(8) PHASE I BOOK EXPLOITATION SOV/2457

Vsesoyuznaya nauchno-tekhnicheskaya konferentsiya po primeneniyu radioaktivnykh i stabil'nykh izotopov i izlucheniy v narodnom khozyaystve i nauke. 2d, Moscow, 1957

Teplotekhnika i gidrodinamika; trudy konferentsii, tom. 4 (Heat Engineering and Hydrodynamics; Transactions of the All-Union Conference on the Use of Radioactive and Stable Isotopes and Radiation in the National Economy and Science, Vol 4) Moscow, Gosenergoizdat, 1958. 88 p. Errata slip inserted. 2,500 copies printed.

Sponsoring Agencies: Akademiya nauk SSSR, and USSR. Glavnoye upravleniye po ispol'zovaniyu atomnoy energii.

Eds.: M. A. Styrikovich (Resp. Ed.), G. Ye. Kholodovskiy, and M. S. Fomichev; Ed. of Publ. House: L. N. Sinel'nikova; Tech. Ed.: N. I. Borunov.

PURPOSE: This collection of articles is intended for scientists and laboratory workers concerned with the use of radioactive and stable isotopes.

COVERAGE: This collection of papers deals with the application of radioactive and stable isotopes as measuring tools in various types of scientific investigation. No personalities are mentioned. References are given after some of the articles.

TSYTOVICH, N. A., Corr. Mbr., AS USSR, Frozen Ground Research Institute, Moscow

"The Fundamentals of Frozen Ground Mechanics (New Investigations)," a paper submitted at the 4th International Conference of the International Society of Soil Mechanics and Foundation Engineering, London, 12-24 Aug 57. [references 15 Soviet papers]

SOV/124-58-7-8048

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 7, p 108 (USSR)

AUTHOR: Tsytovich, N.A.

TITLE: The Basic Laws That Operate in the Mechanics of Frozen Ground (The Latest Research) [Osnovnyye zakonomernosti v mekhanike merzlykh gruntov (Noveyshiye issledovaniya)]

PERIODICAL: V sb.: Materialy k 4-mu Mezhdunar. kongressu po mekhan. gruntov i fundamentostr. Moscow, AN SSSR, 1957, pp 20-29

ABSTRACT: Founded on experimental investigations, the fundamental assumptions underlying the mechanics of frozen ground are set forth and substantiated, and their practical significance is indicated. 1. The quantity of unfrozen water existing in frozen ground does not remain constant but changes concurrently with the changes in external influences and remains in dynamic equilibrium with said influences. 2. The migration of water through dispersive freezing and frozen ground occurs only when temperature and moisture gradients exist, of which it is then a direct function. 3. The short-term strength of frozen ground varies directly, its long-term strength inversely, with the number of ice inclusions present in it. 4. The bearing capacity

Card 1/2

The Basic Laws That Operate in the Mechanics of Frozen Ground

of frozen ground is a function not only of the ground's composition and the temperature, but also, because of the phenomenon of stress relaxation, of the duration of application of a load. 5. a) When subjected to a subcritical load, frozen ground goes into a consolidation phase. Consolidation deformations, generally, are nonlinear functions of the magnitude of the external pressure involved. In soils having a distinct skeleton and at low temperatures a consolidation deformation can be assumed, within certain limits, to be proportional to the external pressure. 5. b) Steady plastic-flow deformations of frozen ground occur only under certain stress conditions, the plastic-flow rate (within certain limits) being proportional to the excess stresses. 6. During a thaw the deformations of frozen ground are much increased, to such a degree that the ground may settle or cave. Under these conditions a consolidation deformation generally has two components, one that is independent of the amount of external pressure and one that is a direct function of the normal pressure. 7. The strength of thawing ground depends on the texture it had in the frozen state. As a rule, the strength of thawing ground (especially in the case of porous and layered structures) is only a fraction of that of ground which had not been subjected to freezing at all.

Card 2/2 A.I.Govyadinov

1. Soils--Moisture content 2. Soils--Mechanical properties 3. Soils--Freezing 4. Soils--Temperature factors

14(2) PHASE I BOOK EXPLOITATION SOV/1612

Tsytovich, Nikolay Aleksandrovich

Osnovaniya i fundamenty na merzlykh gruntakh (Bases and Foundations in Frozen Ground) Moscow, Izd-vo AN SSSR, 1958. 167 p. 8,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Redkollegiya nauchno-populyarnoy literatury

Resp. Ed.: V.A. Veselov; Ed. of Publishing House: K.M. Feodot'yev; Tech. Ed.: G.A. Astaf'yeva

PURPOSE: This book is intended for engineering and technical personnel in the building industry operating under permafrost conditions. It may also be used by students in construction-engineering institutes.

COVERAGE: This course of lectures, orginally delivered at the Moskovskiy inzhenernostroitel'nyy institut im. V.V. Kuybysheva, embodies the basic principles to be observed in designing and constructing bases and foundations in permafrost regions. It discusses the characteristics of foundation works, utilization of structure under such

Card 1/5

Bases and Foundations (Cont.)

conditions, and the means of combatting the damaging effects of freezing and thawing of ground under the structure. There are 41 figures. There are 91 references of which 90 are Soviet and 1 English.

TABLE OF CONTENTS:

Bases and Foundations (Cont.)

Bases and Foundations (Cont.)

AVAILABLE: Library of Congress (TA 713.T74)

Card 5/5

MM/sfm
5-13-59

BAKAKIN, Valentin Petrovich; TSYTOVICH, N.A., retsenzent; KOLOSKOV, P.I., prof., retsenzent; YAKHONTOV, A.D., red. izd-va; DOBUZHINSKAYA, L.V., tekhn. red.

[Fundamentals of mining in permafrost] Osnovy vedeniia gornykh rabot v usloviiakh vechnoi merzloty. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1958. 231 p.(MIRA 11:8)

1. Chlen-korrespondent Akademii nauk SSSR (for TSytovich).
(Mining engineering) (Frozen ground)

TSYTOVICH, N.A., redaktor; SHEVCHENKO, G.N., tekhnicheskiy redaktor

[Papers presented at the Fourth International Conference on Soil Mechanics and Foundation Engineering] Materialy k IV Mezhdunarodnomu kongressu po mekhanike gruntov i fundamentostroeniiu. Pod red. N.A.TSytovicha. Moskva, 1957. 262 p. (MLRA 10:8)

1. Predsedatel' Komiteta po mekhanike gruntov AN SSSR, chlen-korrespondent AN SSSR, deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for TSytovich). 2. Akademiya nauk SSSR. Komitet po mekhanike gruntov.
(Soil mechanics) (Foundations)

TSYTOVICH, N.A., prof.; ZAKHAROV, I.Z., inzh.

Use of a spherical press in determining protracted resistance of clays to deformations. Trudy Gidroproekta no.1:65-73 '58. (MIRA 11:9)

1. Chlen-korrespondent AN SSSR (for TSytovich).
(Clay--Testing) (Testing machines)

TSYTOVICH, N. A.

SOV/3-58-12-27/43

AUTHOR: Doroshkevich, M.M.

TITLE: Intervuz Scientific and Methodical Conferences (Mezhvuzovskiye nauchnyye i metodicheskiye konferentsii). An Important Problem of Construction (Vazhnaya problema stroitel'stva)

PERIODICAL: Vestnik vysshey shkoly, 1958, Nr 12, p 75 (USSR)

ABSTRACT: The problem of investigating the supporting properties of soil is of special significance in view of the wide scope of construction. The conference convened by the Moskovskiy inzhenerno-stroitel'nyy institut (MISI) on these questions therefore attracted the attention of higher educational and scientific-research institutions. N.A. Cytovich, Member Correspondent of the AS USSR, reported on the results of the International Congress on the Mechanics of Soil Strength and Foundation Construction held in London at the end of 1957. The wide application of the latest methods of research, e.g., by means of radioactive methods of emanation, had a favorable effect on the development of this branch of science. This was the subject dealt with by Professor I.I. Cherkasov and Candidate of Technical Sciences Ye.M. Filippov, Vsesoyuznyy nauchno-issledovatel'skiy institut geofiziki

Card 1/3

Intervuz Scientific and Methodical Conferences. An Important Problem of Construction.

(All-Union Scientific-Research Institute of Geophysics), Engineer I.V. Dudler (Gidroproyekt) and others. Candidate of Technical Sciences D.Ye. Pol'shin (Nauchno-issledovatel'skiy institut osnovaniy - Scientific-Research Institute of Foundations), stated that various processes taking place in the soil can be studied with the help of radioactive methods. Candidate of Technical Sciences Ya.L. Kogan (Gidroproyekt) reported on the use of piezodynamometers when examining the capillary pressure in soils and its influence on the processes taking place there. The Engineers D.S. Baranov and N.N. Uskov (MISI) spoke on the same subject. Several reports were devoted to the problem of creeping clayey soils when displacing it. Professor N.N. Maslov (Moskovskiy avtomobil'no-dorozhnyy institut - Moscow Automobile and Road Institute) suggested a new solution for the problem of speedy removal of the supporting structure in case of a flat deformation. Engineer A.M. Skibitskiy (Gidroproyekt) generalized the results of experiments in studying the creeping of compact clay foundations at the Kuybyshev and Saratov GES. The rated characteristic of the soil in case of displacement can be obtained by various methods, e.g., by preliminarily packing

Intervuz Scientific and Methodical Conferences. An Important Problem of Construction.

the soil or taking into account capillar pressure. According to Ye.S. Lovetskiy, Engineer of Gidroproyekt, this method does not reflect correctly the characteristics of the soil under given conditions. An experimental method is required. By further studying this problem, Engineer V.A. Durante (Gidroproproyekt) told of the soil's capability to pack depending on the speed of work. The speeches of Professors N.Ya. Denisov (MISI), M.N. Gol'dshteyn (Dnepropetrovskiy institut inzhenerov zheleznodorozhnogo transporta - Dnepropetrovsk Institute of RR Engineers) and G.M. Lomize (Moskovskiy energeticheskiy institut - Moscow Power Engineering Institute) dealt with research of forest grounds.

ASSOCIATION: Moskovskiy inzhenerno-stroitel'nyy institut imeni V.V. Kuybysheva (Moscow Engineering and Construction Institute imeni V.V. Kuybyshev)

TSYTOVICH, N.A.

Commission (National Association of the U.S.S.R.) on Soil Mechanics and Foundation Engineering. Osn. fund. i mekh. grun. no.1:27-28 '59. (MIRA 12:7)

1.Predsedatel' Komissii po mekhanike gruntov i fundamentostroyeniyu, deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR. (Soil mechanics) (Foundations)

TSYTOVICH, N.A.

Toward new achievements in the theory and practice of building foundations on permafrost. Osn., fund. i mekh. grun. no.3:1-2 '59. (MIRA 12:8)

(Frozen ground) (Foundations)

TSYTOVICH, N.A., otv.red.; ASTRUSHIN, B.D., red.izd-va; MAKUNI, Ye.V., tekhn.red.

[Materials on the physics and mechanics of frozen grounds] Materialy po fizike i mekhanike merzlykh gruntov. Moskva, Izd-vo Akad.nauk SSSR, 1959. 106 p. (MIRA 12:11)

1. Mezhduvedomstvennoye soveshchaniye po merzlotovedeniyu, 7th, Moscow, 1956. 2. Chlen-korrespondent AN SSSR; Institut merzlotovedeniya im. V.A.Obrucheva AN SSSR (for TSytovich).
(Frozen ground)

VYALOV, Sergey Stepanovich; TSYTOVICH, N.A., otv.red.; SHLEPOV, V.K., red.izd-va; BRUZGUL', V.V., tekhn.red.

[Rheological properties and the bearing capacity of frozen ground] Reologicheskie svoistva i nesushchaia sposobnost' merzlykh gruntov. Moskva, Izd-vo Akad.nauk SSSR, 1959. 187 p. (MIRA 13:2)

1. Chlen-korrespondent AN SSSR (for TSytovich).
(Frozen ground) (Foundations)

BARANOV, I.Ya., otv.red.; TSYTOVICH, N.A., otv.red.; CHEKOTILLO, A.M., otv.red.; BANKVITSER, A.L., red.izd-va; MAKUNI, Ye.V., tekhn.red.

[Studies in permafrost construction engineering] Materialy po inzhenernomu merzlotovedeniiu. Moskva, Izd-vo Akad.nauk SSSR, 1959. 199 p. (MIRA 12:8)

1. Mezhduvedomstvennoye soveshchaniye po merzlotovedeniyu. 7th, Moscow, 1956.
(Building--Cold weather conditions)

ROZA, Sergey Adol'fovich; TSYTOVICH, N.A., prof., retsenzent; ENDER, G.V., kand.tekhn.nauk, red.; SOBOLEVA, Ye.M., tekhn.red.

[Calculating the settlement of structures of hydroelectric power stations] Raschet osadki sooruzhenii gidroelektrostantsii. Moskva, Gos.energ.izd-vo, 1959. 330 p. (MIRA 12:8)

1. Chlen-korrespondent AN SSSR (for TSytovich).
(Foundations) (Soil mechanics)
(Hydroelectric power stations)

TSYTOVICH, N.A., prof.; VESELOV, V.A., dotsent, kand.tekhn.nauk; KUZ'MIN, P.G., dotsent, kand.tekhn.nauk; FERRONSKIY, V.I., kand.tekhn. nauk, assistent; PILYUGIN, A.I., kand.tekhn.nauk, assistent; LUGA, A.A., kand.tekhn.nauk, starshiy nauchnyy sotrudnik; SOKOLOV, N.M., kand.tekhn.nauk, starshiy nauchnyy sotrudnik; SAVINOV, O.A., doktor tekhn.nauk; KOSTERIN, E.V., kand.tekhn.nauk, assistent. Prinimali uchastiye: AKINSHIN, V.M.; MARTSENYUK, V.I., starshiy laborant. VASIL'YEV, E.D., prof., doktor tekhn.nauk, retsenzent; BEREZANTSEV, V.G., prof., doktor tekhn.nauk, retsenzent; LAGAR'KOV, N.I., inzh., nauchnyy red.; SMIRNOVA, A.P., red.izd-va; NAUMOVA, G.D., tekhn.red.

[Foundation engineering] Osnovaniia i fundamenty. Pod red. N.A. TSytovicha. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1959. 452 p. (MIRA 13:5)

1. Chlen-korrespondent AN SSSR (for TSytovich). 2. Zaveduyushchiy laboratoriyey kafedry osnovaniy i fundamentov Moskovskogo inzhenerno-stroitel'nogo instituta imeni V.V.Kuybysheva (for Akinshin). 3. Zaveduyushchiy kafedroy osnovaniy i fundamentov Leningradskogo instituta inzhenerov zheleznodorozhnogo transporta imeni akademika V.N.Obraztsova (for Berezantsev).
(Foundations) (Soil mechanics)

VINOKUROV, F.P., prof.; TETERKIN, A.Ye., kand.tekhn.nauk; PITERMAN, M.A., inzh.; TSYTOVICH, N.A., prof., red.; BARABANOVA, Ye., red.izd-va; VOLOKHANOVICH, I., tekhn.red.

[Peat in construction] Torf v stroitel'stve. Pod red. F.P.Vinokurova i N.A.TSytovicha. Minsk, Izd-vo Akad.nauk BSSR, 1959. 241 p. (MIRA 14:1)

1. Deystvitel'nyye chleny Akademii stroitel'stva i arkhitektury SSSR (for Vinokurov, TSytovich). 2. Chlen-korrespondent AN SSSR (for TSytovich).

(Peat)

5(2), SOV/20-125-6-28/61

AUTHORS: Topchiyev, A. V., Academician, Tsytovich, N. E., Pokrovskaya, Ye. S.

TITLE: Synthesis and Properties of Alkyl Indanes With a Substituent in the Five-membered Ring (Sintez i svoystva alkilindanov s zamestitelem v pyatichlennom kol'tse)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 6, pp 1275-1276 (USSR)

ABSTRACT: After a survey of publications (Refs 1-8) the authors state that e.g. the synthesis of indane homologues with one or two side chains in the five-membered ring is complicated, i.e. they are obtained by closing the ring on the basis of phenyl-propionic acid, β-alkyl-phenyl-propionic acid, and benzyl-alkyl-malonic-ester - and has to pass through several stages. In the present paper the synthesis of alkyl indanes with a substituent in the five-membered ring is described by a simple method: according to the method of Thiele (Ref 6). The authors tried to condense indene with methyl-ethyl ketone according to Thiele, this method, however, gave only a small yield of double-unsaturated (dvunepredel'nyy) hydrocarbon (approximately 7%). The changed reaction conditions offered, however, a butylidene-indene yield

Card 1/3

Synthesis and Properties of Alkyl Indanes With a Substituent in the Five-membered Ring

SOV/20-125-6-28/61

of 38% of the theoretical one. The isolated hydrocarbon was yellow and had a boiling point of 122-122.5° at 6 torr. A hydrogenation at usual temperature and a hydrogen pressure of 125 atmospheric excess pressure in the presence of a nickel-skeleton catalyst lead to a colorless secondary butyl-indane-1 (Table 1). A yellow hydrocarbon fraction with 136°/4 - 145°/4 boiling within a wide temperature range was isolated from indene and methyl-butyl ketone introduced into the reaction according to reference 8. A colorless hydrocarbon, i.e. 2-hexyl-indane-1 (Table 1) was produced by the hydrogenation of this fraction, a further above-mentioned treatment, and a chromatographic separation on silica gel. Still higher yields were obtained with 2 volumes H_2SO_4 of indene and acetone in an ethereal solution and in the nitrogen current. The hydrocarbon can be separated more easily by this method. After hydrogenation and repeated vacuum distillation the wide yellow fraction 89°/4 - 116°/4 yielded colorless isopropyl-indane-1 (Table 1). This substance was produced already earlier by another method (Ref 9) which gave, however, only its boiling point. The refractive index of the resultant 2-hexyl-indane-1 differs from that of references

Card 2/3

Synthesis and Properties of Alkyl Indanes With a Substituent in the Five-membered Ring

SOV/20-125-6-28/61

3 and 5. This difference is assumed to be caused by a deviating structure of the hexyl radical. There are 1 table and 8 references, 2 of which are Soviet.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petroleum-Chemical Synthesis of the Academy of Sciences USSR)

SUBMITTED: January 5, 1959

Card 3/3

5(3) SOV/20-128-3-34/58

AUTHORS: Topchiyev, A. V., Academician, Tsytovich, N. E., Pokrovskaya, Ye. S.

TITLE: Synthesis of Hydrocarbons of the Indane Series

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 558-560(USSR)

ABSTRACT: In previous papers on the synthesis mentioned in the title, a complicated method of producing the alkyl indanes was described (Refs 1-3). Another method - alkylation of indane with unsaturated hydrocarbons for the introduction of side chains into the aromatic ring (Refs 4-7) - yielded satisfactory results. It was also used in the present paper. The alkylation was carried out under continuous mechanical stirring, and cooling with ice water. After 2-3 further distillations of the principal fraction of the reaction products separated by usual distillation, the position of the side chains was determined by ultraviolet spectra (by M. V. Shishkina, Laboratoriya fiziki i fiziko-khimii nefti = Laboratory of Physics and Physical Chemistry of Petroleum , at the authors' institute). In all monosubstituted indanes, the side chain was in position 5 on the aromatic ring. The indane hydrocarbons obtained, together with their constants, are indicated in table 1. They are: tertiary butyl-indane-5 ($C_{13}H_{18}$), heptyl-indane-5($C_{16}H_{24}$),

Card 1/2

Synthesis of Hydrocarbons of the Indane Series SOV/20-128-3-34/58

iso-octyl-indane-5 ($C_{17}H_{26}$), cyclo-pentyl-indane-5 ($C_{14}H_{18}$), dicyclo-pentyl-indane ($C_{19}H_{26}$), tricyclo-pentyl-indane ($C_{24}H_{34}$), and cyclo-pentyl-indane-1 ($C_{14}H_{18}$). There are 1 table and 13 references, 4 of which are Soviet.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petroleum-chemical Synthesis of the Academy of Sciences, USSR)

SUBMITTED: June 5, 1959

Card 2/2

TSYTOVICH, N.E.; POKROVSKAYA, Ye.S.

Synthesis of hydrocarbons of the indan series with side chains in the five-membered and benzene rings. Dokl. AN SSSR 134 no.5:1119-1122 O '60. (MIRA 13:10)

1. Institut neftekhimicheskogo sinteza Akademii nauk SSSR. Predl stavleno akademikom A.V.Topchiyevym.
(Indan) (Hydrocarbons)

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AUTHORS: Tsytovich, N. E. and Pokrovskaya, Ye. S.

TITLE: Synthesis of Hydrocarbons of the Indan Series With Side Chains in the Five-membered and the Benzene Ring

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 5, pp. 1119-1122

TEXT: The authors describe the synthesis of hydrocarbons of the indan series with substituents in the five- or six-membered ring, as well as with substituents in both rings at the same time. The substances A,C-E were produced for the first time. A) 1-cyclohexyl indan was produced (similar to 1-cyclopentyl indan, Ref. 2) by condensation of indene in ethereal solution with cyclohexanone (indene : ketone = 2 : 1) in the presence of KOH solution in methanol. B) 1-isopropyl indan (described earlier in Ref. 1). The reaction product of indene with acetone (2 : 1) was hydrogenated over nickel skeleton catalyst at an initial hydrogen pressure of 150 atm and room temperature, and subsequently distilled three times. Two carbon fractions (86-87 and 87-88°C) were isolated, whose

Card 1/3

85957

Synthesis of Hydrocarbons of the Indan Series With Side Chains in the Five-membered and the Benzene Ring

S/020/60/134/005/C34/035XX
B016/B054

densities and refractive indices were different. They are further investigated by the authors. C) 5-decyl indan was produced by alkylation of indan with decene in the presence of 92% H_2SO_4 (2 : 1 : 2). The amount of the fraction of resulting hydrocarbon, isolated after double distillation (boiling point 160-161°C at 4 mm Hg), corresponded to a yield of 76% decyl indan, calculated for decene. The authors consider position 5 of the side chain to be most probable (Ref. 7). D) 1-isopropyl-5-tert.-butyl indan and 1-isopropyl-5,7-di-tert.-butyl indan. Similar to C, D was produced by alkylation of B with isobutylene in the presence of 92% H_2SO_4. The final yield was 3[illegible]%, calculated for isobutylene. The tertiary butyl group is supposed to take position 5 in indan (Ref. 7). In the authors' opinion, also a small amount of trialkyl indan is formed in this case. To obtain comparative data on the sulfurizability of the hydrocarbons mentioned, they were treated with 98% H_2SO_4. A-C were fully sulfurized by 1 volume of H_2SO_4 within 1 h. D was sulfurized at 20% by 2 volumes of 100% H_2SO_4 within 30 min. As was expected, E proved to be

Card 2/3

85957

Synthesis of Hydrocarbons of the Indan Series With Side Chains in the Five-membered and the Benzene Ring

S/020/60/134/005/034/035XX
B016/B054

most resistant. Its volume remained unchanged after 30 minutes of treatment with 3 volumes of 100% H_2SO_4. There are 1 table and 7 references: 3 Soviet, 2 German, and 1 Swiss.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis of the Academy of Sciences USSR)

PRESENTED: June 3, 1960, by A. V. Topchiyev, Academician

SUBMITTED: June 3, 1960

Card 3/3

TOPCHIYEV, A.V.; TSYTOVICH, N.E.; POKROVSKAYA, Ye.S.

Synthesis and properties of indan hydrocarbons. Neftekhimiia 1 no.1:15-22 Ja-F '61. (MIRA 15:2)

1. Institut neftekhimicheskogo sinteza AN SSSR.
(Hydrocarbons--Analysis) (Indan)

TSYTOVICH, Nikolay Aleksandrovich; KACHURIN, Sergey Petrovich; MEYSTER, Leonid Antonovich; SMIRNOVA, N.P., red.; RAKTIN, I.T., tekhn. red.

[Frozen rocks; their role in nature and human life] Merzlye gornye porody; ikh rol' v prirode i zhizni cheloveka. Moskva, Izd-vo "Znanie," 1961. 31 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Ser. 12, Geologiia i geografiia, no.14) (MIRA 14:8)

(Frozen ground)

TSYTOVICH, N.A., zasluzhennyy deyatel' nauki i tekhniki, prof., red.; VINOGRADOVA, G.M., red. izd-va; GILENSON, P.G., tekhn. red.

[Reports read at the Fifth International Conference on Soil Mechanics and Foundation Engineering] Doklady k V Mezhdunarodnomu kongressu po mekhanike gruntov i fundamentostroeniiu. Pod red. N.A.TSytovicha. Moskva, Gos. izd-vo lit-ry po stroit., arkhit. i stroit. materialam, 1961. 204 p. (MIRA 14:10)

1. International Conference on Soil Mechanics and Foundation Engineering. 5th, Paris, 1961. 2. Predsedatel' Natsional'noy assotsiatsii SSSR po mekhanike gruntov i fundamentostroeniyu , Chlen-korrespondent AN SSSR i Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for TSytovich).
(Soil mechanics—Congresses) (Foundations—Congresses)

PHASE I BOOK EXPLOITATION SOV/5483

Tsytovich, Nikolay Aleksandrovich, Innokentiy Nikolayevich Votyakov, and Vsevolod Dmitriyevich Ponomarev

Metodicheskiye rekomendatsii po issledovaniyu osadok ottaivayushchikh gruntov (Recommendations on Methods for Investigating Settlement of Thawing Ground) Moscow, Izd-vo AN SSSR, 1961. 54 p. Errata slip inserted. 1,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut merzlotovedeniya im. V. A. Obrucheva.

Resp. Ed.: N. A. Tsytovich, Corresponding Member, Academy of Sciences USSR; Tech. Ed.: L. A. Lebedeva.

PURPOSE: This booklet is intended for personnel in the construction industry and related occupations.

COVERAGE: According to the authors the booklet fills the gap in technical literature on methods of field investigation of thawing-ground settlement. The changes in the porosity coefficient of thawing grounds in relation to

Card 1/3

external pressure, settlement of thawing ground and foundations, field investigation of thawing-ground settlement, and application of radioactive isotopes to such investigations are examined. Operating instructions for the GPP-4 gamma-density field meter are included, and measurement errors, observations, test data, and safety technique are discussed. Formulas to determine calculation coefficients are given. Ch. I was written by N. A. Tsytovich, and Ch. II by I. N. Votyakov, scientific worker in the Northeastern Branch of the Institut merzlotovedeniya (Institute of Permafrost Study). V. D. Ponomarev, scientific worker in the Department of Frozen-Ground Mechanics of this institute, wrote Ch. III. There are 14 references, all Soviet.

TABLE OF CONTENTS:

TSYTOVICH, N.A.

Formation, development, and practical applications of the mechanics of frozen ground. Issl.po fiz. i mekh. merzl. grun. no.4:113-128 '61. (MIRA 14:12)

(Frozen ground)

TSYTOVICH, N.A.

The work of the section of "Foundations on a Natural Footing" of the Fifth Congress on Foundation Construction. Osn., fund.i mekh.grun. 3 no.6:3-5 '61. (MIRA 15:4)
(Foundations--Congresses)

TSYTOVICH, N.A.

PHASE I BOOK EXPLOITATION SOV/5834

Akademiya nauk SSSR. Institut merzlotovedeniya

Issledovaniya po fizike i mekhanike merzlykh gruntov (Investigations in Frozen-Ground Physics and Mechanics) no. 4, Moscow, 1961. 251 p. Errata slip inserted. 1500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut merzlotovedeniya im. V. A. Obrucheva.

Resp. Eds.: Z. A. Nersesova and N. A. Tsytovich; Ed. of Publishing House: I. N. Nikolayeva; Tech. Ed.: V. V. Volkova.

PURPOSE: This collection of articles is intended for geocryologists and agriculturists.

COVERAGE: The collection was written by staff members of the Institut merzlotovedeniya, AN SSSR -- Institute of Permafrost Studies, AS USSR -- on the basis of their scientific research work conducted at the Laboratory of Physics and Mechanics of Frozen Ground. The articles in the first part

Card 1/4

Investigations in Frozen-Ground Physics (Cont.) SOV/5834

of the collection deal with the physics of the cryogenic processes. Physical and chemical investigations in this field were based on the "theory of chemical potential" developed by I. A. Tyatyunov, Doctor of Geological and Mineralogical Sciences. The works in the second part of the collection are of considerable interest as they concern problems of mechanics of frozen ground and ice and include important results of investigations in Antarctica dealing with the processes of ice flow and deformation and the structural strength of frozen ground. A new method for calculating the plastic viscous flow of ice-sheets is proposed by S. S. Vyalov; his deductions are based on the data of field observations which he undertook during the second Soviet Antarctic Expedition (1956-1958). References follow each article.

TABLE OF CONTENTS:

Card 2/4

TSYTOVICH, N.A., prof., red.; NYSTROVSKAYA, N.A., red. izd-va; BOROVNEV, N.K., tekhn. red.

[Industrial methods of building pile foundations in housing construction] Industrial'nye metody ustroistva svainykh fundamentov v zhilishchnom stroitel'stve. Moskva, Gosstroizdat, 1962. 102 p. (MIRA 15:8)

1. Chlen-korrespondent Akademii nauk SSSR, Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR (for TSytovich).

(Foundations) (Piling (Civil engineering))

TSYTOVICH,N.A.; ZHUKOV, V.F.

"Designing buildings for regions of the Far North" by A.P. Kushnev. Reviewed by N.A.TSytovich, V.F.Zhukov. Osn., fund.i mekh.grun. 4 no.5:31 '62. (MIRA 15:12)

(Foundations)
(Building—Cold weather conditions)
(Kushnev, A.P.)

VINOKUROV, Fedor Petrovich; TETERKIN, Arkadiy Yefimovich; PITERMAN, Mark Aleksandrovich; TSYTOVICH, N.A., akademik, red.; BARABANOVA, Ye., red. izd-va; VOLOKHANOVICH, I., tekhn. red.

[Structural properties of peat soils]Stroitel'nye svoistva torfianykh gruntov. Pod red. N.A.TSytovicha i F.P.Vinokurova. Minsk, Izd-vo Akad. nauk BSSR, 1962. 282 p. (MIRA 16:3)

1. Akademiya stroitel'stva i arkhitektury SSSR, Chlen-korrespondent Akademii nauk SSSR (for TSytovich).
(Peat soils) (Soil mechanics)

A

TSYTOVICH, N., zasluzhennyy deyatel' nauki i tekhniki RSFSR

Achievements of science and technology should be directed to construction on frozen ground. Na stroi. Ros. 3 no.10: 13-15 O '62. (MIRA 16:6)

1. Chlen-korrespondent AN SSSR, deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR.
(Foundations) (Frozen ground)

SHISHKINA, M.V.; KUSAKOV, M.M.; TSYTOVICH, N.E.

Infrared absorption spectra of hydrocarbons of the indan series. Izv. AN SSSR.Ser.fiz. 26 no.10:1260-1263 O '62. (MIRA 15:10)

1. Institut neftekhimicheskogo sinteza AN SSSR.
(Hydrocarbons—Spectra) (Indan)

S/048/62/026/010/008/013
B117/B186

AUTHORS: Shishkina, M. V., Kusakov, M. M., and Tsytovich, N. E.

TITLE: Infrared absorption spectra of indane series hydrocarbons

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 10, 1962, 1260-1263

TEXT: Infrared absorption spectra of indane derivatives were analyzed within the range 5-15 μ. Ultraviolet spectra of these derivatives have been described in earlier papers (M. M. Kusakov, Ye. A. Prokof'yeva, M. V. Shishkina, Optika i spektroskopiya, 8, 27 (1960)). Spectra of these compounds from one to three C_1 - C_{10} substituting groups displayed several characteristics that distinguish indanes from benzenes substituted correspondingly, and which allow of determining them within the range mentioned. Conclusions: The indane spectrum obtained here agreed with published data (J. Entel, C. H. Rouf, H. C. Howard, Anal. Chem., 25, 1303 (1953)). The spectra of 1-isopropylene indane and 1-cyclopentyl indane are similar to that of 1-methyl indane (same reference) but do not exclude the presence of an isomer substituted in position 2. A comparison

Card 1/2

between the spectra of 5-substituted indanes and that of 5-methyl indane indicated the presence of substituting groups both in position 5 and in position 4. Spectra of 5-substituted indanes and 1-isopropyl-5-tert-butyl indane displayed bands corresponding to 1,2,4-substitution. Spectral analysis shows that dicyclopentyl indane contains 4,7- and 5,6-isomers and perhaps even 4,6-isomers. In the case of 1-methyl-3-phenyl indane it could be proved that the phenyl-substituting group adds to the pentacyclic indane ring. The tertiary butyl groups of 1-isopropyl di-tert-butyl indane (N. E. Tsytovich, Ye. S. Pokrovskaya, Dokl. AN SSSR, 134, 119 (1960)) were found to be mostly in para- and ortho-position with respect to one another. The meta-isomer corresponding to the 1,2,3,5-substitution of the benzene ring is present in smaller amounts. There are 3 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR (Institute of Petrochemical Synthesis of the Academy of Sciences USSR)

TSYTOVICH, Nikolay Aleksandrovich, prof., zasl. deyatel' nauki i tekhniki; BYSTROVSKAYA, N.A., red.; SHERSTNEVA, N.V., tekhn. red.

[Soil mechanics] Mekhanika gruntov. Izd.4., perer. i dop. Moskva, Gosstroiizdat, 1963. 636 p. (MIRA 17:2)

1. Chlen-korrespondent AN SSSR (for TSytovich).

TSYTOVICH, Nikolay Aleskandrovich

"Instability of the mechanical properties of frozen grounds"

report to be submitted for the Intl. Conference on Permafrost, Purdue Univ., Lafayette, Indiana, 11-15 Nov 63

TSYTOVICH, N.A., red.

[Reports at the International Conference on Permafrost] Doklady na Mezhdunarodnoi konferentsii po merzlotovedeniiu. Pod red. N.A.Tsytovicha. Moskva, Izd-vo AN SSSR 1963. 258 p. (MIRA 17:9)

... International Conference on Permafrost. Lafayette, 1963. 2. Predsedatel' Natsional'nogo assotsiatsii SSSR po mekhanike gruntov i fundamentostroyeniyu, chlen-korrespondent AN SSSR.

TSYTOVICH, N.A., prof.

Complete settlement concentrated in a single building. Tekh. mol. 31 no.2:37 '63. (MIRA 16:6)

1. Deystvitel'nyy chlen Akademii stroitel'stva i arkhitektury SSSR, chlen-korrespondent AN SSSR.
(Russia, Northern—City planning)

TSYTOVICH, N. A. (Moscow)

"Some problems of deformability of disperse soil systems".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 January - 5 February 1964.

TSYTOVICH, N. A.; ZARETSKIY, Yu. K.

"Consideration of heterogeneity and non-linear character in analysis of bed creep."

report submitted for Intl Symp on Rheology & Soil Mechanics, Grenoble, France, 1-8 Apr 64.

LALETIN, Nikolay Vasil'yevich; TSYTOVICH, N.A., zasl. deyatel' nauki i tekhniki RSFSR, prof., doktor tekhn. nauk, retsenzent; ABELEV, Yu.M., prof., doktor tekhn. nauk, retsenzent

[Foundation-beds and foundations] Osnovaniia i fundamenty. Moskva, Vysshaia shkola, 1964. 379 p. (MIRA 17:11)

1. Chlen-korrespondent AN SSSR, Rukovoditel' kafedry Mekhaniki gruntov, osnovaniy i fundamentov Moskovskogo inzhenerno-stroitel'nogo instituta im. V.V. Kuybysheva (for TSytovich).

TSYTOVICH, N.A.

Physicomechanical processes in frozen ground. Osn., fund. i mekh.grun. 6 no.2:29-31 '64. (MIRA 17:4)

S/0225/64/000/003/0011/0014

ACCESSION NR: AP4039829

AUTHORS: Abelev, M. Yu.; Tsytovich, N. A.

TITLE: Problems of applying the seepage consolidation theory to strongly compressible saturated clayey soils

SOURCE: Osnovaniya, fundamenty* i mekhanika gruntov, no. 3, 1964, 11-14

TOPIC TAGS: soil, soil behavior, soil consolidation, clay, saturation condition, permeability, compressibility, Darcy law, porosity

ABSTRACT: The validity of the seepage consolidation theory as applied to saturated clayey soils with a compressibility coefficient $a > 0.1$ cm^2/kg was investigated at Kafedra "Mekhanika gruntov, osnovaniya i fundamenty" Moskovskoga inzhenerno-stroitel'nogo institute imeni V. V. Kuyby*sheva (Department of Soils Mechanics, Bases and Foundations at the Moscow Structural Engineering Institute). The work was undertaken because of the conflicting opinions published on this subject. The tested specimens (2, 4, 6, 8, 10, and 12 cm high) were made of loose clay and loam and of undisturbed loam. All experiments were conducted under water. It was

Card 1/4

ACCESSION NR: AP4039829

determined that under a pressure of no less than 1 kg/cm^2 maintained up to the consolidation of 75-80% the period of consolidation is directly proportional to the squares of the specimen heights. A strong deviation from the seepage consolidation theory was noted at loads below 1 kg/cm^2. The experiments proved that the structural compressive strength represents a definite and measurable quality of strongly compressible soils and that it is independent of the duration of pressure application under water. Numerous tests with vertical loads showed that the shearing strength of these soils is independent of their saturation and is determined by their structural cohesion ($\tau = c_c$). Compression tests revealed that the loads were resisted by the soil skeleton without any increase in the intrapore pressure. The relation between the coefficient of porosity and the coefficient of permeability was found to be logarithmic (see Fig. 1 on the Enclosure). It was determined that at the beginning of consolidation the permeability of the soils tested followed Darcy's law, but at a certain porosity (typical for every soil) the permeability deviates from this law. Further experiments showed that after the completion of settling the intrapore pressure does not drop to zero. The remnant pressure was 0.1-0.15 kg/cm^2 and did not change in the course of 34 days. In thick layers it was found to vary with the depth and breadth of the soil layer, increasing

Card 2/4

ACCESSION NR: AP4039829

with the distance from the draining surface. For design work its mean value may be calculated from the formula $u_{remn.} = I_0 h \Delta_B$, where $u_{remn.}$ is mean remnant intrapore pressure, I_0 is the original pressure gradient, h is 1/2 thickness of the layer of strongly compressible soil, Δ_B is density of water. The investigation of the effectiveness of sand drains in consolidation of saturated clayey soils was carried out with drains 4-8 cm in diameter in soil layers 50 cm in diameter and 50 cm thick, under the pressure of 1.5 kg/cm^2. The specimens rested on a 5-cm base of sand. Intrapore pressure and settling were measured at 10 points throughout the depth of each layer. Similar experiments without the use of drains provided the control data. Small drains were found less effective than the large ones because of their rapid filling with loam, but all drains proved highly effective in expediting the consolidation of weak soils. Orig. art. has: 5 graphs and 1 table.

ASSOCIATION: Kafedra "Mekhanika gruntov, osnovaniya i fundamenty" Moskovskogo inzhenerno-stroitel'nogo instituta imeni V. V. Kuyby*sheva (Department of Soils Mechanics, Bases and Foundations, Moscow Structural Engineering Institute)

SUBMITTED: 00 DATE ACQ: 26Jun64 ENCL: 01

SUB CODE: ES, AS NO REF SOV: 009 OTHER: 000

ACCESSION NR: AP4039829

ENCLOSURE: 01

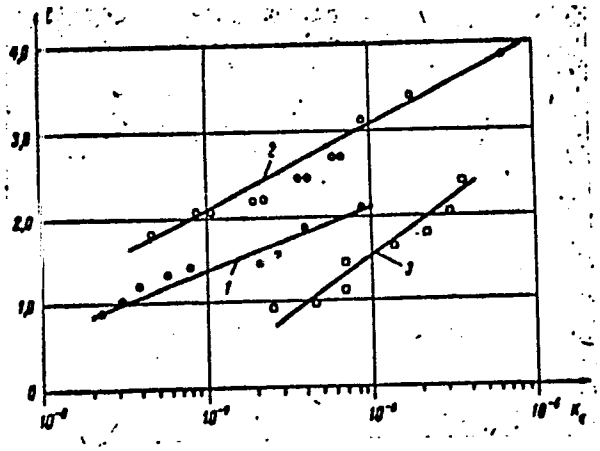

Fig. 1. Relation between the coefficient of permeability and the coefficient of porosity. 1- river loam (city of Arkhangelsk); 2- organo-mineral loam (city of Riga); 3- river loam (city of Volgograd).

Card 4/4

TSYTOVICH, N.A.

Conference on Cryopedology held in the United States. Vest. AN SSSR 34 no.5:110-112 My '64. (MIRA 17:6)

1. Chlen-korrespondent AN SSSR.

TSYTOVICH, N.A.; KOSTINENKO, G.I.

In the Committee (of the National Association of the U.S.S.R.) on Soil Mechanics and Foundation Engineering (KOMGF). Osn. fund. i mekh. grun. 6 no.4:31 '64. (MIRA 17:12)

1. Predsedatel' Komissii (Natsional'noy assotsiatsii SSSR) po mekhanike gruntov i fundamentostroyeniyu (for TSytovich).
2. Uchenyy sekretar' Komissii (Natsional'noy assotsiatsii SSSR) po mekhanike gruntov i fundamentostroyeniyu (for Kostinenko).

TSYTOVICH, Nikolay Aleksandrovich, zasl. deyatel' nauki i tekhniki prof.

[Theory and practice of foundation construction; results of the Fifth International Congress on Soil Mechanics and Foundation Construction] Teoriia i praktika fundamentostroeniia; k itogam V Mezhdunarodnogo kongressa po mekhanike gruntov i fundamentostroeniiu. Moskva, Stroiizdat, 1964. 92 p. (MIRA 18:5)

1. Chlen-korrespondent AN SSSR.

TER-MARTIROSYAN, Z.G.; TSYTOVICH, N.A.

Secondary consolidation of clays. Osn., fund. i mekh. grun. 7 no.5:12-15 '65. (MIRA 18:10)

TSYTOVICH, N.A., doktor tekhn. nauk, prof., zasl. deyatel' nauki i tekhniki, red.; DOLGOVA, K.N., red.

[Reports for the 6th International Congress on Soil Mechanics and Foundation Engineering] Doklady k VI Mezhdunarodnomu kongressu po mekhanike gruntov i fundamentostroeniiu. Moskva, Stroiizdat, 1965. 182 p. (MIRA 18:8)

1. Moscow. Nauchno-issledovatel'skiy institut osnovaniy i podzemnykh sooruzheniy. 2. Predsedatel' Natsional'noy assotsiatsii SSSR po mekhanike gruntov i fundamentostroyeniyu chlen-korrespondent AN SSSR (for TSytovich).

TSYTOVICH, N.A.

Sixth International Congress on Soil Mechanics and Foundation Engineering (Canada, 1965). Osn., fund. i mekh.grun. 8 no.1:33-34 '66.

(MIRA 19:1)

TSYTOVICH, V.

USSR/ Physics - Movement equations

Card 1/1 Pub. 22 - 9/40

Authors : Ivanenko, D., and Tsytovich, V.

Title : Relativistic equation of three-bound bodies

Periodical : Dok. AN SSSR 99/3, 373-376, Nov 21, 1954

Abstract : Properties of the interreacting operators are described. The operators were obtained in the process of the derivation of a movement equation for three bodies in an electromagnetic field reacting upon each other (only electromagnetically for simplicity). The equation was derived by a method based on the calculus of variations which led to the convariance of equation tensors which had been discussed by Wentzel. In the present article the derived equation differs somewhat from that obtained by Wentzel. Four references; 1-USSR and 4-Foreign (1951-1954).

Institution: Moscow State University M.V. Lomonosov

Presented by: Academician V.A. Lebedov, August 7, 1954

USSR/Physics - Relativistic TSYTOVICH, V.N. FD-1894

Card 1/1 Pub. 146-14/21

Author : Tsytovich, V. N.

Title : Relativistic corrections in the problem of two bodies

Periodical : Zhur. eksp. i teor. fiz. 28, 113-115, January 1955

Abstract : The author discusses the method of finding propagation functions in quantum electrodynamics by means of variational derivatives with respect to sources, this method being used to obtain the relativistic covariant equation of motion of the electron and positron interacting through an electromagnetic field. He points to the theoretical significance of taking into consideration the corrections to the relativization of two bodies in the case of interactions of positronium with external fields; first he has to consider the problem of finding the energy of interaction among the particles by means of the relativisitc equation for the bound states. He thanks Prof. A. A. Sokolv, M. M. Mirianashvili, and Prof. D. D. Ivanenko. Six references: e.g. V. B. Berestetskiy and L. D. Landau, ibid., 19, 673, 1949.

Institution: Moscow State University

Submitted : July 21, 1954

USSR/Physics - Electrodynamics Tsytovich, V.N. FD-1844

Card 1/1 Pub. 146-4/25

Author : Ivanenko, D., and Tsytovich, V. N.

Title : Theory of the loss of energy of charged particles through a ferromagnetic

Periodical : Zhur. eksp. i teor. fiz. 28, 291-296, March 1955

Abstract : The authors investigate the effect of saturation of energy losses when charged particles pass through ferromagnetics, as studied by D. Ivanenko and V. S. Gurgenidze (DAN SSSR, 67, 997, 1949; Vestnik MGU, 2, 69, 1950) and Ch. Weizsaecker (Ann. d. Phys., 17, 1933). They analyze the division of the losses into ionizational and Cherenkov losses. Nineteen references; e.g. V. N. Tsytovich, Vestnik MGU, 11, 27, 1951.

Institution: Moscow State University

Submitted : March 5, 1954

USSR/Physics - Relativity theory TSYTOVICH, V.N. FD-1858

Card 1/1 Pub. 146-16/25

Author : Tsytovich, V. N.

Title : Causal development of a connected system in relative time

Periodical : Zhur. eksp. i teor. fiz, 28, 372-374, March 1955

Abstract : In the relativistically variant [sic] equation describing the bound motion of two interacting particles (A. D. Galanin, ibid., 23, 488, 1952), each of the particles is ascribed its own time: t_1 and t_2. The author poses the interesting problem of how these two times are interconnected. Six references; e.g. V. N. Tsytovich, ibid., 28, 113, 1955 (on the effective energy of excitation in the theory of two bodies).

Institution: Moscow State University

Submitted : July 21, 1954

USSR/Nuclear Physics - Positronium spectrum FD-2340

Card 1/1 Pub. 146 - 5/34

Author : Tsytovich, V. N.

Title : Spectrum of positronium in external fields

Periodical : Zhur. eksp. i teor. fiz. 28, 664-678, Jun 1955

Abstract : The author finds the energy of interaction of a positronium atom with external electric and magnetic fields all the way up to terms of the order of $(v/c)^2$. He investigates the splitting of spectral lines of the positronium atom in weak and strong electric and magnetic fields. He calculates the Stark effect in weak and strong electric fields, and the probability of annihilation of a positronium in external electric and magnetic fields. He thanks Professor A. A. Sokolov. Fourteen references; e.g. A. I. Mukhtarov, Dissertation, Scientific-Research Institute of Physics, MGU*; A. A. Sokolov and V. N. Tsytovich, ibid. 24, 253, 1953.

Institution : Moscow State University (MGU*)

Submitted : March 13, 1954

Tsytovich, V. N.

530.145

4820. THEORY OF ELECTRON FIELD MASS IN THE PRESENCE OF A MEDIUM. A.A.Sokolov and V.N.Tsytovich. Zh. éksper. teor. Fiz, Vol. 30, No. 1, 130-40 (1956). In Russian.

Field contributions to the electron mass due to an external medium are considered. The electron-positron vacuum is taken into account in the calculations. A.

Moscow State U.

TSYTOVICH, VN.

4

Distr: 483d /484e

Sokolov, A. A., and Tsytovich, V. N. The theory of the electron mass in vacuo and in a medium

I-F-W

field equations of quantum electrodynamics are solved in second approximation for the emission and absorption of a photon in the medium. A convergent expression is obtained for this difference and for the corresponding level shift in a hydrogen atom. This shift is much smaller than the Lamb shift, but under normal pressure and temperature larger than the shift due to the interaction between the electron and the radiation field. *E. Gora.*

SOV/56-34-6-42/51

AUTHOR: Tsytovich, V. N.

TITLE: On the Interaction With a Medium of a Current Incident to It (O vzaimodeystvii so sredoy naletayushchego na neye toka)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 6, pp. 1646-1648 (USSR)

ABSTRACT: This paper analyzes the interaction of a constant rectilinear current I with a medium(with arbitrary μ and ε/ω). This medium may occupy the half-space $x \leq 0$. The current (the direction of which is parallel to the separating boundary) may move towards the medium with the constant velocity v that is perpendicular to the separating boundary. First a formula is given for the force which acts upon the unit length of the current. A method for the derivation of this formula is mentioned. Then this expression is specialized for a non-dispersing medium. For $\beta^2 > (\mu^2 - 1)/(\varepsilon\mu - 1)$ the attraction changes over to repulsion. The author gives the results for some special cases and thanks M. S. Rabinovich, M. L. Levin, and L. M. Kovrizhnykh who discussed the results of this paper. There are 3 references, 3 of which are Soviet.

Card 1/2

SOV/56-34-6-42/51

On the Interaction With a Medium of a Current Incident to It

ASSOCIATION: Moskovskiy gosudarstvennyy universitet
(Moscow State University)

SUBMITTED: March 10, 1958

Card 2/2

TSYTOVICH, V.N.

Chemical Abst.
Vol. 48 No. 9
May 10, 1954
Nuclear Phenomena

8

Radiation of fast electrons in a magnetic field in the presence of a medium. V. N. Tsytovich. *Vestnik Moskov. Univ.* 6, No. 11, *Ser. Fiz.-Mat. i Estestven. Nauk*, No. 7, 27-36(1951).—A simultaneous study is made of the effect of the radiant electron (Ivanenko and Pomeranchuk, *Doklady Akad. Nauk S.S.S.R.* 44, 343(1944); *C.A.* 38, 6153[9]; 43, 483*f*) and of the "super-radiant" electron (Frank and Tamm *C.A.* 31, 3779[9]), i.e., the properties of the radiation of an electron which is moving at a const. velocity in a circular path in a dielec. medium. It is assumed that for a certain range of frequencies the velocity of the charged particles can exceed the phase velocity of light in the medium. The results which are obtained can be applied to the movement of cosmic particles in a magnetic field, e.g., the earth's field.
J. Rovtar Leach

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24(3)
AUTHOR: Tsytovich, V. N.

TITLE: On the Interaction Between a Medium and a Ring Current Incident on It (O vzaimodeystvii so sredoy naletayushchego na neye kol'tsevogo toka)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 6, pp 1407-1416 (USSR)

ABSTRACT: The author bases his investigations upon a previous paper (Ref 1) which investigated the interaction between a medium taking up a half space and a constant rectilinear current impinging upon the latter with a constant velocity of $\beta = v/c$. The results given by this paper hold for a ring current only on certain conditions. This paper investigates the field of a ring current with radius a, which impinges with constant velocity v upon the medium taking up the lower half-space $z < 0$. This medium has arbitrary μ and ε. In the upper half space $\varepsilon = \mu = 1$. The position of the current ring is assumed to be parallel to the surface of the medium. Equations are set up for the current density, amperage I(t), radial function D(ϱ,a) and the potential A. Further, a short description is given of the method, which is based upon a Fourier (Fur'ye)-

Card 1/2

On the Interaction Between a Medium and a Ring Current Incident on It

decomposition of the potential equation. In the following, the integral equations for the determination of the Fourier components are derived, and the solution of the first approximation is determined and discussed (see figure 3). The dependence of the current on time is represented in a table for $c/r \gg \nu$ and $c/r \ll \nu (r = -vt)$. In conclusion, the two cases are dealt with separately for low and high velocities. The author thanks V. I. Veksler, M. S. Rabinovich, M. L. Levin and L. M. Kovrizhnykh for their discussions. There are 3 figures, 1 table, and 4 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

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24.2120

AUTHOR: Tsytovich, V. N.

TITLE: On Elastic Reflection of a Current Winding by a Plasma

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, No. 6, pp. 142 - 145

TEXT: The author deals with some dynamic problems of the collision of a circular current with a plane plasma boundary if the former is moving at nonrelativistic initial velocities. Rapid and slow collisions have to be distinguished. The former include collisions at which the duration of collision is shorter than the characteristic time connected with dissipative processes (electrical conductivity of the plasma, resistance of the winding, etc.). The reverse condition applies to the latter collisions. To produce a reflection, it is necessary that the collision is a rapid one, and that the potential barrier between winding and plasma is higher than the initial energy of motion of the ring towards the plasma. It is shown that under such conditions even a plasma of low density may represent a good reflector. The stability of this current ring depends on the circumstance inhowfar the ring diameter changes during collision. The author found a criterion

Card 1/3

which is fulfilled when the ring radius changes to a negligible extent. The problem as to the height of the potential barrier is dealt with at first. If the magnetic flux through the winding is conserved, $V = \Phi^2/2(L-M)$, where L is the instantaneous value of the self-inductance coefficient of the winding, M is that of the mutual-inductance coefficient, and Φ is the magnetic flux through the winding. Dispersive properties of the plasma restrict the growing of the potential barrier. Some respective details are discussed, and some characteristics of a collision with reflection are investigated theoretically. Among other things, it is shown that the losses (during collision) in the plasma are negligibly small if the duration of collision is short with respect to the mean frequency of collisions between electrons and plasma ions. A condition for the conductivity of the plasma can be derived from this fact. The energy losses caused by the resistance of the winding may be high if the Joulean heat formed by the collision is of the order of magnitude of the total energy of the winding before collision. A condition for the conductivity of the winding can be derived from this fact. Further expressions are given for the critical velocity and for the change in the radius of the winding during collision. In conclusion, the author thanks M. L. Levin and M. S. Rabinovich for discussions. There is 1 Soviet reference.

Card 2/3

69789

On Elastic Reflection of a Current Winding by a Plasma S/055/59/000/06/16/027
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ASSOCIATION: Kafedra elektrodinamiki i kvantovoy mekhaniki (Chair of Electrodynamics and Quantum Mechanics)

SUBMITTED: May 15, 1959

Card 3/3

TSYTOVICH, V.N.

Acceleration by radiation and the generation of fast particles under cosmic conditions. Part 2: Outbursts of supernovae. Astron.zhur. 41 no.1:7-18 Ja-F '64. (MIRA 17:4)

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

TSYTOVICH, V.N.

Effect of resonance properties of plasma on the propagation of electroacoustic waves. Vest Mosk. un. Ser. mat., mekh., astron., fiz., khim. 14 no.2:135-141 '59 (MIRA 13:3)

1. Kafedra elektrodinamiki i kvantovoy mekhaniki Moskovskogo gosuniversiteta.
(Resonance) (Plasma (Ionized gases))

23721
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24.2120 (3717, 3817, 1538)

AUTHOR: Tsytovich, V. N.

TITLE: Relativistic radiation of an annular current

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 665-675

TEXT: The present paper deals with radiation emitted by current-carrying annular plasma columns. A condition is found indicating that this radiation is weak, and it is shown that the radiation can always be relatively weakened by accordingly increasing the number of particles in a heavy plasma column with increasing energy. This does not depend on the selected shape of the plasma column, and holds generally for a coherent impact acceleration. First, the author studies the radiation of an annular current of the radius a, whose amperage changes with time according to $I = I(t)$ and the law of motion $z = z(t)$. It is assumed that the velocity at which the ring moves, remains perpendicular to the current plane during the whole time of acceleration. An example for the calculation of radiation losses is given. A retarded Green function is used to obtain the radiation intensity. In the center-of-mass system of a light ring colliding with

Card 1/6

Relativistic radiation of an annular ...

the heavy plasma column, the latter is assumed to be at rest during the collision, while the light ring collides with the heavy plasma column with an initial energy determined by $\gamma_\infty = \left[1 - \frac{v_\infty^2}{c^2}\right]^{-1/2}$. v_∞ is the initial velocity. The author shows that the case where the collision time $t_{coll} < \frac{a}{c}\gamma_\infty$, is not of interest for the impact acceleration, and makes the calculation for the case $t_{coll} \gg \frac{a}{c}\gamma_\infty$. He obtains

$$W = \frac{\pi a^4}{2c}\int\left\{\frac{I^2\omega^4}{c^8}\frac{36}{35(1-\beta^2)^7}(1+18\beta^2+21\beta^4)+\right.$$
$$+\frac{64I\omega^2}{35c^7}(3I\omega+I\dot{\omega})\frac{\beta(3+7\beta^2)}{(1-\beta^2)^6}+[3I\omega+I\dot{\omega})^2+6I\dot{I}\omega^2]\times \qquad (8)$$
$$\left.\times\frac{4}{15c^6}\frac{1+7\beta^2}{(1-\beta^2)^5}+\frac{16(3I\omega+I\dot{\omega})\dot{I}}{5c^5(1-\beta^2)^4}+\frac{4}{3c^4}\frac{\dot{I}^2}{(1-\beta^2)^3}\right\}dt.$$

Card 2/6

for the total radiation intensity W. (8) contains a multipole radiation of any order. As an example for the calculation of the radiation intensity, the author studies the radiation in the center-of-mass system during the collision of the heavy ring with a light one ($M \gg m$) in the case, where the currents in the rings before collision are almost equal to certain limit values $I^* = \frac{e N_e c}{2\pi a}$, $I_0^* = \frac{e N_{eo} c}{2\pi a}$, respectively. For W, he obtains

$$W = \frac{4\pi a I^{*2}}{2c^2} \frac{\gamma_\infty^{5/2} s^{3/2}}{g^{9/2}} \frac{8072}{11025} \varphi(\gamma_\infty) \qquad (17)$$

where $\varphi(\gamma_\infty)$ is expressed by

$$\varphi(\gamma_\infty) = \frac{\sqrt{\gamma_\infty^2 - 1}}{\gamma_\infty}\left\{1 - \frac{8219363}{32288\gamma_\infty^2} + \frac{6022579}{64576\gamma_\infty^4} + \frac{29182}{8072}\frac{1}{\gamma_\infty^6}\right\} + \qquad (18)$$

$$+ \frac{105}{8072\gamma_\infty^2} \ln\left(\gamma_\infty + \sqrt{\gamma_\infty^2 - 1}\right)\left\{8553 - 15217\frac{1}{\gamma_\infty^2} - \frac{11277}{8\gamma_\infty^4}\right\} +$$

$$+ \frac{105}{8072\gamma_\infty} \arccos\frac{1}{\gamma_\infty}\left\{-990 + \frac{21109}{\gamma_\infty^2}\right\}.$$

Card 3/6

Relativistic radiation of an annular ...

Asymptotically, $\varphi(\infty) = 1$. The $\varphi(\gamma_\infty)$ curve shows that values approaching the asymptotic values are only obtained with rather large γ_∞-values ($\gamma_\infty > 100$). The author compares the radiation intensity obtained with the radiation related with the annular charge for which he obtains

$$W_Q = \frac{4\pi n l^{*2}}{2c^2} \frac{4\pi\gamma_\infty^{3/2} s^{1/2}}{9g^{3/2}} \varphi_Q(\gamma_\infty), \quad \text{and} \tag{21}$$

$$\varphi_Q(\gamma_\infty) = \frac{\sqrt{\gamma_\infty^2 - 1}}{l_\infty} \left\{1 + \frac{2}{\gamma_\infty^2}\right\} - \frac{1}{3\gamma_\infty^2} \ln\left(\gamma_\infty + \sqrt{\gamma_\infty^2 - 1}\right). \tag{22}$$

A comparison of (21) with (18) shows that W and W_Q depend on γ_∞ in different ways: with sufficiently large γ_∞, W will always predominate. Then, the author finds the condition for the elasticity of collision, i.e., for the radiation which is slight as compared to the initial energy of the light ring: $j \gg \frac{\gamma_\infty^2 v^{3/2}}{x_\infty^{1/2} s^{1/2}} \frac{1}{\Lambda^{1/2}}$ (25) where $\Lambda = L/4\pi a$. This shows that radiation,

Card 4/6

as compared to the initial energy, may always be sufficiently small if the ratio of amperages in the coils is sufficiently high, i.e., if the ratio between the number of electrons in the heavy ring and the number of electrons in the light ring is large. Besides, it is necessary to fulfill the condition that a "reflection" (elastic or inelastic) occurs at all. It is $i > \frac{\nu\gamma_\infty^{3/2}}{x_\infty s^{3/2}}$. (26) If the number of electrons in the coil is sufficiently small (ν is large), a state is possible in which radiation is absolutely unimportant, i.e., if a reflection takes place, the latter will always be elastic. But if the radiation of the annular charge predominates, the author obtains the condition for the "elasticity" of the impact by comparing the radiation related with the annular charge with the initial energy of the light ring. The physical ideas on which the calculations described are based have been formulated by V.I. Veksler, whom the author thanks for discussing the paper. There are 1 figure and 4 Soviet-bloc references.

Card 5/6

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Relativistic radiation of an annular ...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: Jänner 5, 1960

Card 6/6

25022
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3.2310 (1395, 1489)

AUTHOR: Tsytovich, V. N.

TITLE: Transient radiation of a current passing through the boundary of a plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 7, 1961, 766-774

TEXT: In conducting this study, the author examined the transient radiation and the work performed by a rectilinear current passing at a constant velocity $\beta=\frac{v}{c}$ through a vacuum-to-plasma boundary, which is assumed to have a finite thickness with linearly decreasing density. The current is assumed to run parallel to the boundary. The plasma is located in a constant magnetic field perpendicular to the boundary and regarded as a uniaxial gyrotropic crystal. First, the calculations are performed for a sharp plasma-to-vacuum boundary in linear approximation with the magnetic field along the z direction, and the plasma in the region $z>0$. The components of the Fourier potentials of the current I have, under the conditions $\varphi=0$ and $\frac{\partial}{\partial x_i}\varepsilon_{ik}A_k=0$, the form

Card 1/9

Transient radiation of a current ...

$$A_l = \int a_l(k, \omega) e^{i\left(kz + l\frac{\omega}{v}(z-vt)\right)} d\omega dk; \quad l = 1, 2, 3, \tag{3}$$

$$\left.\begin{aligned} a_z = a_y = \frac{l}{c\pi v} \frac{g_3}{g_1 g_2 - \nu^2 g_3 \frac{\omega^2}{c^2}}; \quad a_1 = a_x = -l\nu \frac{g_3}{g_2} a_y, \end{aligned}\right\} \tag{4}$$

where

$$\left.\begin{aligned} g_1 = \frac{\omega^2}{v^2}(1 - \beta^2\varepsilon) + k_z^2; \quad g_2 = \frac{\omega^2}{v^2}(1 - \beta^2\varepsilon) + \frac{k^2\varepsilon}{\varepsilon_x}, \\ g_3 = \frac{\omega^2}{c^2} - \frac{k^2}{\varepsilon_x}. \end{aligned}\right\} \tag{5},$$

which leads to the solution

$$A_l^{\text{on.}} = \int d\omega dk \left(\Phi_{l1} e^{i(kz - \omega t + l\lambda_1 x} + \Phi_{l2} e^{i(kz - \omega t + l\lambda_2 x}\right), \tag{6}$$

Card 2/9

for the free field in the plasma, where

$$\lambda_{1,2}=\frac{\omega^2}{c^2}\varepsilon-k^2+\frac{1}{2}k^2\left(1-\frac{\varepsilon}{\varepsilon_z}\right)\pm\sqrt{\frac{1}{4}k^4\left(1-\frac{\varepsilon}{\varepsilon_z}\right)^2+\nu^2\frac{\omega^2}{c^2}\left(\frac{\omega^2}{c^2}-\frac{k^2}{\varepsilon_z}\right)}, \quad (7)$$

$\vec{\Phi}_{i1}$ and $\vec{\Phi}_{i2}$ are connected with $\vec{I}_{y1}$ and $\vec{I}_{y2}$ by the relation

$$i\nu\Phi_{x1,2}=\frac{\lambda_{1,2}^2-\frac{\omega^2}{c^2}\varepsilon+k^2}{\frac{\omega^2}{c^2}}\Phi_{y1,2};\quad \Phi_{x1,2}=\frac{i\nu k\lambda_{1,2}}{\varepsilon_z\left(\lambda_{1,2}^2-\frac{\omega^2}{c^2}\varepsilon+k^2\frac{\varepsilon}{\varepsilon_z}\right)}\Phi_{y1,2}. \quad (8)$$

With the same operations for the vacuum ($\lambda^2=\frac{\omega^2}{c^2}-k^2$; $\mathrm{Im}\lambda<0$; $k\vec{\Phi}_{x,o}+\lambda\vec{\Phi}_{z,o}=0$ (11)) one obtains

Card 3/9

Transient radiation of a current ...

$$\Phi_{y1}=\frac{s_0(\lambda-\lambda_2)a_y+s_2\left(\lambda-\frac{\omega}{v}\right)(a_y^0-a_y)}{s_2(\lambda-\lambda_1)-s_1(\lambda-\lambda_2)}, \quad (12)$$

$$\Phi_{y,2}=\frac{s_0(\lambda-\lambda_1)a_y+s_1\left(\lambda-\frac{\omega}{v}\right)(a_y^0-a_y)}{s_1(\lambda-\lambda_2)-s_2(\lambda-\lambda_1)}, \quad (13)$$

$$\Phi_{y,0}=\frac{s_2(\lambda_1-\lambda_2)a_y+\left[s_2\left(\lambda_1-\frac{\omega}{v}\right)-s_1\left(\lambda_2-\frac{\omega}{v}\right)\right](a_y^0-a_y)}{s_2(\lambda-\lambda_1)-s_1(\lambda-\lambda_2)}, \quad (14)$$

$$s_{1,2}=\frac{\lambda\lambda_{1,2}-\frac{\omega^2}{c^2}+\frac{k^2}{\varepsilon_z}}{\lambda^2_{1,2}-\frac{\omega^2}{c^2}\varepsilon+k^2\frac{\varepsilon}{\varepsilon_z}}; \quad s_0=\frac{\frac{\omega}{v}\lambda-\frac{\omega^2}{c^2}+\frac{k^2}{\varepsilon^2}}{\frac{\omega^2}{v^2}(1-\beta^2\varepsilon)+k^2\frac{\varepsilon}{\varepsilon_z}}. \quad (15)$$

With these solutions one finds the work performed by the current per unit length:

$$W_0=\frac{I}{c}\int\frac{\frac{\omega}{v}}{\lambda-\frac{\omega}{v}}\Phi_{y,0}d\omega dk, \quad (16a)$$

Card 4/9

Transient radiation of a current ...

(in vacuo) and

$$W_s = -\frac{I}{c}\int \frac{\omega}{v}\left(\frac{\Phi_{y,1}}{\lambda_1 - \frac{\omega}{v}} + \frac{\Phi_{y,2}}{\lambda_2 - \frac{\omega}{v}}\right) d\omega dk. \qquad (16b)$$

(in the plasma). In order to obtain the macroscopic mass renormalization, the solution of the current field has to be substituted in the expression for the energy of the field per unit length; in this way one obtains

$$\mathcal{E} = \frac{\pi v}{2}\int d\omega dk a_y^2 \left\{\left(\frac{\omega^2}{v^2} + k^2 + \frac{\omega^2}{v^2}\frac{\omega^2}{c^2}\frac{\nu^2}{g_2^2}\right) + \right.$$

$$+ \frac{\omega^2}{c^2}\left[\varepsilon + \omega\frac{d\varepsilon}{d\omega} + \frac{\nu^2}{g_2^2}\left(2\frac{\omega^4}{c^2 v^2} + 2\frac{\omega^2}{c^2}k^2\frac{\varepsilon}{\varepsilon_z} - \frac{\omega^2}{v^2}k^2\frac{1}{\varepsilon_z} - \frac{\omega^4}{v^4}\varepsilon - k^4\frac{\varepsilon}{\varepsilon_z} + \right.\right. \qquad (17)$$

$$\left.\left. + \frac{\omega^2}{v^2}\frac{k^2}{\varepsilon_z}\omega\frac{d\varepsilon_z}{d\omega} + g_3^2\omega\frac{d\varepsilon}{d\omega}\right) + 2\omega\nu\frac{d\nu}{d\omega}\frac{g_3}{g_2}\right]\Big\}.$$

The lower limit for the integration over the transverse momentum k is given by $k > k_{min} \sim \frac{1}{a}$, where a is the radius of curvature of the current. The

Card 5/9