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USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

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AGROTECHNOLOGY

SMUT CONTROL IN USSR

Moscow ZASHCHITA RASTENIY in Russian No 4, Apr 83 pp 8-11

[Abstract] A meeting devoted to the problems of smut and its control in the USSR was held in Moscow on January 25-28, 1983. The consensus of the participants, mostly agricultural scientists and researchers, was that there is a need to develop an all-encompassing approach to dealing with this problem. Controlling this problem will require coordination of administrative and technological resources in order to avoid needless dissipation of resources. The scientific institutions thus far have failed to provide effective directives for the control and elimination of smut, and in many cases the recommendations made have been of a preliminary and unconfirmed nature and, in fact, contradictory. The situation needs to be rectified as soon as possible in order to avoid further agricultural losses. Figures 4.
[408-12172]

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INTERACTION OF WHEAT LECTIN WITH FREE-LIVING NITROGEN-FIXING MICROORGANISMS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 3, Jan 84
(manuscript received 26 Jul 83) pp 751-754

KOTUSOV, V. V., SEMAK, N. N., SHCHEGOLEV, S. YU., POZDNYAKOVA, L. I.
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[Abstract] Interaction of lectins with free-living, nitrogen-fixing microorganisms was studied with use of an extract of soft spring wheat Saratovskaya-52 as a lectin preparation. Interaction of wheat lectin with *Azospirillum brasilense* Sp 7, *Spirillum azotocolligens* 129 and *Azobacter indicum* 79/9073 was revealed in an agglutination reaction. It was found that wheat lectin interacts with the free-living, nitrogen-fixing microorganisms studied. The high agglutination level during interaction of wheat lectin with *Azospirillum brasilense*, an associative microorganism for grain crops, was of special interest since it is

possible that this associativity is determined by the interaction between lectin and the carbohydrate structure of the cellular surface of the microorganism which evidently contains N-acetyl-D-glucoses. It is assumed that interaction of lectin with free-living microorganisms promotes the inclusion of nitrogen-fixers in the rhizosphere of grasses. Figure 1; References 12: 9 Russian, 3 Western.
[329-2791]

UDC 633.11:631.52

STUDY OF GROWTH TYPE GENETICS IN SOME SPRING WHEAT VARIETIES

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 18, No 1, Jan-Feb 84
(manuscript received 21 Jul 82) pp 46-50

RIGIN, B. V. and BULAVKA, N. V., Scientific Research Institute of Plant Growing, Leningrad, Mironovka Scientific Research Institute of Wheat Selection and Wheat Seed Growing

[Abstract] Features of growth-type genetics of spring varieties of Mironovka selection and varieties used as initial material to produce winter varieties are reported. The number of growth-type genes found in a dominant state was determined for 8 varieties. Varieties of the Mironovka Institute of Wheat Selection have the following genotypes which control the spring growth-type: Mironovskaya yarovaya--vrn 1, vrn 2, Vrn3, Mironovskaya rannyaya--vrn1, vrn2, Vrn 3, Bezostaya 4 yarovaya--Vrn1, vrn2, vrn3. Spring wheat varieties used at the institute as initial material have the genotypes: Artemovka--Vrn1, Vrn2, vrn3, World seeds 1877--Vrn1, vrn2, vrn3. Some spring wheat varieties contain biotypes differing in genes which control the spring growth-type. References 5: 2 Russian, 3 Western.
[426-2791]

UDC 577.155

SITE-SPECIFIC RESTRICTION ENDONUCLEASE FROM BACILLUS THURINGIENSIS STRAIN

Moscow DOKLADY AKADEMIT NAUK SSSR in Russian Vol 274, No 3, Jan 84
(manuscript received 7 Jul 83) pp 742-744

AZIZBEKYAN, R. R., REBENTISH, B. A., STEPANOVA, T. V., NETYKSA, YE. M. and
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and Selection of Industrial Microorganisms, Moscow

[Abstract] The restriction-Modification system designated as system Btil, observed for the first time by genetic and biochemical methods in strain Bac. thuringiensis Isr, is discussed and described. Genetic material obtained in the study indicates the existence of a restriction-modification system in strain Isr cells, which existence is confirmed by demonstrating the possibility of isolating restriction endonuclease from strain Isr cells. Restriction activity of the enzyme isolated from strain Isr is assessed by hydrolyzing DNA of various origin. On DNA of phage ϕ X174RF restrictase Btil has 1 recognition site, virus SV 40 has 6, plasmid pBR322 has 8 and PA03 has 2 cleavage sites. Bac. thuringiensis isolates only one site-specific Btil. Figure 1; references 9: 2 Russian, 7 Western.
[329-2791]

UDC 575.172+576.858.6

HYPERSENSITIVITY OF ELASTOSTRESSED DNA TO DNASE IN TRANSCRIPTION-ACTIVE MINICHROMOSOMES OF SV 40 VIRUS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 3, Jan 84
(manuscript received Aug 83) pp 754-758

LUCHNIK, A. N., BAKAYEV, V. V. and YUGAY, A. A., Institute of Developmental Biology imeni N. K. Kol'tsov, USSR Academy of Sciences; Institute of Molecular Biology, USSR Academy of Sciences, Moscow

[Abstract] Experiments which show that virus microsomes which are sensitive to DNase 1 are elastostressed are described and discussed. Results of the experiments support the authors' data--indicating that transcription-active microsomes contain elastostressed DNA--show that elastic stresses

in DNA by themselves (or changes of secondary structure of DNA caused by them) may serve as a cause of increased hypersensitivity of transcription-active chromatin to DNase I and justify the assumption that the accessibility of transcription-active chromatin for transcription of RNA-polymerase, like its accessibility for DNase I attacks, may be connected with conformational changes in the secondary structure of DNA, caused by elastic stresses. Figures 4; References 15: 1 Russian, 14 Western.
[329-2791]

UDC 577+547

TRANSFER MECHANISM OF AN ENZYME, ADSORBED ON SURFACE OF INSOLUBLE SUBSTRATE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 3, Jan 84
(manuscript received 5 Aug 83) pp 758-762

RABINOVICH, M. D., KLESOV, A. A. and BEREZIN, I. V., corresponding member
USSR Academy of Sciences, Moscow State University imeni M. V. Lomonosov;
Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow

[Abstract] General principles of analysis of enzymatic degradation of insoluble biopolymers which make it possible to demonstrate graphically the transfer of the enzyme between insoluble substrate particles and to determine the transfer of the enzyme between insoluble substrate particles and to determine the transfer rate with the use of an insoluble stained substrate are described and discussed. Stained insoluble cellulose OTs-31 (active organce) and unstained substrates are used. Kinetic curves of formation of stained products being firmly sorbed by the enzyme during various sequences of addition of stained and unstained substrates showed that the nature of the kinetics depends upon the order of addition of insoluble substrates. A substrate primarily completely bound with an unstained substrate may act on a stained substrate on several variants. A stained amorphous substrate has greater adsorption capacity than an unstained crystalline substrate. Sorption capacity of the unstained substrate increases in the course of amorphization. Liberation of the enzyme may be due not to dissolution of cellulose particles but due to desorption of the enzyme from the surface. Transfer of enzyme between substrate particles proceeds much more quickly than their complete hydrolysis. Figure 3; references 15: 6 Russian, 9 Western.
[329-2791]

ISOLATION FROM MYOCARDIUM SARCOLEMA OF A PROTEIN WHICH INDUCES DUCT Ca^{2+} -CONDUCTANCE OF BILAYER LIPID MEMBRANES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 3, Jan 84
(manuscript received 23 Aug 83) pp 764-768

KOSTYUK, P. G., academician, KURSKIY, M. D., VOROBETS, Z. D. and SOKOLOV, YU. V., Institute of Physiology imeni A. A. Bogomolets, UkSSR Academy of Sciences; Institute of Biochemistry imeni A. V. Palladin, UkSSSR Academy of Sciences, Kiev

[Abstract] An attempt to isolate a rabbit myocardium sarcolemma component possessing selective Ca^{2+} -transporting properties during its reconstruction in bilayer lipid membranes (BLM) is described and discussed. Ion-transporting properties of 5 fractions obtained chromatographically were studied by measuring their electrical characteristics. Protein-possessing selective Ca^{2+} -transporting activity is present only in fraction I. Introduction of this protein, with a molecular mass of kD, from both sides into a solution washing the BLM-induced electrical conductance of the membrane which depended on the presence of Ca^{2+} in the washing solution. Figures 4; references 13: 1 Russian, 12 Western.
[329-2791]

ABIOGENIC FORMATION OF PURINES AND PYRIMIDINES UNDER CONDITIONS SIMULATING ASH-GASEOUS CLOUDS DURING VOLCANIC ERUPTIONS

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian
Vol 20, No 1 (manuscript received 10 Nov 82) pp 3-8

LAVRENT'YEV, G. A., STRIGUNKOVA, T. F., YEGOROV, I. A. and MISHIN, L. N., Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow

[Abstract] Abiogenic synthesis of purine and pyrimidine bases from simple gases (CO_2 , N_2 , H_2O , NH_3) was studied under conditions of modeling ash-gaseous clouds forming during volcanic eruptions. These conditions recreated in a reactor included electric discharge, temperature reaching 530°C , a mineral catalyst in "boiling" state and considerable temperature gradients. In the presence of ash, the products included uracil, thymine, adenine and guanine in 10^{-6} to $10^{-7}\%$ yield based on the vapor-gas mixture passed through the reactor; without ash the last two products were absent. It was proposed that during a primitive stage of earth development, the ash-gaseous clouds played an important role in synthesis of prebiological compounds. Figures 3; references 8: 5 Russian (1 by Western authors, 3 Western.
[373-7813]

IMPROVEMENT OF ORGANIZATION OF BIOCHEMICAL REAGENT PRODUCTION

Riga IZVESTIYA AKADEMII NAUK LaSSR in Russian No 11, Nov 83
(manuscript received 13 Jun 83) pp 32-34

ZAMAKH, V. P. and KUFTINA, O. V., "Biokhimreaktiv" Scientific and Production Association

[Abstract] Organizational aspects of methods which should be introduced to ensure adequate production of biochemical reagents in the republic are described and discussed with emphasis on activities of the "Biokhimreaktiv" Scientific and Production Association which produces nearly one half of the reagents produced in the republic. Recommendations presented include: transfer of non-specialty production to other enterprises; increase of experimental production in order to develop new reagents; production of traditional biochemical preparations at series production plants or at newly constructed specialized plants; provision of an effective organizational and economic mechanism of cooperation of the Association with scientific organizations, colleges and individual scientists; specialization of production; organization in 1985 of highly specialized production of biochemical output from non-food material from the ocean and fish industry wastes; improvement of the material and technical base: production of reagents which can be stored and used when needed; creation of a centralized bank of methods of producing biochemical reagents and improvement of provision of raw materials.
[333-2791]

THERMODYNAMIC FORMULATION OF MEMBRANE TRANSPORT

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA. BIOLOGIYA in Russian
No 2, Apr-Jun 83 (lecture read on 10 Dec 81) pp 3-18

THELLIER, M., RIPOLL, C., DEMARTY, M., LASSALLES, J. P., VINCENT, J. C.,
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tory of Chemistry of Macromolecular Compounds, E.R.A., National Scientific
Research Center, Mont-Saint-Aignan, France

[Abstract] (This article is a translation, from French, of a report delivered at Moscow State University, 10 Dec 81) Models of transmembrane transport which are based on models of homogeneous enzymatic catalysis are generally limited in their applications, and it appears that thermodynamic formulations might better describe the actual situation. Thermodynamics of equilibrium states allow for the introduction of parameters such as selectivity and activity coefficients, which are characteristic of a compartmental approach. In addition, linear thermodynamics of irreversible processes facilitate discussion of transmembrane transport from one compartment to another, and to define perturbations that interfere with such a transport. It is then possible to identify those mechanisms that are intimately related to chemical reactions, i.e., active transport, for which equations of flux coordination are inapplicable. In the nonlinear area, thermodynamics make possible an appreciation of unstable elements and oscillating or variable parameters that can seriously complicate any experimental approach. Figures 7; references 39: 2 Russian, 37 Western.
[424-12172]

STEADY-STATE ELECTRON TRANSFER IN PHOTOSYNTHETIC SITES

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 6 May 83) pp 13-18

SHINKAREV, V. P., ZHERDEV, A. V. and RUBIN, A. B., Biological Faculty,
Moscow State University imeni M. V. Lomonosov

[Abstract] A series of differential and algebraic equations are advanced for electron transfer in photosynthetic centers, which take into consideration light intensity and electron concentration in donor and acceptor particles in a previously described kinetic model [Rubin, AB & Shinkarev, VP, Electron Transfer in Biological Systems [in Russian], Moscow, 1984]. The resultant calculations demonstrated that the electron density on the donor and acceptor sides of the active centers depends on the overall rate constant and is S-shaped. These calculations demonstrated that in the presence of a hierarchic system of rate constants in a steady-state system a relatively simple description of electron transfer in the active centers is possible. References 10: 8 Russian, 2 Western. [365-12172]

EFFECTS OF CALCIUM IONS ON THERMOLUMINESCENCE OF LIPID PEROXIDATION

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 31 Mar 82) pp 60-64

MUKALOV, I. O., GOYDA, Ye. A., KUSEN', S. I. and DANILEVICH, N. I.,
Institute of Biochemistry imeni A. V. Palladin, Ukrainian SSR Academy
of Sciences, Kiev

[Abstract] In view of the preliminary reports that Ca^{++} may enhance lipid peroxidation, studies were conducted on the effects of addition of CaCl_2 to a system designed to evaluate thermoinduced lipid peroxidation, using loach eggs, oocytes, muscles and embryos and rat liver. Ca^{++} was observed to potentiate peroxidation and the appearance of a blue-violet component in the emission spectrum which is absent if Ca^{++} is not added. The kinetics of the observed light emission coincided with the kinetics of lipid peroxide accumulation. These data were interpreted to indicate that Ca^{++} promotes free radical lipid peroxidation, and that a similar mechanism may be at play in native biological membranes. Since lipid peroxidation is a key mechanism in the function of biological membranes, such a mechanism may also be involved in cellular proliferation and differentiation during embryogenesis. Figures 6; references 22: 13 Russian, 9 Western. [365-12172]

BIOTECHNOLOGY

GREAT POTENTIAL IN BIOTECHNOLOGY

Moscow MOLOCHNAYA PROMYSHLENNOST' in Russian No 11, Nov 83

SHILER, G. G., candidate of technical sciences, Scientific Industrial Association "Uglich"

[Abstract] Some of the advantages of bioengineering methods are discussed with emphasis on processes being used in the dairy industry, especially in cheese-making in which enzymatic processes are being used to accelerate the cheese-making process and to improve the taste, color, aroma and consistency of the cheeses. Prospects for using gene engineering achievements to give bacterial leavens such valuable properties for cheese-making as polyvalent resistance to bacteriophages, active antagonistic action against harmful microflora and provision of the required proteolytic and lipolytic action were discussed. An enzyme preparation of fungal origin (lipogeotin), developed at the Scientific Industrial Association "Uglich," accelerates the cheese-making process by 15-20 days. The need to develop low-calorie, high-protein, low-fat dairy products to provide a balanced diet for persons leading a sedentary life style is discussed. Plyubagin, which inhibits development of microflora in dairy products and renders them harmless to man, has been developed jointly by the Scientific Industrial Association "Uglich" and the Nikitskiy Botanical Garden of the USSR Academy of Sciences.
[341-2791]

ENVIRONMENT

UDC 595.32/33:591.524.1(26)

SHIFT OF CRITICAL SALINITY BARRIER IN CASPIAN SEA AND ARAL SEA WITH
BRANCHIOPODA AND OSTRACODA AS EXAMPLES

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 5, May 83
(manuscript received 17 Feb 82) pp 689-693

ALADIN, N. V., Zoological Institute, USSR Academy of Sciences, Leningrad

[Abstract] An attempt to establish experimentally whether or not the upper barrier of critical salinity for lower fresh water Crustacea is shifted in the Caspian Sea and Aral Sea is presented. In addition to the theoretical importance of deciding this question, it also has practical importance in attempts to predict the change of biological resources of the Caspian Sea and Aral Sea as their salinization progresses. It was found that the critical salinity barrier (5-8 percent) is shifted to higher concentrations in these seas according to the study of 16 fresh water and brackish water species of Branchiopoda and Ostracoda. There was a coincidence of the upper limits of salinity-tolerant ranges for chlorinity, making it possible to express the critical salinity in terms of the chlorinity index. The critical salinity zone in these seas has greater range between extreme points than is the case with seas with oceanic salt composition. Figure 1; References 24: 17 Russian, 7 Western.
[1003-2791]

APPLICATION OF MATHEMATICAL THEORY OF EXPERIMENTAL ANALYSIS TO ASSESSMENT OF COMBINED EFFECTS OF CHEMICAL AGENTS

Moscow GIGIYENA I SANITARIYA in Russian No 1, Jan 84
(manuscript received 22 Jun 83) pp 39-41

SOVA, R. Ye., All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev

[Abstract] A survey is presented of the various mathematical approaches that can be taken to an analysis of the combined effects of various chemical agents. A useful approach is the use of factor analysis in combination with regression analysis, which permits an evaluation of the combined physiological effects. Such effects can either reflect independent action of the chemicals manifested as antagonism or synergism leading to an additive effect, coalition, or mutual interdependence. The latter category of interaction can lead either to antagonism, an effect that is less than additive, or to synergism with a net effect that is more than additive. References 19: 18 Russian, 1 Western.
[403-12172]

UDC 613.632.4+614.72]:615.9]-074:543.42.062

COMBINATION OF CHROMATOGRAPHY AND MASS SPECTROMETRY IN ANALYSIS OF TOXIC SUBSTANCES ADSORBED ON DUSTS

Moscow GIGIYENA I SANITARIYA in Russian No 1, Jan 84
(manuscript received 14 Apr 83) pp 44-47

DMITRIYEV, M. T., RASTYANNIKOV, Ye. G., ETLIN, S. N. and MALYSHEVA, A. G., Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow

[Abstract] Description is provided of the application of a combination of mass spectrometry and chromatography to the analysis of toxic substances adsorbed on dust particles. The results of such an analysis, summarized in tabular form, demonstrate that adsorption of various organic chemicals on dust particles is a widespread phenomenon, and that the category of such chemicals includes saturated, unsaturated and aromatic hydrocarbons, aldehydes, ketones, nitriles, alcohols, esters, furanes, organosulfur compounds, etc. Many of the adsorbed chemicals are extremely toxic (acrylonitrile, chlorophenol, styrene, benzamide, propionitrile, etc.) Figures 2; references 7: 5 Russian, 2 Western.
[403-12172]

HYGIENIC SIGNIFICANCE OF SURFACTANTS IN ENVIRONMENT

Moscow GIGIYENA I SANITARIYA in Russian No 1, Jan 84
(manuscript received 18 May 83) pp 53-55

VOLOSHCHENKO, O. I and MUDRYI, I. V., Kiev Scientific Research institute
of General and Communal Hygiene imeni A. N. Marzeyev

[Abstract] A review is presented of the current state of environmental pollution with various surfactant agents, the effects on health and welfare of humans and animals, and of the methods that may be employed for a more accurate assessment of the problem and its correction or prevention. Any attempt in the public health sector must take into consideration the entire scope of the problems (pollution of the soil, air, water resources, food chain, etc.) as well as the steps that can and must be taken at the source of the problem, i.e., the manufacturing of such agents. One important aspect is a thorough understanding of the migration of the surfactants in the environment, their biological and nonbiological transformation and degradation in the environment, and the fate of the degradation products and their danger to health. References 40: 30 Russian, 10 Western.
[403-12172]

EFFECTIVENESS OF VARIOUS SAMPLE COLLECTORS IN BACTERIOLOGICAL AIR ASSAYS

Moscow GIGIYENA I SANITARIYA in Russian No 1, Jan 84
(manuscript received 13 Jul 83) p 63

BEREZHKINA, G. N., POLYAKOVA, V. A., GIPP, Ye. K. and YELIZAROVA, Z. D.,
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[Abstract] Comparative evaluation was conducted on air sample collectors PAB-1 and Krotov's apparatus in assessment of bacterial concentration in a given air sample. Although PAB-1 apparatus was found, in general, to be comparable in efficiency and reliability to Krotov's apparatus, its large size, inappropriate disposition of electrodes, and the lack of a timer were deemed a hindrance to routine use. These shortcomings in PAB-1 should be corrected before the decision is made to mass produce this unit.
[403-12172]

UDC 579.841.11.001.33

IDENTIFICATION OF PSEUDOMONAS PSEUDOMALLEI

Moscow LABORATORNOYE DELO in Russian No 7, Jul 83 pp 61-62

ILYUKHIN, V. I., POPOVTSEVA, L. D. and PIVEN', N. N., Volgograd Scientific Research Anti-Plague Institute

[Abstract] Two tables listing Pseudomonas properties are presented which have been used as an aid in the identification of Ps. pseudomallei. The first table contains standard Pseudomonas characteristics for generic identification, i.e., Gram stain (-), flagellation (+), catalase activity (+), cytochrome oxidase activity (+), and oxidative glucose fermentation (+). The second table provides criteria for species identification, which includes dissociation, carbohydrate oxidation data, decarboxylase activity, pigment formation, and so forth.
[420-12172]

UDC 576.895.42

TICK-BORNE RELAPSING FEVER IN UZBEKISTAN: NIDI AND MORBIDITY

Leningrad PARAZITOLOGIYA in Russian Vol 18, No 1, Jan 84
(manuscript received 7 Apr 83) pp 10-14

VASIL'YEVA, I. S., SHARIPOV, M. K., YERSHOVA, A. S., MANSUROV, A. A., MUKHITDINOV, A. G., IBRAGIMOV, Yu. I. and USMANOV, S. U., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, Moscow; Uzbek SSR Ministry of Health, Tashkent

[Abstract] Epidemiologic studies were conducted in 1977-1979 and in 1982 in the Namangan and Andizhan oblasts of Uzbekistan to assess the current danger of tick-borne relapsing fever. Despite significant progress made in public health in the Central Asian republics in the eradication of the tick vectors, and other control measures, these studies revealed that in the oblasts under consideration 27-80% of the cattle barns and

sheds harbored the tick vectors. These observations indicate that the danger of human outbreaks of tick-borne relapsing fever continues to be a source of legitimate concern. New methods must be developed for the eradication of the ticks and closer monitoring of potential breeding sites must be maintained. References 19 (Russian).
[430-12172]

UDC 616.935-036.2(047)

CURRENT STATE OF DYSENTERY EPIDEMIOLOGY: LITERATURE REVIEW

Kiev VRACHEBNOYE DELO in Russian No 7, Jul 83
(manuscript received 12 April 82) pp 94-99

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[Abstract] A literature review of largely Soviet sources is presented on the current status of dysentery and its epidemiology. Consideration of the pathogens includes an analysis of their biological and physiological characteristics, the regional distribution of the shigellae, morbidity patterns, seasonality of outbreaks, and so forth. Other topics reviewed included antibiotic resistance, susceptibility of the aged and infirm and of infants and children, and the shifting pattern of morbidity from the warmer to the cooler months. In recent years there has also been a gradual shift in the etiologic agents, in that Flexner's bacillus appears to be yielding ground to the Sonne bacillus as an etiologic agent in a predominant number of cases. Such observations point to the need for continuous epidemiologic monitoring of this interesting and challenging disease entity. References 86: 75 Russian, 11 Western.
[414-12172]

PREVENTION OF CROSS-INFECTION IN HEPATITIS TYPE A

Kiev VRACHEBNOYE DELO in Russian No 7, Jul 83

(manuscript received 9 Dec 82) pp 105-107

TISHCHENKO, K. T., STROGANOV, B. V., GOLYUSOVA, Ye. V., TAT'YANKO, N. V. and KRASOVITSKIY, Z. I., Consultant Polyclinic, Kiev Scientific Research Institute of Epidemiology and Infectious Diseases imeni L. V. Gromashevskiy, Ukrainian SSR Ministry of Health; No 1 City Hospital, Sumy

[Abstract] Several hundred pediatric and adult cases of hepatitis A were analyzed in order to determine steps that have to be taken to prevent cross-infection with hepatitis B virus. The results showed that joint hospitalization of both types of cases runs a serious risk of cross-infection of the former patients with the B virus, as indicated by the appearance of HBsAg in the area of the hepatitis A patients that were negative prior to hospitalization. In order to avoid and prevent such nosocomial infections, it is recommended that, whenever possible, patients with mild type A hepatitis be maintained on home care. In other cases, patients with hepatitis type A should be kept separately from patients with hepatitis B.

[414-12172]

UDC 576.895.421

POPULATION DENSITIES OF CARRIERS AND VECTORS OF TICK-BORNE ENCEPHALITIS VIRUS IN ENDEMIC AREAS

Leningrad PARAZITOLOGIYA in Russian Vol 16, No 5, Sep-Oct 82 pp 395-403

NAUMOV, R. L., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] For a period of 14-17 years, 20-40 sites in the Dzhoykoy range of the Western Sayans were followed and monitored for the population densities of small mammals and the imago, nymph and larval stages of the tick Ixodes persulcatus, in order to evaluate these parameters as factors responsible for the maintenance of the tick-borne encephalitis virus in the region. Evaluation of the correlation coefficients for the mammal and tick populations revealed that such situations are best assessed in terms of critical ranges of the populations in question. In general, the overlap among the biotic populations, i.e., between the small mammals and the ticks and among the tick stages, is such that the virus and its various strains are maintained in the region with no break in transmission and, consequently, the area remains endemic and poses a threat to human health. Figures 1; references 10 (Russian).

[432-12172]

CLINICAL-EPIDEMIOLOGICAL CHARACTERISTICS OF LEPTOSPIROSIS

Kiev VRACHEBNOYE DELO in Russian No 12, Dec 83
(manuscript received 16 Feb 83) pp 100-103

ZEYGERMAKHER, G. A. and CHERNOKOZINSKIY, A. A., Zaporozhye Institute for the Advanced Training of Physicians and Zaporozhye Oblast Branch of Public Health

[Abstract] First incidences of leptospirosis in Zaporozhye Oblast were noted in 1951. For the first 15 years thereafter, this disease was not reportable and it exhibited a sporadic incidence pattern. Starting from 1977, when leptospirosis spread among cattle, human cases among the meat-handlers began to be noticed. In 1982, nine cases on a single site were registered, all occurring within five days, all of them working with animals; water was suspected as the carrier of the infection. During the same time, seven sporadic patients were registered who contacted the disease through natural microfoci of infection. Comparison of the clinical course of this disease in both groups showed that when it developed under agricultural conditions, it had a much milder course. Marginally, it was noted that only one of the 16 cases had been diagnosed properly. References: 5 (Russian).
[396-7813]

SUCCESSFUL TREATMENT OF TETANUS ON BASIS OF VACCINATION

Alma Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 11, Nov 83 p 70

UTEPOV, B. U., KURMANBAYEV, Ye. K. and MUKHAMBETOV, K. R., Kzyl-Ordinsk City Hospital

[Abstract] The authors report on treatment of a tetanus case subsequent to 2nd-3rd degree thermal burns on 5% of the patient's body, the right shoulder and armpit. Emergency medical treatment 6 hours after the accident had included burn treatment and anti-tetanus vaccination. After 20 days, the patient manifested signs of tetanus, and was given emergency room treatment for suffocation and other symptoms. Injections included diazepam, sodium thiopental, rheopolyglucin, heparin and spasmolytics. Pneumonia was also treated when it appeared. Some 17 days after hospitalization, the patient had recovered sufficiently to be released for outpatient treatment. The grafted burn area healed completely.
[397-12131]

DIAGNOSIS OF BRUCELLOSIS AND EVALUATION OF LABORATORY DATA

Alma Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 11, Nov 83 pp 35-38

REMENTSOVA, M. M., SHLEKENOVA, R. Z., KURMANOVA, K. B., SAKHISHEVA, S. Sh. and VARLAMOV, N. N., Institute of Epidemiology, Microbiology and Infectious Diseases, KaSSR Ministry of Health; Republic Public Health and Epidemiological Station, KaSSR Ministry of Health

[Abstract] Long experience has shown that practicing physicians poorly diagnose brucellosis in various animals, partially by failing to use or properly interpret available laboratory tests. At the authors' institute, 624 cases were observed in the period 1971-1982. In this group 256 incorrect diagnoses were made, including rheumatism, bronchitis, pneumonia and others. A lengthy case history is given as an example, in which a female patient was treated for ailments such as acute cholecystitis and acute pyelonephritis without running a hemoculture. Practicing physicians should consider a broad range of factors, including epidamnosis, collected environmental items such as milk, meat, hides and their derivatives, and results of hemocultures and other serological investigation before establishing a diagnosis. The Wright and Burne reactions and endemic histories are also guidelines in determining a brucellosis diagnosis. Kazakhstan is known to have Brucella infections in small horned livestock, and therefore, special attention should be directed at considering brucellosis infections.

[397-12131]

SOURCES OF BRUCELLOSIS INFECTION AT PRIMARY WOOL PROCESSING PLANT

Alma Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 11, Nov 83 pp 60-61

OMIROVA, R. Yu., TURDYMATOVA, M. T., ULMANOVA, K. A. and ISLAMOV, R. Z., Dzhambul Pedagogic Institute; Dzhambul Oblast Veterinary Laboratory

[Abstract] The Dzhambul primary wool processing plant receives fleeces from Kazakhstan, Mongolia, Australia, Argentina, New Zealand and Uruguay. They are then quarantined for 2 months in accordance with veterinary regulations. Yet, 10 to 23% of workers at the plant suffer brucellosis infections. The present article reports on an attempt to pinpoint the technological operation most likely to be the source of infections. Workers were checked for prior infection, vaccinated, and studied by Wright, Heddleson and Burne skin allergy tests. Results showed much higher incidence of infection among workers of the sorting and classification team. A possible sensitization by subinfectious amounts of brucellosis pathogen was observed in these workers. References 2 (Russian).

[397-12131]

TREATMENT OF BRUCELLOSIS (HELP FOR PRACTICING PHYSICIANS)

Alma Ata ZDRAVOOKHRANENIYE KAZAKHSTANA in Russian No 11, Nov 83 pp 65-68

KASATKINA, I. L., Department of Infectious Diseases, Alma Ata Medical Institute

[Abstract] The author provides guidelines from her own experience on how to diagnose and treat brucellosis. Since there are wide differences in the nature and course of the disease, various combinations of antibiotics and vaccines may be required. Often two compatible antibiotics, such as streptomycin and tetracyclin, may be effective. Penicillin has been found to be ineffective. According to the patient's response, antibiotics may be continued, or other combinations attempted, and if no fever is present, none should be prescribed at all. The author views vaccine therapy as ineffective in treating brucellosis. She warns of the need for caution in treatment to avoid harmful side effects of various medications and therapies. Novocain or hydrocortisone "blockading" may be useful, but individual cases are the determining factors. Anti-inflammation treatment, including hydrosteroids, are indicated for allergic myocarditis, which occurs only occasionally. In the absence of acute symptoms such as temperature and inflammation, rehabilitational therapy is indicated. Conservative treatment is the general rule. Psychological factors, and the need for normal work and rest, must also be considered. References 4 (Russian). [397-12131]

UDC 579.843.1.083.33

SEROTYPING OF VIBRIO EL TOR SEROVAR INABA

Moscow LABORATORNOYE DELO in Russian No 8, Aug 83
(manuscript received 30 Apr 82) p 62

KOZHUKHOV, I. G., ISAYEVA, G. P., KRASNOUSOVA, N. V. and MENYAYKIN, A. K.

[Abstract] A difficult point in the serodiagnosis of cholera is the antigenic lability of the vibrios, which can lead to confusing and unreplicable serologic results. In order to define the conditions under which diagnostic serology would have more credibility, studies were conducted which demonstrated that a number of El Tor vibrios initially typeable by agglutination at 37°C within 3.5-4 h of growth by Inaba antisera, are not reactive or are weakly reactive if the results are read at 21 h. Reculturing such vibrios again leads to positive serologies in 3.5-4 h with type-specific Inaba antisera. Therefore, recommendations are made that, for the purpose of rapid bacteriologic diagnosis, the El Tor vibrios be grown for 6 h and preliminary serologic readings be taken at 3.5-4 h at 37°C. References 6: 5 Russian, 1 Western. [419-12172]

PROSPECTS FOR USING INTEGRATED METHODS IN COMBATING BLOOD-SUCKING
ARTHROPODS IN LIGHT OF RESOLUTION OF KEY NATIONAL ECONOMIC GOALS

Moscow MEDITSINSKAYA PARAZITOLOGIYA in Russian No 1, Jan-Feb 84 pp 3-5

ALEKSEYEV, A. N., Moscow

[Abstract] Improved labor productivity and decreased turnover of personnel in agricultural occupations require improved control of mosquitoes, ticks and other blood-sucking arthropods. While malaria, acarid-bite encephalitis and other diseases have largely been controlled, much remains to be accomplished in areas such as pesticide resistance problems, control and elimination of breeding grounds, etc. Methods including biodegradable insecticides, biological means of control and permanent environmental improvements (e.g., land drainage), are all necessary to achieve permanent elimination of these annoying and harmful pests. Insecticides that take the development of resistance into account, biological means such as larva-eating fish and bacteria, are recommended. Soviet workers also employ mechanical means of protection in the form of the "Zhukovoy uniform" to ward off ticks and flying arthropods.
[434-12131]

UDC 576.895.771:591.67:576.893.192.6].95.8

COMPARISON OF FLIGHT CAPABILITY OF AEDES AEGYPTI THAT ARE INFECTED AND
NOT INFECTED WITH PLASMODIA

Moscow MEDITSINSKAYA PARAZITOLOGIYA in Russian No 1, Jan-Feb 84
(manuscript received 31 May 83) pp 11-13

ALEKSEYEV, A. N., ABDULLAYEV, I. T. and RASNITSYN, S. P., Institute
of Medical Parasitology and Tropical Medicine imeni Ye. M. Martynovskiy,
USSR Ministry of Health, Moscow

[Abstract] Numerous recent studies have considered the effect of parasites on mosquitoes, such as increased mortality and reduction of flight range. Since the authors were unable to study *An. pulcherrimus* directly due to the absence of available malaria victims, they selected instead *Ae. aegypti* and its parasite *Plasmodium gallinaceum*. Laboratory mosquitoes were nourished with chickens infected with *P. gallinaceum*, and then their flight range determined using a flight chamber device. Contrary to expectations, the infected insects had greater range than the uninfected controls. Subsequent tests and closer analysis indicated that precise species of both mosquito and parasite must be defined to obtain an accurate reading of the effects of oocysts on flight capability. References 8:
4 Russian, 4 Western.
[434-12131]

UDC 576.895.771.01(571.52)

FLIGHT RANGE OF AEDES SPECIES MOSQUITOES FROM BREEDING GROUNDS IN THE
TUVA STEPPE ZONE (CENTRAL TUVA BASIN). REPORT 1. FLIGHT RANGE OF
A. VEXANS

Moscow MEDITSINSKAYA PARAZITOLOGIYA in Russian No 1, Jan-Feb 84
(manuscript received 14 Apr 83) pp 18-22

PROSKURYAKOVA, A. M. and MARKOVICH, N. Ya., Institute of Medical Parasitology and Tropical Medicine imeni Ye. I. Martsinovskiy, USSR Ministry of Health, Moscow

[Abstract] The flight ranges of species of mosquitoes, including *Aedes vexans*, *A. sticticus*, *A. cinereus* and *A. c. caspius*, were studied in the Yenisey left bank region, the upper reaches of the future Sayanskiy reservoir. Their breeding habits and flight ranges were studied in relation to meadow marshes, higher terrain, open steppe and piedmont terrain. The gradual spread of *A. vexans*, a highly numerous species that attacks humans, is traced. Examples in significant numbers were found 12 km from breeding grounds in early July within 2 weeks of hatching. Strong winds interfered with the count in the open steppe zone, but results showed that even in extreme drought conditions, *A. vexans* ranged at least 16 km from breeding grounds. In June most specimens were found in the Yenisey basin, but their spread was more even in July and August, particularly during a temperature inversion, when high numbers were encountered in the piedmont. Figure 1; references 12: 7 Russian, 6 Western.
[434-12131]

UDC 576.895.421:591.69:578.833.26

VIRUS TITERS IN IXODES PERSULCATUS TICKS FROM VARIOUS PARTS OF TICK-BORNE
ENCEPHALITIS ZONE

Moscow MEDITSINSKAYA PARAZITOLOGIYA in Russian No 1, Jan-Feb 84
(manuscript received 5 Apr 83) pp 34-36

BANNOVA, G. G., SEMASHKO, I. V., KARAVANOV, A. S., SARMONOVA, A. S. and ANDREYEVA, Ye. B., Institute of Poliomyelitis and Viral Encephalitides, USSR Academy of Medical Sciences, Moscow

[Abstract] The severity and high mortality of tick-borne encephalitis in the Khabarovsk Kray and the Pacific coastal region suggested unusually high pathogen concentrations in the *I. persulcatus* ticks common to the Far East region. The present article reports on titration to verify this hypothesis in the Baikal-Amur Mainline [railroad] construction zone and the Udmurt ASSR, during May-June 1982. Collected specimens

were kept at 4°C for 3 weeks, then cooled to -70°C before titration. Parallel plaque-formation and cytopathogen action tests showed the first to be somewhat more sensitive and accurate, but there were significant variations in results. The authors attribute these variations to the small sample studied and possible improper storage of positive samples prior to titration. No significant regional differences in pathogen concentration were observed. References 9: 6 Russian, 3 Western.
[434-23242]

UDC 576.895.421.06:591.67:578.833.26

STUDY OF DEPENDENCE BETWEEN DENSITY OF TAIGA TICKS Ixodes persulcatus
P. SCH. AND VIRUS CARRYING IN FOCI OF TICK-BORNE ENCEPHALITIS IN NOVGOROD
OBLAST

Moscow MEDITSINSKAYA PARAZITOLOGIYA in Russian No 1, Jan-Feb 84
(manuscript received 4 Nov 82) pp 37-39

FEDEROVA, V. G., ALEKSEYEV, A. N., CHUNIKHIN, S. P. and KURENKOV, V. B.,
Novgorod Pedagogic Institute, Institute of Poliomyelitis and Virus Encephal-
itides, USSR Academy of Medical Sciences, Moscow

[Abstract] The authors compared density of Ixodes persulcatus taiga ticks and their virus carrying in drained and undrained foci of the Novgorod Oblast during 1968-1980. Results indicated that nearly twice as many ticks were found in undrained areas as in drained areas (ca. 21 as opposed to 10 ticks per "flag-hour"). Tick-borne encephalitis was isolated only in drained areas where tick population surpassed 25 per flag-hour, i.e., in relatively rare instances, during 1977-1980. Apparently a population of 25-30 ticks per flag-hour is critical for maintaining virus circulation. References 9 (Russian).
[434-12131]

UDC 616.981.49-036.22(476) "1960-1982"

EPIDEMIOLOGICAL CHARACTERISTICS OF SALMONELLOSIS IN BSSR IN 1960-1982

Minsk ZDRAVOOKHRANENIYE BELORUSSII in Russian No 2, Feb 84
(manuscript received 13 Apr 83) pp 51-54

BUR'YAK, V. N., VAL'VACHEV, I. I. and SMYSLOV, V. V., Minsk Municipal Epidemiological Station (N. V. Shestopalov, chief physician), Republican Epidemiological Station (Uu. S. Danishevich, chief physician), Department of Epidemiology and Microbiology (professor N. I. Val'vachev, head of the department), Belorussian Institute of Advanced Training of Physicians

[Abstract] Dynamics, territorial distribution and age-related structure of salmonellosis morbidity in the BSSR and in the city of Minsk from

1960 to 1982 are analyzed on the basis of official records from republic and Minsk epidemiological stations. There was some increase in salmonellosis morbidity in the BSSR and a gradual decrease in incidence of the disease in Minsk in the period studied. While the relative indicators of salmonellosis morbidity in Minsk exceeded indicators for oblasts 2-33-fold up to 1976, they were almost equal in these areas by 1982 and indicators for Vitebsk, Gomel' and Mogilev oblasts were higher than those for Minsk. In 1981-1982, morbidity was highest among children under the age of 1 year with this age group making up one fourth of the cases in Minsk and more than one third of the cases in the BSSR. Figure 1; references 17: 8 Russian, 9 Western.
[439-2791]

UDC 614:664:339]:008/47+57)

CONTRIBUTION OF HYGIENISTS TO SOVIET FOOD PROGRAM

Moscow GIGIYENA I SANITARIYA in Russian No 1, Jan 84
(manuscript received 24 Mar 83) pp 5-7

DOTSENKO, V. A., Leningrad Sanitary-Hygiene Medical Institute

[Abstract] A survey is presented of the tasks and accomplishments of Soviet hygienists, particularly those at the Leningrad Sanitary-Hygiene Medical Institute, as they relate to the implementation of the current Soviet Food Program. The six major areas of concern to the hygienists are: 1) improvement of the sanitary and hygienic situation at agroindustrial complexes, 2) reduction in the morbidity of workers in the agroindustrial complexes, 3) quality control over new methods and techniques in the use of fertilizers, pesticides, fodder, herbicides, preservatives and packagings, 4) goal-directed research at encouraging proper nutrition in the populace, 5) testing and evaluation of new food products, and 6) health campaigns aimed at improving the general state of health of the population and of the agroindustrial workers. Each of these areas is within the realm of special groups of specialists at the Institute, and the results will be particularly applicable to the northwestern economic region of the USSR. References 1 (Russian).
[403-12172]

MUTAGENIC EFFECT OF NATURAL AND SYNTHETIC POLYNUCLEOTIDES AND PROBLEM OF DIRECTED MUTATION

Moscow ZHURNAL OBSHCHEY BIOLOGII in Russian Vol 43, No 6, Nov-Dec 82
(manuscript received 25 Jan 82) pp 747-763

GERSHENZON, S. M. and ALEKSANDROV, Yu. N., Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev

[Abstract] The authors review early research in random and controlled mutation through directed alteration of DNA. Tests with fruit flies have shown that exogenous DNA causes genetic mutation without major chromosome restructuring, in a highly specific manner and with long-lasting effects. Recent research has been directed at synthetic polynucleotides, four of which were highly mutagenic and selective; these are labeled poly(dA), poly(rA), poly(rAC) and poly(rI). In experiments with the D-18 line of *Drosophila melanogaster*, which are known to have recessive mutation in the 2nd chromosome 0.3 to 0.4% of the time. In the laboratory experiments, the frequency of mutations was increased hundreds-fold. The loci of the mutations on the chromosome, however, were reduced sharply, from 5-10 for the synthetic polynucleotides compared to 400-1600 for spontaneous natural mutations. Many mutations induced by DNA A. nidulans were alleles of others, indicating either rather lengthy contact points or sub-units that contact several sensitive chromosome loci at once. The similarities between natural and synthetic polynucleotides reported in the article are regarded to be largely hypothetical, and require much more investigation. Figures 7; references 53: 18 Russian, 35 Western.
[377-12131]

COMBINED ACTION OF GAMMA-IRRADIATION AND 5-BROMODESOXYURIDINE ON HUMAN CHROMOSOMES

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 18, No 1, Jan-Feb 84
(manuscript received 21 Jun 82) pp 50-54

SAPACHEVA, V. A., Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow

[Abstract] A study of quantitative patterns of combined action of gamma-irradiation and 5-bromodesoxyuridine on human lymphocyte chromosomes at the G_0 stage is described and discussed. The relationship of the frequency of chromosomal aberrations to the gamma-radiation dose and 5-bromodesoxyuridine concentration on one healthy blood donor lymphocytes was studied in a two-factor experiment with variation of the radiation dose (0, 75, 150, 225, 300 rads) and the 5-bromodesoxyuridine concentration (0, 5, 10, 20, 40 $\mu\text{g/ml}$) on a culture medium, 25 variants of cultures were studied. It was found that 5-bromodesoxyuridine induces chromatid type aberrations, with the frequency of chromatid aberration increasing with the increase of 5-bromodesoxyuridine concentration. Cytogenetic effect of the 5-bromodesoxyuridine concentration appears predominantly in cells of the second fission. 5-bromodesoxyuridine modifies the effect of gamma-irradiation on human lymphocytes at the G_0 stage, increasing the number of radiation-induced aberrations of the chromosomal type and delays the lymphocyte cell cycle. References 16: 3 Russian, 13 Western.
[426-2791]

EXPRESSION OF GENES OF BACILLUS SUBTILIS LYSIN BIOSYNTHESIS IN ESCHERICIA COLI CELLS

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 18, No 1, Jan-Feb 84
(manuscript received 20 Nov 83) pp 58-60, 74

SHEVCHENKO, T. N., OKYNEV, O. V., ALEKSIYEVA, Z. M. and MALYUTA, S. S.,
Institute of Molecular Biology and Genetics, UkSSR Academy of Sciences, Kiev

[Abstract] Genetic analysis of hybrid plasmids, pLRS33 and pLRB4, containing Bac. subtilis genes coding lysin biosynthesis is described and discussed. It was found that, after transformation of strains of E. coli auxotrophic for lysine and diaminopimelic acid by these plasmids, there occurs complementation dapA, dapB, dapC, dapD, dapE, lysA mutations by plasmid pLRS33 and dapC, dapB and lysA mutations by plasmid pLRB4. Plasmid pLRS33 carries at least 6 of bacillus subtilis lysin biosynthesis

and plasmid pLRB4 carries 3. Introduction of these plasmids into the E. Coli cells is accompanied by an increase of the level of synthesis of lyxin and its precursor diaminopimelic acid. References 11: 4 Russian, 11 Western.
[425-2791]

UDC 612.766.1:658.514+616-008

PHYSIOLOGICAL RESPONSIVENESS OF OPERATORS IN RELATION TO WORK AND
HOMEOSTATIC DISORDERS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 81-85

DONSKAYA, L. V., BADKHEN, V. V. and DUBININA, I. A., Leningrad Scientific
Research Institute of Work Capacity Expertise and Organization of Work for
Invalids

[Abstract] The physiological responsiveness of 55 male and female operators with hypertension was compared with the corresponding physiological parameters in 25 normotensive operators, in a study involving evaluation of hemodynamic parameters and a battery of psychophysiological indicators which determine occupational performance. The results demonstrated that the hypertensive operators could be characterized as having increased peripheral vascular resistance (by ca. 15%), increased BP, increased cerebrovascular tonus with attendant decreased cerebrovascular systolic filling, and a depressed CNS functional state. Many of these parameters showed a further degree of deterioration at the end of a working day. These observations underline the heavy physiological toll exacted by the nature of the operator's work, and the differences between the responses of normotensive individuals and those with homeostatic disorders reflected by hypertension. Figures 3; references 19 (Russian).
[400-12172]

FUNCTIONAL STATUS IN RELATION TO WORK, PERFORMANCE AND HEALTH

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 June 83) pp 66-71

SOLONIN, Yu. G., MASLENTSEVA, S. B., KUZNETSOVA, Z. M., KOZLOVSKIY, V. A.
and UST'YANTSEV, S. L., Scientific Research Institute of Labor Hygiene and
Occupational Diseases, RSFSR Ministry of Health, Sverdlovsk

[Abstract] Ergometric, physiological and sanitary-statistical studies were conducted on individuals in various occupations to determine correlates between an individual's physiological status, his work performance and general health. As a result of the examination of some 4186 workers, on the basis of physiological and health criteria, they could be divided into three categories in terms of morbidity and physical performance: 20-29 year old, 30-39 year old and 40-49 year olds. The physiological demands of physical work determine the physiological status and performance of workers, as well as their general health. Such studies can provide invaluable data pertinent to applied physiology in determining optimum physical demands that can be placed on workers and the duration for which such work can be done without having an adverse effect on health. The heavier the physical work the more serious the consequences for performance and health, and the negative factors are cumulative with age and duration of employment. The full potential of work physiology can only be realized when such studies are conducted not only with respect to the immediate physiological effects, but also with respect to cumulative effects in relation to age and age-related morbidity. References 17 (Russian).
[400-12172]

ELECTROSLEEP IN PROPHYLAXIS OF PSYCHONEURAL STRESS AND RECOVERY OF MENTAL PERFORMANCE IN OPERATORS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 47-51

GONSHARENKO, A. M., KANDROR, I. S., POPOVA, I. I. ROYTENBURD, S. R. (deceased)
and SHAKHNAROVICH, V. M., All-Union Scientific Research Institute of
Railway Hygiene, Moscow

[Abstract] In view of the therapeutic effectiveness of electrosleep in the management of various neurological problems, a study was made of the potential usefulness of this modality in the prophylaxis of the adverse effects of stressful and emotion-laden shift work of train dispatchers and

machinists, and in the restoration of mental efficiency. The 25-35 year old subjects were subjected to 15-16 electrosleep procedures, each lasting for 1 h and consisting of 120 Hz current below the threshold for perception. The subjects were administered a variety of standard psychological tests before and after electrosleep for evaluation of mental efficiency, along with rheoencephalographic studies and BP determinations. The results showed that, in both groups, electrosleep improved cerebrovascular circulation and decreased systolic and diastolic blood pressure. The psychological test battery demonstrated that electrosleep improved mental performance in all the subjects tested. The effects of electrosleep were ascribed to improved sleep patterns and psychoemotional stabilization, which in turn was responsible for raising the stress threshold of the subjects. Figures 1; references 14: 10 Russian, 4 Western.
[400-12172]

UDC 612.81

EEG INFORMATIONAL CONTENT IN PREDICTION OF WORK PERFORMANCE

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 41-46

BAGROVA, N. D., KOROBV, R. N. and GROMOV, Yu. M., Military Medical Academy
imeni S. M. Kirov, Leningrad

[Abstract] An evaluation was made of the utility of various EEG parameters as indicators for the selection of operators in terms of physiological reserves. The study involved 19 subjects, 19-24 years old, tested on an exercise cycle and exposed to physical loads of 100-250 W, and required to perform mental tasks before, during and after the physical load. Analysis of the EEG data showed that spectral power density within the range of frequencies of 1 to 32 Hz may provide useful information. The employment of psychophysiological tests led to a statistically significant decrease in the density of the alpha rhythm and increased the density of rhythms in the 14-30 Hz band; there was a linear relationship between the difficulty of the mental tasks and changes in the EEG tracings. Tests calling for making operational corrections and for making a selection from among eight signals were found to be most informative. The consensus was that an increase or a decrease in the spectral power density of the slow waves (2-8 Hz), and of those around 15 Hz and greater, in response to mental tasks after a physical exertion, are most reflective of the performance efficiency of operators. Figures 1; references 12 (Russian).
[400-12172]

FUNCTIONAL STATUS OF OPERATORS AND ITS SYSTEMIC AND TECHNICAL DETERMINANTS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 20 May 83) pp 23-30

AVER'YANOV, V. S., VINOGRADOVA, O. V., KAPUSTIN, K. G., LEONOVA, V. A.,
MALAKHOV, N. S., IL'VE, A. S., CHERNYSHEV, V. I. and YAROVAYA, R. M.,
Scientific-Industrial Association of Petrochemical Processes, Leningrad

[Abstract] An analysis was performed of the activities of operators at petrochemical plants, employing various physiological parameters and psychological tests, in order to derive data for setting psychophysiological standards for the type of work performed. The high-stress work of the operators, which requires constant decision making and is compounded by the danger of an explosion or a fire, was shown to alter their physiological balance significantly. In general, such individuals present with enhanced functional tone of the parasympathetic branch of the autonomic nervous system. The net effect is a reduction in the stability of a number of psychophysiological parameters and in an increased amplitude of their fluctuations. In conjunction with this observation, it was also found that occupationally related psychophysiological parameters vary little due to well-entrenched habits and psychological attitudes. Subjective evaluation of the time required to accomplish a given operation by the workers showed that the subjects felt this parameter to increase in proportion to job stress, although objective measurements demonstrated that no such increase took place. References 27: 25 Russian, 2 Western. [400-12172]

LASER EFFECTS

UDC 616.37-089:615.849.19

LASER SURGERY OF PANCREAS

Moscow KHIRURGIYA in Russian No 7, Jul 83
(manuscript received 17 Feb 82) pp 33-36

BUYANOV, V. M., professor, CHUMAKOV, A. A., POLSACHEV, V. I. and
OSIPOV, V. L., Chair of General Surgery, Chair of Pathologic Anatomy
Therapeutics Faculty, 2nd Moscow Medical Institute imeni N. I. Pirogov

[Abstract] A brief discussion is presented on the use of lasers in pancreatic surgery in conjunction with tissue adhesives to minimize trauma and complications inherent to surgery on an organ that has both endocrine and exocrine functions. Experimental studies on autopsy materials, based on histological and cytological evaluation of the pancreas, demonstrated that CO₂ laser Skal'pel'-1 resection resulted in minimal tissue damage and bleeding in comparison with standard surgical procedures. This impression was further confirmed in operations on eleven patients with malignant and nonmalignant pancreatic conditions: tissue damage and bleeding were at a minimum and the entire procedure required much less time. The postoperative periods were without complications, which also provided confirmation of the utility and safety of laser surgery. Figures 1; references 4 (Russian).
[411-12172]

CARBON DIOXIDE LASER IN COMBINED THERAPY OF ACUTE PURULENT LACTATION
MASTITIS

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian No 1, Jan 84
(manuscript received 17 May 83) pp 67-69

SKOBELKIN, O. K., professor, BREKHOV, Ye. I., doctor of medical sciences,
CHEGIN, V. M., candidate of medical sciences, DERBENEV, V. A. and
PETUSHKOV, V. V., Moscow

[Abstract] An analysis was made of the results of treating 188 patients, 18 to 43 years old, either with standard surgical procedures for acute, purulent lactation mastitis, or with a "Romashka" CO₂ laser scalpel. Surgery was followed by irrigation of the abscess site with hydrogen peroxide, antibiotics, and aspiration drainage. The 87 patients that underwent laser surgery and primary sutures for wound closure required an average of 15.1 days for the full course of treatment, while the control subjects required a mean of 18.9 days. Laser therapy was found superior to standard operative approaches in that less trauma was involved, bleeding was better controlled, and healing accelerated and it can, therefore, be recommended for use in such cases.
[422-12172]

HELIUM-NEON LASER MANAGEMENT OF VARICOSE ULCERS

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOVA in Russian No 1, Jan 84
(manuscript received 22 Nov 82) pp 69-71

USIK, V. S., No 1 Chair of Surgical Diseases, Altay Medical Institute imeni Lenin Komsomol

[Abstract] A treatment protocol was devised for the management of crural varicose ulcers with a helium-neon laser with an output power of 20 mW, and with the 630 nm beam defocused to 4 mm. The daily sessions commenced with 3 min exposures and progressed to 21-25 min after a full course consisting of up to 30 sessions. Evaluation of the clinical results showed that improvements were noted within 3-4 sessions with elimination of necrotic tissue and initiation of granulation and healing, alleviation of pain and edema, and cutaneous hyperemia. Microcirculatory studies showed improvement in blood flow in the affected areas and increased oxygen supply to the tissues. Only seven patients failed to show any improvement. Although the type of laser used and the power output employed did not show any evidence of a bactericidal effect, this modality has clearcut advantages in the management of chronic, varicose leg ulcers. References 3 (Russian).
[422-12172]

EFFECTS OF LASER IRRADIATION ON HEMATOLOGIC INDICATORS IN ACUTE PNEUMONIA CASES

Kiev VRACHEBNOYE DELO in Russian No 7, Jul 83
(manuscript received 30 Nov 82) pp 9-12

SHTEL'MAKH, N. I. and FILIPPOVA, S. M., Chair of Introductory Course in Internal Diseases, Therapeutics Faculty, Kharkov Medical Institute

[Abstract] A comparison was made of the therapeutic effectiveness and effects, on hematologic indicators, of the use of helium-neon laser on acute pneumonia patients, in comparison with effects in patients treated with such physical modalities as ultrasonication, inductothermy, electrophoresis, etc. The 105 patients on antibiotics and helium-neon laser irradiation (apparatus LG-75, 25 mW emission power, 7-15 min treatment sessions to give a total dose of 280-380 J) applied to the paravertebral reflexogenic zone (7.6 mW/cm^2) and in the projection of the inflammatory infiltrate (122 mW/cm^2) showed significant clinical improvement within 2-4 days and a cure rate of 79.1% by the 10th day. The cure rate for the 53 patients on antibiotics and other physical modalities was only 41.5% by the 10th day. Furthermore, laser treatment enhanced reversion to normal values of serum albumin and the various globulin fractions with concomitant normalization of the albumin/globulin ratio. In addition, in the laser group a marked decrease was also seen in the blood levels of sialic acid, seromucoids and ceruloplasmin, which underlined the anti-inflammatory effects of the helium-neon laser. References 12 (Russian). [414-12172]

UDC 616.8-085.849.19(048.8)

LASER APPLICATIONS TO NEUROSURGERY

Moscow VOPROSY NEYROKHIRURGII in Russian No 1, Jan 84
(manuscript received 10 Oct 82) pp 57-60

RYABENKO, V. I., Institute of Neurosurgery imeni N. N. Burdenko, USSR Academy of Medical Sciences, Moscow

[Abstract] Development of laser technology in the United States, Canada and the USSR led early to medical experiments that determined the CO_2 laser to be the most effective for neurosurgery. Laser irradiation was found to stimulate nerve cells and promote healing of blood vessels. Study of the complex biological effects of laser irradiation on human tissue is continuing. Studies of swelling and peripheral damage in surgery also emphasize the advantages of laser neurosurgery. By 1969, CO_2 laser surgery was used to remove multiform glioblastomas. The minor damage to

surrounding tissue and rapid recovery are also noted. Use of stereotaxis and laser surgery, along with advances in constant action gas lasers, offer growing prospects for wider applications of laser irradiation in neurosurgery. References 26: 12 Russian, 14 Western.
[444-12131]

UDC 617.57/.58-089.843:615.847.8

FUNCTION RECONSTITUTION OF AUTOTRANSPLANTED LIMB BY MEANS OF MAGNETIC FIELDS

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 1, Jan 83 (manuscript received 13 Oct 82) pp 55-56

SURGANOVA, S. F., Department of Operative Surgery and Topographic Anatomy, Vitebsk Medical Institute and Academic Group

[Abstract] Magnetic fields (MF) are used with increasing frequency as postoperative measures, exhibiting anti-inflammatory, pain relieving and vasodilating properties; they increase blood circulation and stimulate metabolism and some regenerative processes. The goal of this study was to evaluate the use of MF in functional reconstitution of autotransplanted limbs. Experiments were performed on dogs and rabbits. It was shown that limb autotransplantation coupled with exposure to MF during the conservation and rehabilitation periods exhibited less drastic postoperative reactions and lowered ischemic and revascularization complications in the limbs and in the organism as such. These improvements were due to better blood and lymphatic circulation in the main and micro-circulating system. This positive effect of MF was due to its anabiotic action which affected inhibition of enzymatic processes of tissue proteolysis, depressing the activity of respiratory enzymes and slowing down the intensity of autolysis. References 8 (Russian).
[366-7813]

TREATMENT OF PURULENT-INFLAMMATORY DISEASES OF THE SOFT TISSUES WITH USE
OF A CO₂ LASER IN AN OUTPATIENT SETTING

Kiev KLINICHESKAYA KHIRURGIYA in Russian No 1, Jan 84)
(manuscript received 24 Dec 82) pp 1-4

SKOBELKIN, O. K., BREKHOV, Ye. I., SHABLOVSKIY, O. R. and TRIZNO, T. N.,
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[Abstract] Use of the "Skalpel-1" CO₂ laser surgical device in 55 operations (carbuncles--10, abscessing furuncles--18, subcutaneous paronychia--12, osteal paronychia--9 and other purulent-inflammatory diseases--6) carried out in an outpatient setting is described and discussed. The sterilizing properties of the "Skalpel-1" improves results of the surgery, reduces duration of patient incapacity 1.8-fold and increases the number of surgical procedures which may be carried out in an outpatient setting. Three surgical procedures with the use of "Skalpel-1" are described and indications for use of each are given. References 4 (Russian). [443-2791]

ECOLOGICAL DISTINCTIONS OF HIGHER NERVOUS ACTIVITY IN DOLPHINS

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[Text] A study was made of higher nervous activity in the bottlenosed dolphin (*Tursiops truncatus* Montagu) during the period of initial adaptation to captivity. Data obtained for 24 animals are summarized. It is reported that they presented slower formation of situational behavior than terrestrial animals--dogs and monkeys. The demonstrated prevalence of "automatisms" in dolphin behavior, as well as prevalence of situational and previously developed conditioned food-searching reflexes, over newly introduced conditioned stimuli, combined with stability of developed reactions, provide for higher stability of their behavior. These distinctions are viewed as functional mechanisms of adaptation of situational behavior to a stable aquatic environment. Behavioral adaptation of captive dolphins can be arbitrarily separated into three stages: period of prevalence of passive defense reactions, period of prevalence of ecologically determined programs and period of adaptation to new principles of food-searching activity.

With reference to levels of adaptive (Batuyev, 1967, 1970, and others) evolution of mammalian behavior, one can distinguish a group of representatives of this class which, while it has ancestors in common with terrestrial mammals, evolved for a long time under unique conditions related to aquatic lifestyle. The cohort (Geptner et al., 1976) of whales (*Cetacea*) is such a group. The following were the most general factors, which determined the overall formation of cetacean behavior at the final stage of their evolution: relative simplicity of finding food, its profusion and virtual absence of predators for which whales would be constant feed objects, as well as inability to breathe in their principal habitat (Tomilin, 1957; Lilly, 1961; Geptner et al., 1976, and others). Thus, the environment, which ultimately shaped the behavior of modern whales, generally differed in that there was high stability of factors instrumental in vital functions and endangering existence. In our opinion, these environmental distinctions had to be

involved in formation of the corresponding specifics of situational behavior (Kupalov et al., 1964) of these animals. The assumption was made that, in this case, adaptation of situational behavior is effected by means of special programs that could be demonstrated experimentally.

We checked the advanced hypothesis for several years on cetaceans, the Black Sea bottlenosed dolphins (*Tursiops truncatus* Montagu), for which the above general theses concerning stability of their environment are the most valid. The studies were conducted by the conditioned reflex method on 24 animals. Most of our own material was concerned with food-searching reactions which, in our opinion, reflect the most general patterns of situational behavior as a whole. The material in question was based on previously published data, the methods of obtaining which are standard for the conditioned reflex method and have been described in our works cited below.

To date, considerable material has been accumulated pertaining to the study of behavior of captive dolphins. Various forms of motor reactions are described, in which they were trained during circus performances and experiments (Hediger, 1963; Norris et al., 1965; Turner, Norris, 1966; Voronin et al., 1975, and others). There are data indicative of formation in these animals of complex intraherd relations in artificially formed groups (Tavolga, Essapian, 1957; Tavolga, 1966; Voronin et al., 1971, and others). Instances have been described of formation of relatively complex actions in dolphins on the basis of imitation (D. Caldwell, M. Caldwell, 1966; Tayler, Saaymen, 1973, and others). Captive dolphins demonstrate individual and collective games that are quite complex in structure (Tavolga, 1966, and others), and they are also capable of primitive operant activity (Brown, Norris, 1956; Tayler, Saaymen, 1973). We know that dolphins have a well-developed communicative system (McBride, Hebb, 1948; Tavolga, Essapian, 1957; Lilly, 1967; Caldwell et al., 1962; Evans, Bastian, 1969; Markov et al., 1974, 1975, 1978, and others). The capacity of bottlenosed dolphins to operate with empirical dimensionality of figures has been described (Krushinskiy et al., 1972, and others). In these experiments, a bottlenosed dolphin (female) was able to solve, on the basis of game reinforcement, a complex problem based on the fact that the lure, in the form of a ball, could be hidden only in a three-dimensional figure, but not a plane geometric one. However, a similar task had been basically solved by other mammals also on the basis of food reinforcement--lower primates, wolves, brown bears and others (Krushinskiy, 1977).

Bottlenosed dolphins demonstrated the ability to perform some new movement, which they had not made before, upon a signal from the experimenter (Pryor et al., 1969). Analogous complex actions with possible assessment of the problem as a whole among representatives of terrestrial animals were recorded on monkeys (Tikh, 1970). There are also references to the possibility of formation of similar behavior in domestic cats and pigeons (Pryor, 1975).

The first studies of dolphin behavior using the conditioned reflex method were conducted by L. G. Voronin and L. B. Kozarovitskiy (Voronin, 1967; Voronin, Kozarovitskiy, 1969; Voronin, 1970). They analyzed formation of a simple conditioned motor-alimentary reflex and differentiation in the bottlenosed dolphin. Both reflexes developed slowly. The authors concluded that

bottlenosed dolphins are characterized by considerable inertia of nervous processes (particularly the process of inhibition), combined with good concentration and extensive irradiation in the motor analyzer, as well as high imbalance of the excitatory process. According to the data of Yu. D. Starodubtsev (1973) and others, it is difficult for bottlenosed dolphins to develop a chain conditioned reflex of "free choice" among simultaneously presented conditioned stimuli. Unlike rats and chimpanzees, they were unable to single out only "beneficial" actions that were reinforced and exclude actions that were not mandatory to receive reinforcement out of a set of actions, after prior training. L. B. Kozarovitskiy et al. (1971) demonstrated that development of conditioned reflexes to a set of successively delivered stimuli occurs in bottlenosed dolphins in virtually the same way as most higher animals. Simple motor-alimentary conditioned reflexes are readily formed in bottlenosed dolphins (Beach, Pepper, 1972) when there is reinforcement of part of the responses, and they are retained up to a reinforcement probability of 0.028. The capacity of bottlenosed dolphins to distinguish in a set general distinctive features (Beach, Herman, 1972) and eliminate the "deleterious" effect of a stimulus (Murchison, Pepper, 1972) has also been described.

In our studies, we tried to single out the distinctions in dolphin behavior that could be related to their ecology. For this reason, we took animals for experiments that were sufficiently adapted to experimental conditions, but which had not been trained in prior experiments. Initial adaptation consisted of training the animal to approach the experimenter for food without using conditioned stimuli that were used in subsequent experiments. We thus were always able to check changes in the animals' behavior in the course of our experiments.

Table 1 summarizes the essential material of our studies characterizing higher nervous activity in bottlenosed dolphins, including both previously published data (Protasov, Morozov, 1971; Protasov, Sergeyev, 1974a, 1974b, 1975; Protasov et al., 1975, 1976; Protasov, 1978, and others) and those obtained additionally. The results of experiments that defined some of the characteristics discussed are given in the text and in Tables 2 and 3.

Analysis of our data and those cited in the literature enables us to conclude that bottlenosed dolphins are generally capable of perceiving the same categories of probabilistically organized events as most highly developed terrestrial animals, and are not inferior to the latter in complexity of organization of behavior as a whole. We can single out two main groups of situational problems, the speed of learning which differs appreciably for dolphins: 1) problems with an alternative of the "yes--no" type; 2) problems with "or--or" type of alternative.

We can include in the first group development of simple food-searching and defense reflexes, inhibitory differentiation, conditioned inhibition and more complex reactions of the second-order reflex type (highest), complex stereotypes, etc. In development of conditioned responses of this group, the animal must either perform a determinate act or none at all, in response to one of several possible cues. Although training is slower for dolphins in this category of situations on the average than in a number of terrestrial higher mammals, for example dogs (Kupalov et al., 1964, and others), on the whole this category of problems is not difficult for dolphins.

Table 1. Formation of motor-alimentary and defense conditioned reflexes (CR) in bottlenosed dolphins (Tursiops truncatus Montagu)

Form of CR	Number of animals	Number of experiments	Results of experiments, mean frequency of using conditioned stimuli	Main distinctions in CR formation
Simple food-searching	10	10	First manifestation after 3-10 times, specialization after 20-30	Resistance of simple CR to external inhibition. May not become extinct for several years
Intermittent extinction of simple food-searching	5	5	First manifestation after 20-50 times without reinforcement. Complete extinction in 3-5 experiments	Marked neurotic manifestation during and even after extinction under the influence of using conditioned stimulus
Simple defense	3	3	Avoidance reaction after 1-3 deliveries of negative stimulus	May not disappear for several years
Deferred simple motor-alimentary and CR to time	4	5	Extinction of previously developed simple CR with 40-80 s delay	Time reflex with delays of 10, 20, 40 s could not be developed, in spite of rhythmic use of stimuli 800-2000 times for each interval
Delivery of unditioned stimulus before conditioned (reverse order)	2	2	Change in order of delivery leads to extinction of previously developed simple CR after the very first deliveries	None of the neurotic manifestations typical of cases of intermittent extinction is observed
Differentiation: of positive and inhibitory significance of conditioned stimulus in sequence (dynamic stereotype)	1	3	Food-searching reaction only with every 2d or every 3d delivery (75-100% adequate responses in 5-6 tests)	Extinction of CR with reinforcement of every 4th presentation. No neurotic manifestations in all 3 experiments
of sonic conditioned stimuli by the site of their reinforcement	4	8	CR developed in 1 experiment	After extinction without training CR was not restored, in spite of using stimuli 600 times in 17 tests
of conditioned stimuli on basis of choice of example sonic and echolocation distinction	4	6	CR developed in 2 experiments only for 3-dimensional figures. In the 1st case average 69% and in the 2d up to 90-100% adequate responses, CR specialization after 420 and 2650 times, resp.	Choice can be deferred for up to 30-40 s

Table 1 [continued]

Form of CR	Number of animals		Numb. of exper.	Results of experiments, mean frequency of using conditioned stimuli	Main distinctions in CR formation
of heteromodal complex (light + sound) from its constituents	1	1	1	Complete differentiation of light from complex. No differentiation of sound from complex (35% adequate responses to sound), 93% adequate responses to complex	Auditory is leading analyzer. Rapid extinction of response to light after 50 presentations. No extinction of response to sound--650 unreinforced presentations (39 tests)
with alternate presentation of condition stimuli (inhibitory differentiation)	10	10	10	First delivery after 4-27, fixed after using differentiating conditioned stimulus 20-466 times	Slow formation of CR due to development of "automatisms"
with concurrent presentation of conditioned stimulus (differentiation with choice)	6	10	10	Successful development in 1 case, 5 experiments, 147 presentations. CR was not formed in 9 cases	Rapid development of unilateral "automatism" with negative results. Substitution of alternate stimulus with concurrent one does not impair differentiation
Change in significance of conditioned stimuli	4	4	4	At the same times as formation of initial differentiations	Same forms of "automatism"
Conditioned inhibition of CR	3	4	4	First manifestation after 10-20, specialization after 100-200 uses of inhibitory conditioned stimulus (8-20 tests)	Inhibitory response to chain conditioned stimulus is formed in the same way as to a solitary one
Second-order CR	2	2	2	First manifestation in 1st-2d test and specialization in 4th-7th	Extinction of second-order CR not observed, in spite of many reproductions (235 and 482 times)
Inhibition of CR by inhibitory second-order stimulus	2	2	2	Inhibition formed in 1 experiment. Specialization up to 90-100% level in 18 tests	Second-order inhibitory conditioned stimulus did not change its significance after alteration of first-order inhibitory conditioned stimulus

The second group refers to formation of choice according to example, differentiation of several conditioned stimuli according to their reinforcement place, formation of conditioned chain reflex in "free" choice of order of using manipulators, differentiation between stimuli delivered simultaneously, etc. During development of conditioned responses in this group, there is concurrent exposure to several conditioned stimuli that must be differentiated. Under these conditions, training of all animals is slower than in the situations of the first group (Vatsuro, 1945; Kupalov et al., 1964, and others); however, we observed particular difficulty in formation of this category of reflexes in the dolphins used in our experiments. It should be noted that, after their establishment, these reflexes could be reproduced in them with a high level of adequate responses. Repeated solving of this category of problems facilitated learning.

Dolphins also demonstrated extreme stability of developed food-searching responses, particularly when they were formed in the nature of simple conditioned reflexes. Such reflexes can suppress defense reactions (fear) and even food motivation. For example, a trained dolphin approaches upon cue a place where there was constant trapping, to which it was impossible to drive him just previously, with a net or lure him there with a fish thrown in the water, or else, a hungry dolphin would return, upon cue, to the experimenter a fish that was thrown to it, and then received the same fish as alimentary reinforcement.

With reference to the mechanisms of behavioral adaptation of dolphins to life in water, we should also single out the relatively low level of aggressive and defense responses and suppression of tactile-motor (manipulation) forms of active exploratory activity (Norris et al., 1965; Voronin et al., 1971; Protasov, 1978, and others). It should also be noted that, in the bottlenosed dolphins, after reaching a rather high level of adaptation to captivity, broad sensory capabilities, particularly the presence of a well-developed echolocating analyzer and sight, are combined with relatively mild response to changes in the external situation. These distinctions make it possible, for example, to conduct experiments in two adjacent pens separated only by a lightweight net, and not use the traditional screen concealing the experimenter from the animal (Voronin, Kozarovitskiy, 1969; Protasov, 1978, and others).

With regard to the instances of slow development of conditioned food-searching reflexes in dolphins, we can distinguish a special fixed program of behavior, which could be generally characterized as "automatism" or, in special cases (Krushinskiy et al., 1972), as "unilateral automatism." In this state, the dolphin's behavior is notably monotonous. The animal makes some between-cue approaches to the place of food reinforcement at regular intervals (Protasov et al., 1976), virtually failing to react to a conditioned stimulus, or (as was the case also in the experiments of Krushinskiy et al., 1972, and Starodubtsev, 1973, and others) approaches monotonously only one place of alimentary reinforcement out of several that are possible according to experimental conditions, or else, for example, when making a choice according to an example (Protasov et al., 1976), chooses one of several presented stimuli disregarding additional conditions that systematically alter the meaning of a given stimulus to its opposite. What was common to all of the above cases was the

replacement by the dolphin of differentiation between stimuli with another form of conditioned reflex response, namely a simple motor-alimentary reaction, which was effected in these cases with partial reinforcement. This motor-alimentary reaction usually was linked to the initial stage of training and had the outward appearance of a previously formed or rapidly formed situational conditioned reflex that is manifested in a stable, "automated" form and prevails over the response to conditioned stimuli used in the experiment.

Development of "automated" responses lowers substantially the speed of formation of behavior that provides for receiving the maximum possible number of reinforcements in the experiment. At the same time, viewing "automated" reactions as one of the means of solving an alternative problem, it should be noted that this method can produce up to 50% reinforced conditioned reflex responses by the animal with random order of presentation of stimuli. In the case of prevalence of "automatism" in behavior, the dolphin is characterized by absence of neurotic manifestations and attempts to alter the form of behavior with a very large number of unreinforced responses in a row: up to 50 in our experiments and even 400 in those of Yu. D. Starodubtsev (1973). And, if neurotic manifestations do occur in the form of generalized motor responses, as was the case in the experiments of L. G. Voronin, L. B. Kozarovitskiy (1969) and our experiments (Table 1), they do so mainly at stages when "automatisms" disappear and formation of the developed conditioned reflex response begins. Appearance of generalized motor reactions in dolphins when altering behavior is consistent with the data of L. V. Krushinskiy (1977) about the onset of marked physiological reactions in the course of elementary reasoning by animals.

"Automatisms" in solving situational problems have been described not only for dolphins, but several terrestrial animals. They were interpreted by authors as an animal's neurotic reaction to a difficult problem (Kupalov et al., 1964; Krushinskiy et al., 1972; Krushinskiy, 1977, and others). However, during the above-described experiments (Table 1), we were compelled to pay attention to appearance of stable "automatisms" in bottlenosed dolphins capable of rather complicated behavior, during development of even simple food-searching reactions and simple differentiations. And the "automatisms" occurred at the early stages of training, virtually like the situational (Uznadze, 1961, and others) form of behavior and, as we have already stated, they were not associated with neurotic manifestations. These facts led us to assume that "automatisms" in situational behavior constitute an adequate form of behavior, at least for some highly developed animals, which has some biological and ecological meaning and cannot be viewed exclusively as a physiological reaction to a difficult task.

If we were to adhere to the Pavlovian classification of conditioned reflexes (Pavlov, 1924, and others), the most distinct manifestation of "automatisms" in dolphins should be referred to the stage of prior specialization of a conditioned reflex, when the animal "detected" to some extent the link between newly introduced conditioned stimuli and food reinforcement, but still did not have sufficient information about the stability of this relationship. The first manifestations of a conditioned reflex preceding onset of "automatisms" can be formed both under the influence of elementary reasoning (Krushinskiy, 1977) and on the basis of reinforcement of the animal's

spontaneous actions. On the whole, we can discuss prevalence in dolphins, at the early stages of training, of situational conditioned reflexes (in their special "automated" form) over reflexes in response to newly introduced conditioned stimuli. The biological meaning of such prevalence, as a reaction that is adequate for the animal, is, in our opinion, the artificial delay in forming new conditioned reflexes. Such a delay makes it possible to establish probabilistic stability of appearance of a new stimulus, disregarding the decline in probability of reinforcement of food-searching reactions. The presence of "automatisms" prevents rapid changes in alimentary behavior in case of random, unstable changes in the environment. In other words, the biological meaning of "automatisms" could consist of optimization of behavior strategy and providing the necessary level of reinforcements when the probability structure of events is unknown to the animal.

Recognition of "automatisms" as a form of behavior that artificially postpones formation of new reflexes and is aimed at determination of probability of relations between conditioned and unconditioned stimuli, makes it possible to explain the stability of repeated food-searching actions yielding no results in dolphins, even after instances when the food-searching reaction occurred under the effect of pronounced reasoning, as can be elicited, for example, in the data published by L. V. Krushinskiy (1977) and others. As shown by analysis of these data, "automatisms" of situational behavior are the least inherent in Carnivora and Corvidae, the food-searching activity of which is the most complex and diverse. It should be stressed also that there is a difference in triggering mechanisms of "automatisms." In dolphins multiple deliveries of a conditioned stimulus, even in solving simple problems, serves as the triggering mechanism of "automatisms." In Carnivora and Corvidae the same reaction arises when the problem becomes more complex. Accordingly, there is also a difference in degree of manifestation of the neurotic component that accompanies "automatisms." In dolphins, there are virtually no neurotic manifestations in the course of "automatic" behavior, whereas in such animals as, for example, dogs the neurotic component is overt (Kupalov et al., 1964, and others). The latter indicates that delay in formation of conditioned reflexes due to "automatisms," though it may be seen in most highly developed animals, is not equally adequate for all animal species.

Thus, a reaction that is the same in form has different biological meanings, depending on the situation in which it is manifested. Evidently, "automatisms" in the presence of neuroses could not have been manifested in the form of an organized form of behavior if they had not existed previously in the form of adequate programs, which had lost their relevance when animals adapted to new conditions. In other words, in the presence of neurotic states we apparently see disinhibition of previously existing behavior programs, one of which is "automatism."

The degree of manifestation of "automatisms" in dolphins depends largely on the frequency of delivery of conditioned stimuli in a test and prior use of animals in experiments. If the frequency of stimuli is reduced to a minimum in each experiment, "automatisms" will not develop as a reaction to multiple delivery of stimuli that is adequate for dolphins. Subsequent summation of results without adjustment for duration of experiments could yield a somewhat unilateral description of learning capacity, since it would not additionally

take into consideration that, at the stage of specialization of a conditioned reflex after multiple presentations of a stimulus, one could observe both virtually linear increase in number of adequate reactions and a decrease due to use by the animal of a qualitatively new behavior program--change to "automatic" actions. And, as observed by some authors (Lilly, 1961, and others), when working with dolphins the impression is formed that a dolphin simply gets "sick and tired" of repeatedly solving a problem that is easy for it. It should also be noted that "automatisms" are virtually never observed when dolphins repeatedly solve similar problems if the planned probability of reinforcement in the experiments is close to 1, and they can reappear if experimental conditions are changed.

We need answers to at least two questions to advance a hypothesis concerning the special significance of "automatisms" as a fixed behavior program that enables dolphins (or other animals) to determine the probabilistic relevance of a new stimulus: Are dolphins capable of differentiating the probability of delivery of stimuli and what are the distinctions of changing from a previously formed behavior program to a new one, with different probabilities of reinforcement of these programs?

The answer to the first question was obtained in experiments involving differentiation by dolphins of sides with maximum probability of reinforcement in a Y-shaped maze (Table 2). In these experiments, a bottlenosed dolphin had to swim into either of the two branches of the maze following the same audio signal. The planned probability of reinforcement was different for each branch. Choice of the side with maximum probability of reinforcement was considered a successful solution. As can be seen in Table 2, dolphins successfully solved the difficult problem with reinforcement of part of the adequate and part of the inadequate choices of sides. A change in choice occurred in 4 out of 6 cases with decline of planned probability of reinforcement to 0.333 mainly with stimulus delivery 50-100 times and in only one case did a change in choice of side require up to 800 deliveries of stimulus with decline of probability of reinforcement to 0.1.

To answer the second question, we conducted a series of experiments, together with T. Yu. Snegireva, to examine the correlation between reaction to "novelty" and to change in probability of reinforcement (Table 3). The experiments were conducted on two adult female bottlenosed dolphins under the same conditions as the preceding experiments. After both dolphins developed the reaction of approaching a cylinder dropped into the water, the cylinder and any of 10 geometrical figures that had not been previously used in experiments were presented to the animals simultaneously. The side on which the figures were presented changed in random order.

As can be seen in Table 3, with decrease in planned probability of reinforcement of a familiar figure (cylinder) to 0.2 in the first experiment, the dolphin rapidly developed the reaction of approach to any new figure reinforced with a probability of 1. However, an increase in probability of reinforcement of the familiar figure to 1 led to the same rapid change to the initial program. In dolphin No 3, the second change to the new program was already considerably easier with decline of probability of reinforcement of approach to familiar figure to 0.8-0.6. It is significant that, in dolphin No 4, the

old program of action was not entirely impaired when planned probability of its reinforcement dropped to 0.3. Thus, this experiment as a whole showed that dolphins present prevalence of previously formed programs over new ones, and that the "novelty" factor is not an additional stimulus for change in behavior of these animals, even when there is alimentary reinforcement.

Table 2. Dynamics of formation of choice of side in Y-shaped maze with partial reinforcement at different probabilities of adequate and inadequate reactions

Stages of experiment	Dolphin No 1				Dolphin No 2			
	Probability of reinforcement on each side of maze	Number of stimuli	Going toward side of maximum probab. of reinforcement		Probab. of reinforcement on each side of maze	Number of stimuli	Going toward side of maximum probab. of reinforcement	
	left	right	%		left	right	%	
First choice of side of approach	0,333	0,666	1-50	6	0,333	0,666	1-50	90
	0,166	0,833	51-100	16	—	—	—	—
	0,166	0,833	101-150	90	—	—	—	—
First change in side of approach	0,666	0,333	1-100	4	0,666	0,333	1-50	68
	0,666	0,333	101-200	61	0,666	0,333	51-100	81
	0,666	0,333	201-300	76	0,666	0,333	101-150	97
Second change in side of approach	0,333	0,666	1-20	25	0,333	0,666	1-200	2
	0,333	0,666	21-40	65	0,166	0,833	201-400	1
	0,333	0,666	41-70	91	0,100	0,900	401-600	9
	—	—	—	—	0,100	0,900	601-700	43
	—	—	—	—	0,100	0,900	701-800	99

On the whole, these results of our observations and experimental data revealed some formal contradictions between facts indicative of complex organization of dolphin behavior as a whole and inertia of change in their food-searching behavior, which was demonstrated with the use of conditioned reflex methods. Inertia of alteration of food-searching behavior is inherent primarily in the early stages of captivity, and in our opinion it reflects the ecologically determined initial structure of behavior, disappearing gradually under the influence of adaptation to new principles of food-searching activity. These principles, which are dictated by conditions of captivity, are based on the fact that food is received for performing different actions such as, for example, pushing objects, making various jumps and other movements that are ecologically unrelated to original food-searching activity. The probability of food reinforcement and forms of food-searching reactions that are reinforced change constantly. There is also change and gradual increase in complexity of relationship between stimuli determining the complexity of food-searching activity and complexity of behavior as a whole. Thus, in captivity there is a change from collective and rather stereotype spontaneous food-searching

activity to a constant search of means of individual procurement of food that are new to the animal during experiments and training. All this requires use of reserves and profound, basic alteration of behavior. The dynamics of such alteration depend on numerous factors, and their investigation requires setting up special experiments. To date, it has not been possible to perform such special-purpose experiments on dolphins.

Table 3. Dynamics of change from old behavior program to new one with simultaneous presentation of familiar figure and series of new figures

Animal	Number of Presentations	Approaches to figures with different probabilities (P) of their reinforcement, %									
		first variant		second variant		third variant		fourth variant		fifth variant	
		$P_1=0,2$	$P_2=1$	$P_1=1$	$P_2=1$	$P_1=0,8$	$P_2=1$	$P_1=0,6$	$P_2=1$	$P_1=0,5$	$P_2=1$
Dolphin No 3	1-20	85	15	55	45	100	—	25	75	10	90
	21-40	30	70	90	10	50	50	35	65	20	80
	41-60	5	95	100	—	65	35	20	80	5	95
	61-80	—	100	100	—	40	60	15	85	5	95
	81-100	—	100	100	—	40	60	20	80	5	95
	101-120	—	100	100	—	60	40	10	90	5	95
Dolphin No 4	1-20	—	—	65	35	100	—	100	—	70	30
	21-40	—	—	95	5	100	—	95	5	50	50
	41-60	—	—	90	10	100	—	95	5	50	50
	61-80	—	—	100	—	100	—	80	20	45	55
	81-100	—	—	100	—	100	—	75	25	50	50
	101-120	—	—	100	—	—	—	80	20	55	45
	121-200	—	—	—	—	—	—	—	—	50	50

Note: P_1 --probability of reinforcement of familiar figure,
 P_2 --the same for each of the new figures.

In view of the foregoing, we consider it impossible to furnish a general description of the level of higher nervous activity in dolphins without separating the degree of their adaptation to arbitrary stages. In our experiments, we used the following working classification: period of prevalence of passive and defense reactions; period of prevalence of ecologically determined behavior programs and period of adaptation to new principles of food-searching activity. The first period was characterized by the possibility of formation in hungry animals of the most elementary food-searching reactions not determined ecologically, which disappear rapidly under the influence of defense reactions in the course of each experiment as the animal becomes satiated. Dolphins usually continue to eat feed simply thrown into the water. The second period, which is chiefly the one we studied, is characterized by prevalence of "automatisms," that are closely linked with prevalence of situational and previously developed food-searching conditioned reflexes over reflexes to newly introduced conditioned stimuli, as well as rather low level of motor forms of exploratory and game activities. The external sign of the third period consists of spontaneous appearance of game activity with "invention" of new forms of games and active attempts made by the animal to obtain feed from the experimenter for performing different movements, including new ones that had not been

reinforced previously. During this period, there is substantial acceleration in formation of food-searching conditioned reflexes and gradual disappearance of their specifics inherent in the second period. Concurrently, difficulties arise in choice of test problems, with which one could assess the ultimate level of intelligence (level of higher nervous activity) of the animal, since it changes constantly in the course of training (McBride, Hebb, 1948; Dembovskiy, 1963, and others). On the whole, the results of our studies and data in the literature do not, in our opinion, permit singling out the bottlenosed dolphin from the basic group of animals with highly developed intelligence, such as lower primates and dogs, at least not at this stage. At the same time, in spite of some of the data submitted here, neither are there any grounds to conclude that they have a low level of development of higher nervous activity. Evidently, it would be more correct to conclude that there is rather stable specialization of behavior, which is related to ecological factors rather than decrease in level of development of higher nervous activity, as compared to highly developed terrestrial mammals.

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CSO: 1840/369

STUDY OF HEMODYNAMIC COMPONENT REGULATION OF DIVING REACTION IN BAIKAL
PHOCA SIBIRICA SEAL

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian
Vol 20, No 1, Jan-Feb 84 (manuscript received 28 Nov 82) pp 104-107

NESHUMOVA, T. V., CHEREPANOVA, V. A. and SHTERENTAL', I. Sh., Institute of
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[Abstract] An attempt was made to evaluate the effect of adrenergic and cholinergic factors on muscular blood flow of the Baikal seal which is capable of staying submerged for prolonged times while exerting considerable muscular activity. It was found that blocking the adreno- and cholinoreceptors by phentolamine and atropine respectively resulted in preservation of muscle blood flow during the diving periods; only cholinoreceptors-block led to abolition of bradycardia. Adrenergic regulation of the blood flow played an important role during post-dive recovery process. Figure 1; references 4 (Russian, one by Western authors). [373-7813]

MELTING CHARACTERISTICS OF SPERM WHALE METHMYOGLOBIN

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 14 Feb 83) pp 151-153

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Institute of Physics, Georgian SSR Academy of Sciences, Tbilisi

[Abstract] Melting characteristics were determined for large (0.5-1 x 1-2 x 2-4 mm³) monoclinic crystals of sperm whale methmyoglobin heated at rates ranging from 1.9 to 24°C/h to 100°C. Microcalorimetric studies showed that the transition temperature decreases from 378.7 kJ/mole at 24°C/h to 339.2 kJ/mole at 1.9°C/h while the full temperature interval of the transition decreases linearly almost 2.5-fold. Under either rate the form of the crystals remained unaffected; however, native crystals are soluble in water while the heated (denatured) crystals were not. Methmyoglobin crystals were seen to behave in a manner analogous to the behavior of other proteins, in that denaturation involved alterations of the crystalline mosaic structure. Figures 3; references 2 (Russian). [365-12172]

UDC 615.036.882.08

EXO- AND ENDOTOXICOSIS: ARTIFICIAL DETOXICATION IN RESUSCITATION

Moscow ANEZTEZIOLOGIYA IREANIMATOLOGIYA in Russian No 5, Sep-Oct 82
(manuscript received 14 May 82) pp 44-46

CHELMAKINA, V. P., SHEL', F. G. and SPIRIDONOVA, L. A., Department of Toxicology, Scientific Research Institute of Regional Pathology, Kazakh SSR Ministry of Health, Alma-Ata

[Abstract] An analysis is presented of 349 cases of acute endo- and exotoxicoes with hepatorenal failure, and the outcome in relation to treatment. All patients were managed in the standard manner intended to eliminate the toxic agents from the body, including artificial detoxication consisting of hemodialysis and blood substitutes. Of the cases analyzed, 236 patients survived, while 113 with irreversible hepatorenal damage succumbed after temporary improvement. The key to survival in such situations was the use of specific antidotes, which are not always available, in combination with enhanced diuresis and blood substitutes to eliminate as much as possible of the toxic agent and prevent further and cumulative damage to vital organs. References 5 (Russian).
[413-12172]

UDC 616-001.4-092-07-085:615.355

LONG-TERM ENZYME TREATMENT IN COMBINATION THERAPY OF REFRACTORY WOUNDS

Leningrad VESTNIK KHIRURGII IMENI I. I. GREKOV in Russian No 9, Sep 83
(manuscript received 9 Jun 82) pp 53-56

KULIKOV, L. K. and KOGAN, A. S., Chair of Surgery, Irkutsk Institute for the Advanced Training of Physicians, USSR Ministry of Health

[Abstract] A cohort of 104 patients, ranging in age from 15-71 years, were treated for refractory, long standing (2 months to 18 years) purulent wounds according to two treatment protocols. One group was treated in the standard manner with surgical debridement followed by sodium chloride dressings, while another group (51 patients) was treated by

surgery in combination with Profezym (immobilized bacterial protease) dressings. The latter approach was superior, with clearing and elimination of pathogenic organisms occurring in an average of 7.8 days, while the former group required a mean of 30.6 days for the same clinical results. Entirely satisfactory results were obtained in 48 of the patients on the Profezym regimen when followed by plastic surgery, whereas plastic surgery was successful in only 31 patients in the enzyme-untreated control group. These observations point to the effectiveness of Profezym in the management of long-standing purulent wounds.

References 10 (Russian).

[410-12172]

UDC 616.8-089.93(571.1/.5)

NEUROSURGICAL SERVICE IN SIBERIA AND FAR EAST

Moscow VOPROSY NEYROKHIRURGII in Russian No 1, Jan 84 pp 50-52

KHARITONOVA, K. I. and KORAI, L. S.

[Abstract] The present article traces the development of neurosurgical services in Siberia from their beginnings in the work of Professor V.M. Mysh in 1909, in Tomsk and later in Novosibirsk. Irkutsk followed these cities as an important center for neurosurgery, and after World War II the evacuation hospitals from that period became new medical centers. The first specialized center for neurotrauma and tumors of the nervous system was organized in Irkutsk around 1950, under the direction of Professor Kh. G. Khodos. New levels in neurotrauma treatment began about 1960, and in 1964 specialties were identified for various regional centers: At Novosibirsk for brain trauma and neurooncology, at Omsk for epilepsy, and at Novokuznetsk for spinal column ailments and trauma. The roles of central agencies and institutes, such as the All-Union Society of Neurosurgeons and the Institute of Neurosurgery imeni N. N. Burdenko, are cited. Research institutes focus on acute brain trauma (at Novosibirsk), osteochondrosis and other spinal ailments (at Novokuznetsk), nervous disorders (at Omsk) and cerebral vascular problems (at Irkutsk).

[444-12131]

SELECTION OF OPTIMAL FREQUENCY OF CURRENT PULSES IN ELECTRIC SLEEP TREATMENT OF CHILDREN AFFECTED BY BILE EXCRETION DISORDERS

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY
In Russian No 1, Jan 83 (manuscript received 5 Aug 81) pp 51-52

CHISTONOGOVA, E. A. and LOVCHIKOVA, N. N., Moscow Oblast Scientific
Research Clinical Institute imeni M. F. Vladimirskiy

[Abstract] Along with pharmacological treatment for vegetative nervous system disorders, electric sleep (ES) is becoming increasingly more important as a therapeutic measure. The goal of the present work was to determine optimal frequency of the current pulse to be used in treating children with chronic cholecystocholangitis. The state of the vegetative nervous system was determined by the vegetative index $VI = 100(1 - d/p)$ where d - diastolic pressure and p - pulse rate. The study group consisted of 53 children in the age bracket 4-14 years old. It was shown that VI must be considered in considering the use of ES for treatment of bile-excretion disorders. With VI higher than +32 (dominant sympathetic tonus) a 10 Hz frequency of current impulses was recommended because it affected sedatively the subcortical structures. With VI less than +32 (equilibrated vegetative nervous system) a 100 Hz impulse frequency should be applied: this frequency showed stimulating effect on higher CNS branches. References: 3 (Russian).
[366-7813]

RECONSTITUTION OF FULL VALUE OF PRESERVED BLOOD AFTER LONG-TERM STORAGE

Moscow GEMATOLOGIYA I TRANSFUZIOLOGIYA in Russian No 10, Oct 83
(manuscript received 24 Mar 82) pp 53-54

AGRANENKO, V. A., professor, MARKOVA, N. A., TIBILOVA, N. N., SUVOROVA, I. A., GOLUBEVA, V. L., KRISHTOF, A. N., BURUSHKINA, T. N., ALEYNIKOV, V. G., MYSHKINA, M. A., KARPENKO, V. V. and YEVDOKIMENKO, V. M., Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow

[Abstract] A new method for reconstituting full value of whole blood stored for 21-28 days was tried based on biochemical reaction with metabolites of carbohydrate-phosphorus metabolism followed by hemosorption. The "rejuvenating solution" consisted of: adenine - 10 mM, inosine - 40 mM, pyruvate - 24 mM, disubstituted phosphate - 16.8 mM, NaCl - 154 mM; blood to solution ratio used was 3:1. The principal biochemical indices of the blood

subjected to "rejuvenation" and hemosorption showed values close to normal; the content of ATP, 2,3-DPG and P₅₀ in erythrocytes, concentration of acid metabolites, potassium, free hemoglobin, pH. Separate treatment with "rejuvenating solution" or hemosorption did not yield satisfactory results. References 7: 4 Russian, 3 Western.
[388-7813]

UDC 615.281

BIOCOMPATIBLE BIODESTRUCTING POLYURETHANES WHICH POSSESS ANTIBACTERIAL EFFECT

Kiev KLINICHESKAYA KHIRUGIYA in Russian No 1, Jan 84
(manuscript received 8 Aug 82) pp 33-55

CHUPRINA, L. N., LIPATOVA, T. E., SHALIMOV, S. A., TSIRKEL', V. A.,
RUDENKO, A. V., LIFSHITS, YU. Z. and PKHAKADZE, G. A., Institute of Organic
Chemistry, UkSSR Academy of Sciences, Kiev; Scientific Research Institute
of Clinical and Experimental Surgery, UkSSR Ministry of Health

[Abstract] Results of studies of biocompatible polyurethanes which are destructible in the organism and are based on simple polyethers and aromatic diisocyanates and which possess antibacterial properties are presented and discussed. Determination of free and polymer-bound antibiotics showed that, under the given conditions of immobilization, the degree of chemical binding of the antibiotics studied varies from 25 percent (for tetraolean) to 62 percent (for lincomycin) as a function of their structure and presence of reactive groups. Polymers containing erythromycin, tetracyclin and tetraolean possess the greatest antibacterial activity while those containing ampicillin and oxacillin were less active. Polymers with lincomycin and control polymers containing no antibiotics produced no antibacterial effect. The experiments showed that polyurethanes are a suitable carrier of biologically active substances, especially antibiotics. References 6 (Russian).

[448-2791]

LOCAL TREATMENT OF PURULENT WOUNDS

Moscow KHIRURGIYA in Russian No 1, Jan 84 pp 136-141

DATSENKO, B. M., professor, KOSTYUCHENOK, B. M., PERTSEV, I. M. and KALINICHENKO, V. N., Surgical Clinic (B. M. Datsenko, head) of the Ukrainian Institute for the Advanced Training of Physicians, Khar'kov; Department of Wounds and Wound Infection (B. M. Kostyuchenok, head) of the Institute of Surgery imeni A. V. Vishnevskiy, Moscow

[Abstract] Development of ointments which produce a pronounced antimicrobial, dehydrating and necrolytic effect in the first purulent necrotic phase of inflammation and their clinical and experimental testing in 1976-1979 were described and discussed. Biopharmaceutical studies were used in developing the ointments (levonorcin and levomekol). The ointments have a multidirectional effect of basic etiopathogenic process with ointments prepared on a water-soluble base, exceeding the effectiveness of analogous ointments on a vaseline-lanolin base 20-80-fold. The ointments have pronounced osmotic properties and produce a dehydrating effect 10-30 times greater than that produced by presently used preparations (10 percent solution of sodium chloride). They reduce the length of treatment significantly. The ointments on a water-soluble base are effective against gram-negative flora and are indicated for use in the first phase of the wound process. An example of the use of levomekol in treating fibrose-purulent peritonitis is presented.

[425-2791]

UDC 541.144.576

TEMPERATURE DEPENDENCE OF KINETICS OF FAST PHASES OF PHOTOINDUCED ELECTRIC
POTENTIAL GENERATION IN FILMS OF HALOBACTERIUM HALORUM PURPLE MEMBRANES

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 274, No 3, Jan 84
(manuscript received 4 Jul 83) pp 738-741

CHAMOROVSKIY, S. K., PIKULENKO, A. Ya., MAKSIMYCHEV, A. V., LUKASHEV, Ye. P.,
PASHCHENKO, V. Z., KONONENKO, A. A. and RUBIN, A. B., Moscow State University
imeni M. V. Lomonosov

[Abstract] The first measurement of the temperature dependence of the
photopotential induced by a laser burst in oriented dried purple membranes
of halobacterium was described and discussed. The fact that, at cryogenic
temperatures, the negative phase of the photopotential with rapid (≤ 300 ns)
kinetic increment is preserved supports the assumption that the primary re-
action of the photocycle of bacteriorhodopsin evidently is accompanied by
a shift of the light particle, the electron, to a considerable distance,
possibly by tunneling. These findings are only tentative. Spectroscopic
data of combination scattering at picosecond time clearance show participa-
tion of the trans-cis-transition of the bacteriorhodopsin molecule in
such processes. Figures 3; references 14: 4 Russian, 10 Western.
[329-2791]

UDC 615.373:579.843.95.083.33].012

SUSPENSION DIAGNOSTICUM FOR STUDIES ON PLAGUE BACILLUS ENDOTOXIN AND
HOMOLOGOUS ANTIBODIES

Moscow LABORATORNOYE DELO in Russian No 8, Aug 83
(manuscript received 15 Jun 82) pp 43-45

VEYNBLAT, V. I., DAL'VADYANTS, S. M. and MEN'SHOV, P. I., All-Union
"Mikrob" Scientific Research Antiplague Institute, Saratov

[Abstract] Details are presented on the preparation of a suspension
diagnostic reagent consisting of plague endotoxin adsorbed to formalinized
sheep erythrocytes. A 10% suspension of the erythrocytes was mixed

with 0.02-0.4% endotoxin solution in 0.85% sodium chloride, pH 7.2, and stored for 16-18 h at 4°C with occasional stirring; 2 h before the adsorption was terminated formalin was added to a 5% concentration. The ready reagent was either stored at 4°C as a 10% red cell suspension in 0.85% NaCl with 2% formalin, or lyophilized as a 10% red cell suspension with 7.5% sucrose, 1.5% polyvinylpyrrolidone or dextran, and 81% distilled water. The reagent was found suitable for sensitive passive hemagglutination and antibody neutralization tests. References 4 (Russian). [419-12172]

UDC 577.3

EFFECTS OF HEATING AND pH ON PHOTOSYNTHETIC SITES OF BACTERIUM RHODOPSEUDOMONAS VIRIDIS

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 12 May 83) pp 7-12

DROZDAVA, N. N., VYCHEGZHANINA, I. V. and KRASNOVSKIY, A. A., Institute of Biochemistry imeni A. N. Bakh, USSR Academy of Sciences, Moscow

[Abstract] Studies were conducted on the effects of elevated temperatures and pH on the activity of photosynthetic centers in the bacterium *Rhodopseudomonas viridis*, which uses infrared light as an energy source for photosynthesis. An increase in the temperature from 20 to 50°C causes an increase in the light-induced signal at 960 nm of about 12-15%, while a further increase in the temperature to 70°C leads to marked changes in the absorption and CD spectra. The latter changes indicate a decrease in the concentration of photoactive forms of bacteriochlorophyll b and conformational changes in the protein component of the pigment-protein complex. Transformation of the bacteriochlorophyll b dimers to the monomeric units results in irreversible oxidation of the monomers to a chlorophyll-like product designated "680." Changes in the absorption at 960 nm due to variations in pH, with maximum absorption observed at pH 7.5-8.0, as well as in the CD patterns, occurred at lower temperatures when the pH values were below pH 7.0 than when the pH was around 7.0 or higher. It appears, therefore, that both temperature and hydrogen ion effects can lead to conformation changes in the pigment-protein complex and alter their spacial relationship with respect to each other and with respect to other components of the electron-donor-acceptor system, and thereby alter the function and stability of the photosynthetic sites. Figures 4; references 18: 6 Russian, 12 Western. [365-12172]

NONIONIZING ELECTROMAGNETIC RADIATION EFFECTS

UDC 616.14-008.64-036.12-085.847.8

CLINICOBIOLOGIC ASPECTS OF MAGNETIC FIELD THERAPY IN CHRONIC VENOUS INSUFFICIENCY

Moscow VOPROSY KURORTOLOGII FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 1, Jan-Feb 84 (manuscript received 22 Nov 82) pp 27-30

ZHUKOV, B. N., TRUFANOV, L. A., MUSIYENKO, S. M., RAGIMOV, E. M. and OLEYNIKOV, V. A., Kuybyshev Medical Institute

[Abstract] An analysis is presented of the biological effects of magnetic fields and the potential clinical significance of such effects in the management of various disorders, particularly those affecting the microcirculatory system. In general, the chief physiological effects find expression in normalization of disordered capillary permeability, enhancement of blood flow and, thereby, improved tissue oxygenation. Therapeutic trials with weak 0.1-10 mT permanent magnetic fields, on 42 patients with post-thrombophlebitic venous insufficiency, showed that sessions up to 10 min in duration for 5-10 days had similar effects. The time scale for the maximum beneficial effect ranged from 7 min for the first session to 4 min for the 10th session, i.e., with therapy the time required for maximum therapeutic effectiveness decreased. In view of the effects on capillary vasodilation, the effects were most conveniently and accurately followed by photopigmentometry. Figures 3; references 4 (Russian). [1010-12172]

ANALYSIS OF CONSTANT MAGNETIC FIELD EFFECTS ON ENZYME KINETICS

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84 (manuscript received 8 Dec 82) pp 23-29

VANAG, V. K. and KUZNETSOVA, A. N. Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] A theoretical description is provided of constant magnetic field (MF) effects on steady-state enzyme kinetics of susceptible systems, which is presumably due to MF-dependence of the rate of spin transitions

in a pair of interacting paramagnetic particles. In the hypothetical system under analysis the electron spins of the active site of an enzyme and the substrate (S) are equal to $\frac{1}{2}$. For relaxation and Δg mechanisms of MF effects on the rate of electron spin conversion, the transitions between the singlet (ST) and the triplet (T) states of the enzyme-substrate complex can be described by monomolecular reactions with defined constants. Graphic methods were used to demonstrate the dependence of the steady-state rate of enzymatic reactions on the elementary kinetic constants and on the St-T transition constants. At $[S] \ll K_m$ (where K_m is the Michaelis constant) there is complete accord between the selected enzymatic model and free radical recombination reactions. MF effects on enzymatic kinetics becomes apparent when $[S] \gtrsim K_m$, presumably mediated via MF effects on free radical recombination. In terms of the free radical mechanism, the effects of MF on enzyme reactions can be seen to be directly related to the ratios between the elementary constants of the reaction. References 7: 6 Russian, 1 Western.
[365-1217]

ABSENCE OF CONSTANT MAGNETIC FIELD EFFECTS ON AUTONOMIC REACTIONS IN HYPERTENSION AND MYOCARDIAL INFARCTION

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 1 Jul 83) p 163

GOLINSKAYA, M. S., MIKHAYLIK, L. V. and KOZLOV, G. D., Central Scientific Research Institute of Health Resort Science and Physiotherapy, Moscow

[Abstract] The potential effects of a 30 mT permanent magnetic field on autonomic function were investigated in a model system on rats with experimental hypertension and myocardial infarction. Evaluation of a number of hemodynamic parameters (EKG, BP, minute volume), motor activity, and respiratory rate failed to show any physiological effects of magnetic field exposure. Similarly, negative results were also obtained in histochemical studies on DNA and dopamine levels in the neurons of the sensorimotor cortex and the caudate nucleus.
[365-12172]

ABSENCE OF EFFECT OF SUPERHIGH FREQUENCY ELECTROMAGNETIC FIELD ON ELECTROPHORETIC MOBILITY OF ERYTHROCYTES

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 16 Aug 83) p 164

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[Abstract] Superhigh frequency electromagnetic fields (1009 or 2375 Hz, 50-450 mW/ml) did not alter the electrophoretic mobility of human erythrocytes. These observations contradict a previous report that such electromagnetic fields alter erythrocyte mobility under such conditions by up to 20% [Ismailov, Biofizika, vol 22: 493, 1977]. References 1 (Russian). [365-12172]

EFFECTS OF SINGLE MAGNETIC FIELD PULSES ON ELECTRICAL ACTIVITY OF MOLLUSCAN NEURONS

Moscow BIOFIZIKA in Russian Vol 29, No 1, Jan-Feb 84
(manuscript received 28 Jan 83; in revised form 18 Apr 83) pp 109-112

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[Abstract] Intracellular recordings were obtained from individual giant brain neurons of the mollusc *Limnaea stagnalis* to study the effects of single magnetic field pulses on neuronal electrophysiology. Studies in Ringer's physiological saline at 22° showed that exposure of the neurons to triangular magnetic field pulses with peak amplitude in the 0.1 to 10 mT range and front velocities ranging from 5×10^{-3} to 2×10^2 mT/sec altered the activities in various manners, i.e., either increasing or decreasing the rate of discharge or altering membrane potential, depending on inherent neuronal activity. For the majority of the neurons tested, the effective induction was in the 0.1 to 1 mT band, and a further increase in the amplitude had no significant effect. In addition to adequate amplitude, for effectiveness a magnetic field must exert its influence for some minimal period of time, since the most rapid wavefront velocities were essentially ineffective. Figures 2; references 7: 5 Russian, 2 Western. [365-12172]

UDC 611.36-08:577.153.9

MORPHOFUNCTIONAL CHANGES IN LIVER RESULTING FROM ACTION OF A SUBSTANCE
INHIBITING ACTIVITY OF CHOLINESTERASE ENZYMES

Leningrad ARKHIV ANATOMII GISTOLOGII I EMBRIOLOGII in Russian No 7, Jul 83
(manuscript received 28 Oct 82) pp 55-62

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Docent I. V. Semenov), Department of Histology, Cytology and Embryology
(Director--Professor G. S. Katinas) and Toxicodynamics of Poisonous
Chemicals Group, Central Scientific Research Laboratory (Director--
Docent M. V. Konstantinov) of the First Leningrad Medical Institute imeni
Academician I. P. Pavlov

[Abstract] The goal of the study was to compare the dynamics of liver structure changes with consideration of histochemical indices of enzymatic activity and glycogen and RNA content during acute intoxication with chlorophos (CP). Experiments were performed on 180-200 g white rats which were injected with 2 ml 30% CP solution (LD₅₀). Detailed description of the changes occurring in these animals were reported. As early as one half hour after administration of CP, butyryl cholinesterase (BCE) activity became 90% inhibited, followed by the decrease of oxidation-reduction activity and an increase in alkaline phosphatase activity (APh). Hepatocyte cytoplasm was filled with glycogen and nearly deprived of RNA. These levels were restored to normal after about six days except for BCE and APh. In general, CP intoxication led to oxidative-reductive processes in subcellular structures of the liver, which then resulted in disturbance of carbohydrate and nucleic acid metabolism. These processes occurred synchronously; they were interconnected and, together with specific inhibition of BCE, led to development of dystrophic changes. These changes could be used as tests for the effect of toxic agents on the liver. Figures 3; references 20: (18 Russian (2 by Western authors), 2 Western.
[387-7813]

MECHANISM OF ACTION OF ALPHA-NEUROTOXINS FROM SNAKE VENOM UPON NICOTINIC CHOLINORECEPTOR OF SYMPATHETIC GANGLION NEURONS OF RABBITS

Kiev NEYROFIZIOLOGIYA in Russian Vol 15, No 4, Jul-Aug 83
(manuscript received 19 May 82) pp 377-383

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[Abstract] Currents evoked by ionophoretic application of acetylcholine and currents evoked by single stimulation of the cervical sympathetic nerve were registered under conditions of fixation of the membrane potential and block of the muscarine cholinoreceptors by atropine (10^{-6} M/liter) in neurons of the isolated rabbit superior cervical ganglion. Alpha-neurotoxins from snake venom (alpha-bungarotoxin and alpha-cobratoxin) in a concentration of 10^{-6} M/liter increased the amplitude (potential) of acetylcholine current in various neurons and caused its inhibition or initial potentiation with subsequent inhibition. Current fluctuation showed that alpha-neurotoxins do not affect single channel current nor lifetime of short-lived nicotinic channels but approximately double the lifetime of long-lived channels. This is probably due to potentiation of the acetylcholine current. The alpha-neurotoxins also inhibited the amplitude of the postsynaptic current evoked by stimulation of the sympathetic nerve, by 44 percent on the average, and extended its abatement by 24 percent on the average. It is assumed that, in the neurons studied, the alpha-neurotoxins may both block and modify the performance of the receptor-channel complex, prolonging its open state. This mechanism of action is seen only in relation to long-lived channels which indicates a difference in pharmacological properties of the two populations of channels associated with nicotinic cholinoreceptors. Figures 4; references 31; 4 Russian, 27 Western.
[440-2791]

UDC 591.524:612.8.015

ARE CHANGES IN MICROVISCOSITY AND ASYMMETRIC DISTRIBUTION OF PHOSPHOLIPIDS IN MEMBRANES A NECESSARY PREREQUISITE FOR SIGNAL TRANSMISSION? COMPARISON OF SIGNAL TRANSMISSION MECHANISMS IN PLASMA MEMBRANES AND IN RETINAL PHOTO-RECEPTORS

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian
Vol 20, No 1, (manuscript received 17 Mar 83) pp 9-16

KAGAN, V. Ye., TYURIN, V. A., GORBUNOV, N. V., PRILIPKO, L. L. and CHELOMIN, V. P., Laboratory of Neurochemistry, Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad; Laboratory of Physical Chemistry of Biomembranes, Biological Faculty, Moscow University

[Abstract] The goal of this work was to compare and analyze the conditions for transmembrane transmission of signals in plasma membranes by means of brain synaptosomes and transmission of optical signals through photoreceptor cell membranes leading to highly sensitive reception of light quanta. This concept was possible because of the presence of similar protein chains in the photoreceptor membranes responsible for the photodependent information transmission: receptor (rhodopsin)--communication protein (transducin)--effector protein (phosphodiesterase). It was shown in this process that rhodopsin could function as an activator of light-sensitive adenylyltransferase system in erythrocytes. The experiments included localization of aminophospholipids and their fatty acids in outer and inner monolayer of plasma membranes from rat (Wistar) brain synaptosomes and retinal photoreceptors from the *Theragra chalcogramma* fish. It was shown that the conditions required for transmembrane signal transmission were fulfilled by synaptosome. Reception of various signals was achieved by different receptors using unified links: receptor-communicator protein-adenylyltransferase. Figures 2; references 24: 1 Russian, 23 Western (2 by Russian authors).
[373-7813]

CHANGES IN ECHOLOCATION EMISSION FREQUENCY AND AUDITORY TUNING IN RHINO-
LOPUS FERRUM-EQUINUM BAT

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian
Vol 20, No 1, Jan-Feb 84 (manuscript received 12 Jan 82) pp 61-69

SOKOLOV, B. V., Institute of Physiology of Leningrad University, Leningrad

[Abstract] The Rhinolopidae bats process a highly developed and super-specialized hearing system closely related to emission of their location signals. In contrast to other bats, they use long wavelength signals (10-70 ms). In a series of studies of echolocation calls emitted by bats, it was noted that in captivity (resting state) these animals shift their resting frequency towards higher frequencies by as much as 1.7 kHz. These data contradicted the original findings of the stability of rest frequencies. Questions were raised as to what caused these changes, as to their extent and whether the auditory tuning was changed in the same direction. The present work was aimed at answering these questions. Experiments performed on bats captured on the Crimean peninsula showed that echolocation signals emitted by bats kept in close proximity to other bats in a state of "resting frequency" did in fact increase during the observation period of 20 weeks. At the same time, a comparable change was observed in the auditory tuning. Both of these processes were reversible. It was suggested that the sharp frequency selectivity of hearing was developed not only by a resonance process in the cochlear but also by functional mechanisms based on sensitivity changes in the receptor apparatus responding to the effect of bats' emission of narrow band echolocation calls. Figures 5; references 11: 2 Russian, 9 Western. [373-7813]

ROLE OF AUDITORY CORTEX AND INFERIOR COLLICULUS IN CONTROLLING ECHOLOCATION
PROCESS IN BATS RHINOLOPHUS FERRUM-EQUINIM BAT

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian
Vol 20, No 1, Jan-Feb 84 (manuscript received 3 Dec 82) pp 70-78

KONSTANTINOV, A. I. and MOVCHAN, Ye. V., Leningrad University

[Abstract] The goal of the study was to evaluate the role of auditory cortex and inferior colliculus in echolocation analysis by bats using compensational Doppler effect system of echolocation. Using behavioral study methods, the effect of destruction of these structures on maximum distance of obstacle recognition was investigated along with the effect on tracing a moving object and the stability and accuracy of the performance

of Doppler echolocation system. It was shown that the auditory cortex participated actively in the echolocation process by optimizing the performance of Doppler-sonar system, by normalization of its functions during the conclusion of the echolocation process and by maintaining the sensitivity of echolocator at a sufficiently high level. The inferior colliculus is an important brain center interacting directly in the matching of signal emission and detection system, in the detection of moving targets, distant objects and in overall functioning of the Doppler-sonar system. Figures 5; references 12: 5 Russian, 7 Western. [373-7813]

UDC 612.766.1

PROBLEMS AND PERSPECTIVES OF ALPINE WORK PHYSIOLOGY

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received received 6 Jun 83) pp 11-15

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[Abstract] A brief survey is presented of certain practical problems pertaining to human adaptation to high altitudes and work performance under such conditions, in light of the fact that approximately 12-15% of personnel assigned to such regions do not show an adequate level of adaptation. These facts indicate that special medical expertise has to be developed for the selection of suitable works, and to provide for physiological evaluation and appropriate training to facilitate adaptation. Other problems that have to be resolved deal with the management of various medical conditions under alpine situations and, in particular, the clinical manifestations and diagnosis and treatment of de-adaptation that may arise for various reasons. Under the conditions prevalent in the Tian Shan and the Pamirs factors other than low oxygen tension are also of key importance, such as excessive ultraviolet and infrared irradiation, the electrical properties of the air and the soil, and extreme differences in daytime and nighttime temperatures. The problem is further complicated by the fact that human responses to the various heliogeophysical, heliothermal and biometeorologic factors differ with the region in question, a point that is not always appreciated in studies on the physiological effects of such factors. References 13: 12 Russian, 1 Western. [400-12172]

EFFECTS OF LONG-TERM EXPOSURE TO LOW POSITIVE TEMPERATURES ON COLD-INDUCED VASODILATION

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 June 83) pp 52-58

GEDYMIN, M. Yu., YEVLAMPIYEVA, M. N., KANDROR, I. S. and LEKSIN, A. G.,
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[Abstract] Studies were conducted on the effects of long-term exposure to temperatures of 5-10°C on cold-induced vasodilation in 20 male tunnel-construction workers in Eastern Siberia and South Ossetia. The 25-40-year-old subjects had a work history of 3 years under the conditions specified. Evaluation of the various physiological parameters demonstrated that the pain perceived at the time of immersion of a hand into cold water was not due to vasoconstriction as generally assumed, but to vasodilation and increased blood filling of the affected extremity, which occurs concomitantly with recovery from initial numbness. Long-term occupational exposure to low temperatures was seen to delay the onset of vasodilation after immersion of the hand in cold water, and was ascribed to enhanced functional tonus of the sympathetic system which interferes with peripheral vasodilation. These observations were taken to indicate that long-term employment in a job, involving exposure to low temperatures, exerts negative effects of adaptive mechanisms of the entire organism with predominance of sympathetic influences. Corrective measures must include steps to enhance physiological responsiveness and tolerance of cold, such as appropriate hot/cold showers and other means. Figures 2; references 6: 5 Russian, 1 Western.
[400-12172]

CIRCULATORY DYNAMICS IN EXPEDITIONARY TOUR OF DUTY

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 86-93

KRIVOSHCHEKOV, S. G. and TATAUROV, Yu. A., Institute of Physiology,
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[Abstract] Circulatory dynamics were evaluated in 19 Ukrainian oil- and gas-field workers, 24 to 26 years of age, transported for two-week tours of duty to the Northern Tyumen Oblast from Ivano-Frankovsk. The flight of 4500 km was 10 h in duration, crossed three time zones and three climatic zones. The two-week tour of duty in Tyumen (at the "Severnnyy

Var'yegan" oilfield) was alternated with a two-week rest period in Ukraine. Evaluation of the physiological status of the workers in the summertime showed that their aerobic (physical) work capacity in Tyumen was diminished, falling to 20-25% below the norm at the end of the tour of duty. At midpoint in the tour of duty, adaptive mechanisms are directed at preserving the physical reserve capacities and largely involve cholinergic regulatory mechanisms, manifested by a gradual and continuous decrease in the heart rate, BP, minute volume and stroke volume. The return flight to Ukraine does not involve any additional fatigue or other manifestations of jet lag, but is followed by gradual improvements in the various hemodynamic parameters and an increase in work capacity. During the stay in Tyumen circadian differences in the various hemodynamic indicators tend to become less pronounced. Figures 3; references 21: 18 Russian, 3 Western.
[400-12172]

UDC 612.741.1

OCCUPATIONAL EFFICIENCY IN RELATION TO PSYCHOPHYSIOLOGICAL CHARACTERISTICS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 94-103

YUROVSKI KH, V. G., All-Union Scientific Research Institute of Work Protection, All-Union Central Council of Trade Unions, Sverdlovsk

[Abstract] An evaluation was made of psychophysiological characteristics which predispose to successful performance at work in the case of punch press operators, lathe hands, and machinists, based on the analysis of 584 cases of work-related trauma. Analysis of the causative factors revealed that 26-35% of the accidents were due to technical failure, 13-18% due to improper management, and 49-59% were the fault of the workers themselves. Further examination showed that 47% of the cases were due to improper or inadequate motor performance of the workers, 10% to inattention or perception errors, and 32-36% were due to delays in decision-making and operational follow-through as a result of shortcomings in mentation, memory or attention. Statistical analysis of the various psychophysiological tests demonstrated that inadequate CNS function leading to sensorimotor dysjunction is the key factor leading to work-related trauma. Other factors that are less contributory but still exceedingly important include inappropriate organization of work procedures and poor management practices (lack of tact, indifference, hypercriticism, etc.). One important step in minimizing work-related trauma is, obviously, careful psychophysiological evaluation of applicant for occupational suitability. Figures 5; references 12: 1 Polish, 10 Russian, 1 Western.
[400-12172]

INDIVIDUAL RESPONSES TO COMBINED HEAT AND PHYSICAL LOAD

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 104-111

MAR'YANOVICH, A. T., BALANDIN, V. S., BEKUZAROV, A. K. and LAPIKOV, G. M.,
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[Abstract] A study was conducted on individual variability in response to a combination of heat stress and physical exertion in the case of eight, clinically healthy, 29 to 34-year-old males. The subjects were exposed to a temperature of 49°C with 20% relative humidity for 2 h per day for 5 days, in combination with 10 min of physical activity equivalent to 40-100 W on an exercise cycle if the rectal temperature did not exceed 38.0-38.5°C. The results showed gradual adaptation of the physiologic parameters under investigation, with considerable individual variability. The heart rate decreased from 116.6-124.1 beats/min, on days 2-4, to 89.9 beats/min, on day 5, for the group as a whole, while the mean rectal temperature and sweat loss decreased from 38.27°C and 330 g/m²/h, on day 2, to 37.37°C and 227 g/m²/h, on day 5, respectively. The single most significant indicator of an overload on the homeostatic mechanisms of heat adaption is discomfort; this factor is unrelated to physical work capacity of an individual or his sweat production. The degree of discomfort that an individual can tolerate to maintain thermal balance varies with the individual. Figures 1; references 33: 13 Russian, 20 Western.
[400-12172

EFFECTS OF ADAPTATION TO HOT CLIMATE ON THERMORECEPTION

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 17 Jul 81) pp 117-119

KOZYREVA, T. V. and YAKIMENKO, M. A., Institute of Clinical and Experimental Medicine, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk

[Abstract] An evaluation was made of cutaneous thermoreception in individuals adapted to hot climates in Ashkhabad, and to cold in various Siberian cities. Analysis of the cutaneous receptors in a total of 106 subjects revealed that adaptation to hot climates for three years leads to functional changes in the temperature analyzer, and that in such individuals, the number of cutaneous receptors responsive to high temperatures is markedly depressed. However, such individuals show no change in the number of

functioning cutaneous cold receptors. These changes may be explainable on the basis of changes in the metabolism of K, Na and Ca in heat-adapted subjects, which may affect both peripheral thermoreception and the central structure of the temperature analyzer. References 8: 6 Russian, 2 Western. [400-12172]

UDC 612.13(99)

EFFECTS OF NATURAL LIGHT CONDITIONS ON BIORHYTHMS IN POLAR DWELLERS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No. 1, Jan-Feb 84
(manuscript received 4 Dec 82) pp 126-129

MOSHKIN, M. P., Institute of Clinical and Experimental Medicine, Siberian Department, USSR Academy of Medical Sciences, Novosibirsk

[Abstract] Evaluations were conducted on the biorhythmic patterns in a number of physiological parameters (body temperature, salivary calcium concentration, diuresis, urinary K and Na concentrations, BP, heart rate, minute volume, ventricular contractility, and salivary and urinary steroid concentrations) in relation to natural light conditions in ten males, 25-39 years old, stationed at the Molodezhnaya station in the Antarctic during the 19th Soviet Antarctic Expedition. Analysis of the data obtained during the polar night, summer and spring demonstrated that the heart rate and the minute volume did not undergo any pattern changes. However, the other parameters of interest showed variable changes in relation to light conditions manifested in the case of electrolytes and steroid hormones by changes in concentrations and shifts in peak concentrations. The changing biorhythmic patterns are summarized in graphic form for the different parameters, and are interpreted to reflect the influence that light conditions exert on neural structures (retina, suprachiasmatic nucleus of the hypothalamus, epiphysis, superior cervical sympathetic ganglion) that function in a regulatory capacity. Figures 4; references 20: 9 Russian, 11 Western. [400-12172]

VARIATIONS IN EEG IN RELATION TO BRAIN FUNCTIONAL STATUS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 10 May 83) pp 130-138

ZHIRMUNSKAYA, Ye. A. and ANOKHINA, N. A., No 1 Hospital, 4th Main Administration, RSFSR Ministry of Hpealth, Moscow

[Abstract] Long-term evaluation of EEG patterns led to the identification of five main types, each consisting of several subvariants: I--spatially and temporally well-organized alpha-rhythm, II--hypersynchronous, monorhythmic, III--desynchronized with low or absent alpha-rhythm, IV--disorganized with dominant alpha-rhythm, and V--disorganized with predominance of theta and delta activity. Examination of 750 patients at one hospital in Moscow in the period 1981-1982 showed that type I activity was most frequently encountered, followed most closely by type IV. Next in sequence of frequency were types III, V and II. In general, minimal disturbances in spatial organization were noted in patients with stage I vasomotor disorders, hypertension or neuroendocrine problems. Disorganization of EEG patterns were usually present in patients with atherosclerosis and those that had sustained neural infections. Hypersynchronization of alpha activity was sometimes noted in endocrine diseases (12% of cases) and rarely in other patients, while diminution or disappearance of alpha activity with enhancement of beta activity is found rather frequently in patients with osteochondrosis (28% of cases). These observations indicate that various physiological and clinical conditions that affect brain function may find reflection in EEG patterns, and are of obvious diagnostic interest. Figures 4; references 16, 13 Russian, 3 Western.
[400-12172]

UDC 612.28

BIOFEEDBACK REGULATION OF PULMONARY VENTILATION

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 19 Jan 83) pp 139-143

BRESLAV, I. S., SHMELEVA, A. M., NORMATOV, A. T. and FROLOVA, V. P.,
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[Abstract] Studies were conducted on the effectiveness of biofeedback regulation of pulmonary ventilation in three 40-43-year-old male subjects: two tachypnoics (11 and 13 resps./min and 0.8 L respiratory volume) and one bradypnoic (3 resps./min and 2.7 L respiratory volume).

In the former two cases, control of pulmonary ventilation at the desired level was achieved essentially by an increase in the depth of respiration and by an increase in the rate of breathing. The control of pulmonary ventilation was postulated to involve direct cortical stimulation of the respiratory musculature via the corticospinal pathways, bypassing the bulbo-pontine mechanism of respiratory regulation. Figures 4; references 8: 5 Russian, 3 Western.
[400-12172]

UDC 612.766

SPATIOTEMPORAL STRUCTURE OF QUANTA OF INDUSTRIAL WORK AND ITS PHYSIOLOGICAL BASIS

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 19 Oct 82) pp 144-152

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imeni P. K. Anokhin, USSR Academy of Medical Sciences, Moscow

[Abstract] Physiological studies were conducted on eleven female controllers of optoelectronic systems to determine the spatiotemporal structure of a quantum of work performed by these 20-24 year old subjects. The parameters under analysis consisted of the EKG, hand EMG, and respiratory rate, and mathematical description of their interrelationships. The analysis demonstrated that the work pattern can be described by a succession of discrete quanta, each quantum representing a control phase under specific autonomic control. The spatial configuration of a quantum is determined by the quantity and order in which the phases follow one another, while the temporal component is predicated on the relationships between the durations of the various phases. The quantum--the essential elementary unit of productive activity--is a dynamic entity subject to variation on the basis of the number of phases involved and their duration and, apparently, the competence of the controller, fatigue, error rate, etc. Figures 5; references 9 (Russian).
[400-12172]

EFFECTS OF SHORT-TERM HEAT ADAPTATION ON CERTAIN INDICATORS OF PHYSICAL CAPACITY FOR WORK

Moscow FIZIOLOGIYA CHELOVEKA in Russian Vol 10, No 1, Jan-Feb 84
(manuscript received 6 Jun 83) pp 163-165

KACHANOVSKIY, K. N., Pedagogic Institute, Chardzhou

[Abstract] The effects of short-term heat adaptation on the capacity to perform physical work were evaluated in the case of eight 28-30 year old males exposed to temperatures of 48°C for 2 h per day for 5 days, in combination with periods of activity on an exercise cycle (three 10-min periods with 60 W rpm). Before and after each heat exposure, measurements were made of the time required to attain a speed of 60 rpm on an exercise cycle with a 450 W load, and of several physiological parameters (heart rate, respiratory rate, BP, etc.). After the 5-day period, muscular strength increased by 19.3% over initial value ($P \leq 0.001$), while tolerance of static exertion equal to 2/3 of maximum muscle strength decreased, on the average, from 16.43 to 7.96%, resulting in a concomitant decrease in the absolute work capacity coefficient from 2.0 to 1.4. Two different types of adaptational mechanisms were evident: in one, increase in static exertion and decrease in time required for assigned physical performance was accompanied by a statistically significant decrease in the respiratory rate, and, in the other mechanism, a decrease in the time of static exertion and in the time required for reaching the preassigned level of physical work was accompanied by an increase in the heart rate and maximum BP. Figures 1; references 8 (Russian).
[400-12172]

UDC 613.646:613.166.9]-07:612.017.2

CRITERIA OF HUMAN COLD ADAPTATION

Moscow GIGIYENA I SANITARIYA in Russian No 1, Jan 84
(manuscript received 17 May 83) pp 7-9

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[Abstract] Comparative evaluations were made of certain physiological parameters of two groups of men in Siberia and the Far North to define those parameters indicative of adaptation to cold. One group of these 20-30 year old subjects was engaged in office work without any outdoor jobs. Acclimatization to cold in the second category of subjects was

indicated by statistically fewer cutaneous "cold" spots, greater efficiency in the utilization of oxygen, lower mean skin temperature, and more efficient shivering thermogenesis. On an overall basis, cold adaptation was marked by metabolic changes that resulted in less heat loss during respiration because of a decreased respiratory minute volume and less convective heat loss from the skin; the estimated cost of energy to maintain thermal balance in the body was decreased by 20% in the group with outdoor occupations. References 6: 5 Russian, 1 Western.
[403-12172]

PSYCHOLOGY

PSYCHOLOGY AND STUDY OF HUMAN FACTOR IN MANAGEMENT

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 5, No 1,
Jan-Feb 84, pp 35-44

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of Management

[Abstract] Study of the "human factor" is, in Andropov's words, intended to provide the most intelligent utilization of the productive and scientific-technical potential of the nation. This factor is thought of as a cybernetic black box and involves individual, personal and group traits of people who are an organic part of the social, economic and sociotechnical system. The study logically includes a psychological aspect: this aspect involves 2 tasks, viz., working out the psychological basis of the conception of man in management, and, coordination of research on psychological problems of the "human factor" in management which have been advanced by other peripheral sciences. The author has attempted to indicate the substantive features considered by the various branches of psychology (which give insight to the human factor), to discuss the place and role of the sciences in resolution of theoretical and coordination tasks (affected by the human factor) of management and to stress characteristic interactions of the various branches of psychological science used. Treatment of the subject is descriptive, e.g., the psychology of management as a branch of psychology is discussed as an applied discipline. Peripheral problems attacked by the various branches of psychology include the personality in organization, the collective (the personnel group) in organization, and the generation and resolution of management problems. Stress is placed on interdisciplinary research. References 15 (Russian). [292-8586]

STRUCTURE OF FORMAL-DYNAMIC PROPERTIES OF HUMAN PSYCHE IN SIGNAL SYSTEMS INTERACTION

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 5, No 1, Jan-Feb 84
(manuscript received 29 Nov 82) pp 45-54

KURANOV, B. V. and RUSALOV, V. M., doctor of psychological sciences, head, Laboratory of Differential Psychophysiology, Institute of Psychology USSR Academy of Sciences

[Abstract] The two levels--as seen by Soviet differential psychophysiol-
ogists--of individual psychological differences in people involve the
first level which reflects differences attributable to socially-caused
traits of the human psyche (motives, interests, knowledge, tendencies,
etc.); the second level reflects only the formal-dynamic properties
of man, traceable to his biological development. With respect to the
latter level this paper [on the title structure] reports analysis of
the characteristics of different kinds of activity, not only verbal
or non-verbal, but also various conflict relationships in them. An
extended review of Pavlov's well-known two signal systems is presented,
wherein the second signal system is characteristic of man, with word
stimuli as "signals of signals." The study employed the Stroop interference
test method to examine mental characteristics related to the two systems.
It was found that mental characteristics are not united because of relation
to the systems but because of three independent factors--verbal-lexical,
visual-effective and imaginary. Classification of special human types
should be constructed not on the basis of one of the systems but on
the basis of the actual composition of signal formal-dynamic characteris-
tics of human mental activity. Figures 2; references 33: 34 Russian,
2 Western.
[292-8586]

RESPONSE OF CARDIAC RHYTHM TO INFORMATION LOAD

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 5, No 1, Jan-Feb 84
(manuscript received 17 June 82) pp 55-61

STANKUS, A. I. and SOKOLOV, Ye. N.

[Abstract] Note is taken that cardiovascular response occurs, not only
to physical load stress, but also to mental and emotional stress and
processing of information. The latter involves the vegetative system
which is basically involved in regulation of cardiac rhythm frequency (CR).
The present paper reports study of CR changes during an information
load of increasing intensity, under conditions of various types of vegeta-
tive regulation of CR. Procedure employed used polygraph recordings
of heart rhythmograms, EKG, respiration, plethysmograms (hand and head),
SRG, muscle tone (hand), EEGs, voice, answers to questions and commands.
The load was the task of identifying presented sound frequencies and
correlation of newly presented sound information, aided by computer

processing. The initial level of the CR governed the extent of acceleration due to an informational load. Predominantly parasympathetic regulation of CR contributed to decreased response to the load and restoration of CR frequency. Figures 3; references 20: 11 Russian, 9 Western. [292-8586]

INFLUENCE OF LEVEL OF ADAPTATION TO LIGHT UPON ESTIMATION OF BRIGHTNESS

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 5, No. 1,
Jan-Feb 84 pp 71-73

NADIROVA, K. N. and SOKOLOV, A. N., Institute of Psychology, USSR Academy of Sciences

[Abstract] A study is reported of the effect of prior adaptation to exposure of subjects to light of three intensities (dark, average and bright) upon the ranking, by the subjects, of the brightness of light to which they are subsequently exposed. Two subjects, 18 and 20 years of age with normal vision (who were familiar with the goals of the experiment) were used in the experiment. The experimental device consisted of a slide projector and a photometer. Setup of the device, levels of exposure, time of exposure, ranking of brightness of stimulus (seen monocularly as a spot on a screen) are described. Distribution of subjects' ranking of stimulus brightness, for the three levels of adaptation, are portrayed in graph form. The highest curve of distribution of ranking scores was for the prior dark adaptation; a lower position was recorded for the average, and lowest curve for the bright adaptation. Plotting of the points of the curves yielded a characteristic Z-shape, not a parallel curve. The influence of the limited scale of rankings, top and bottom ("ceiling and floor") gradings, on distributions of rankings is discussed. No references. [292-8586]

ROLE OF FEEDBACK IN REGULATION OF IDEOMOTOR MOVEMENTS

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 5, No 1, Jan-Feb 84
(manuscript received 20 Jan 82) pp 74-78

GORYACHEVA, T. G. and KAPUSTIN, S. A., Chair of General Psychology, Moscow State University

[Abstract] The importance of study of regulation of ideomotoric movements in development of motor skills is indicated. Research conducted elsewhere on the nature of ideomotoric movements is discussed, in particular that of Easton and Shor [e.g., 1977] on the physiological mechanisms of the

ideomotoric act. In the present paper, the contributions of those authors are tested. The tests involve classic use of ideomotoric control of the swing of a pendulum attached to the subject's index finger. Conditions of this experiment are described. Control of oscillatory movement essentially depended on perception of the action, i.e., presence or absence of visual feedback from the pendulum. It is suggested that control of pendulum movement was realized based on Bernshteyn's reflex ring principle [see Rudik, 1967].
[292-8586]

PERCEPTION OF BINAURAL TEMPORAL SHIFTS

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 5, No 1, Jan-Feb 84
(manuscript received 15 Jul 81) pp 79-84

TEREPING, A. A., candidate of psychological sciences, section head in Laboratory of Production, Radio TV Center, ESSR

[Abstract] In movement of a sound source in a horizontal plane, the sound signals can have amplitudinal and temporal differences; study of the effect of these parameters upon lateralization of sound images usually employs headphones. In the present article, lateralization of sound images related to binaural temporal shifts is reported. Earlier studies, which made use of techniques of non-Soviet authors to determine thresholds of perception of binaural phase shifts, recorded 4-fold higher thresholds than expected. To determine the reasons for this, an automatic device was developed which could study 3 test subjects simultaneously. Details of this device are described. It was found that, in 25% of people, the mechanism for evaluating binaural phase shifts operates poorly or not at all. All test subjects perceived the binaural temporal shifts, provided there was a binaural shift of fronts along with the phase shift. The binaural shift of fronts is considered a more important parameter than the binaural phase shift. Lateralization experiments on sound images requires clear distinction of phase shifts from the binaural temporal shift, and the shift mechanisms are not the same. Figures 2; references 15: 5 Russian, 10 Western (1 by Tereping, et al.).
[292-8586]

UDC 614.2.001.83(100)

SOVIET COOPERATION WITH DEVELOPING COUNTRIES IN THE FIELD OF HEALTH

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 2, Feb 84

(manuscript received 8 Aug 83) pp 41-46

[Article by A.S.Gritsenko, A.A. Rozov, G.S. Orlov and Ye.P. Zhilyayeva,

All-Union Association "Soyuzzdrazvzagranpostavka", USSR Ministry of Health; All-Union Scientific Research Institute of Social Hygiene and Public Health Administration imeni N.A. Semashko, USSR Ministry of Health, Moscow]

[Text] Countries that have recently freed themselves from the colonial yoke are growing in importance. Comrade Yu.V. Andropov, General Secretary of the CC CPSU, justly stated in the speech he delivered at the June 1983 Plenum of the CC CPSU that "Many of them see their ties with the socialist countries as a means of strengthening their independence" [1]. This situation follows from the fact, as stated by comrade Andropov, that "in our era it is socialism that guarantees healthy relations in international relationships, favors disarmament and peace, and protects the interests of all countries and of the entire human race" [2].

The newly-liberated countries are heterogeneous in their political orientation and socioeconomic factors. It is worth noting, however, that in recent years an increasing number of such countries have chosen to follow the socialist orientation and to adhere to it faithfully which, of course, is reflected in the character and rate of their socioeconomic development.

The lack of uniformity in their socioeconomic level is due to a number of factors: differences in the historical conditions of their development, natural resources, and so forth. It is enough to remember that some of these countries have been independent for several decades now, while others have only recently been freed from cruel colonial exploitation, which had abused them and had transformed them into raw material sources for the ruling state. A number of the countries that had gained national independence were subjected to direct aggression from the imperialist powers on numerous occasions, which further weakened their already weak economic foundations.

The UN developed criteria for the identification of the least developed countries (LDC) at the beginning of the seventies in order to classify the newly-independent countries on the basis of their socioeconomic development; such countries have a per capita income of \$100 per year or less, industrial productivity accounts for 10% or less of the gross national income, and the literacy rate of the over-15 population is 20% or lower [3]. On this basis, 25 developing countries have been identified as falling into the LDC category by the UN. By the eighties, their number grew to 31. According to the UN criteria, the African countries in this category are Benin, Botswana, Burundi, Upper Volta, Gambia, Guinea, Guinea-Bissau, Comoro Islands, Lesotho, Malawi, Mali, Niger, Tanzania, Green Point Islands, Ruanda, Somali, Sudan, Uganda, Central African Republic, Chad and Ethiopia; the countries in Asia and Oceania in this category are Afghanistan, Bangladesh, Bhutan, YAR [Yemen], Laos, the Maldives, NDRY [expansion unknown], Nepal and Samoa; in addition, and, in Latin America--Haiti [4].

Not only are such countries growing in number, but there is further differentiation of the developing countries in terms of economic development. In the sixties the mean per capita income per year in this group was approximately 45% of that in all the developing countries; at the present time it is less than 30%. If this trend continues to 1990, the mean per capita income in the LDC may be less than 25% of the mean per capita income in all the developing countries [5].

Lack of financial resources prevents the LDC from developing extensive social programs, such as those inherent in public health programs. Rough calculations by the WHO show that per capita health expenditures in the LDC are only about \$2.5, while in the other developing countries they approach \$17, and in the developed countries fluctuate from \$48 to \$650 [6].

The demographic situation in these countries, which can serve as an indirect indicator of public health and community health services, is entirely unsatisfactory. For each 1000 births 200 die within the first year of life, and an additional 100 die before the 5th year of life; only 500 will live until forty [7]. The expected lifespan in the LDC is 45 years, while it is 60 years in other developing countries [8]. Furthermore, only about 30% of the population in the LDC have access to good drinking water [9]. Infectious and parasitic diseases are widespread. This situation is particularly serious in the tropical countries where more than one billion people suffer from parasitic diseases, and the situation is most serious in the least developed countries.

Inadequate and poor nutrition is one of the most serious factors having an adverse influence on the general status of health in the LDC, particularly as it affects the lower socioeconomic stratum of the population. Chronic malnutrition impairs immunity to infectious agents and leads to serious con-

sequences. In the LDC medical services are inferior to those in other developing countries. For example, there is only one physician per 17,000 people and only one nurse per 6500 people; in the other developing countries the respective figures are one per 2700 and one per 1500, and in the developed countries one per 520 and one per 220, respectively [10]. Within the last ten years special institutions of the UN have given the LDC considerably more attention.

The UN organized a special conference on the LDC, which was held in Paris in 1981. Certain capitalistic countries that had in the past exploited and continue to exploit the newly-independent countries signaled their intention at this conference to increase their assistance to the LDC. However, what remained unsaid was the fact that this assistance is intended to cover the debts that these countries owe to the Western powers. It also remained unsaid that this "assistance" to the LDC was designed to place new burdens on them and to guide them along unidimensional paths subserving the interests of their "benefactors".

The assistance rendered by the Soviet Union to the LDC has an entirely different character; the USSR was never involved in the colonial or neocolonial exploitation of the developing countries and, in distinction to the capitalistic countries, bears no responsibility for depriving them of their natural resources and their low level of socioeconomic development.

Offering genuine assistance to the newly-independent countries is the cornerstone of the Soviet foreign policy, which understands their desire to break away from the tentacles of colonialism and neocolonialism and to overcome poverty, hunger, disease, and economic backwardness and assume an independent existence, particularly so in the case of the LDC.

Cooperation between the Soviet Union and the newly-independent countries is based on the Leninist principles of international relations: equal right of small and large countries, noninterference in internal affairs, and unquestionable recognition of their sovereignty over their natural resources; this is achieved on the basis of long-term international agreements with preference accorded to the development of the state-run sector.

These principles also underlie the cooperation of the USSR with the LDC in the field of health. Such relationships are of necessity complex, and anticipate the sending of Soviet specialists to these countries, training of local cadres, construction of medical facilities, provision of medical instruments and drugs, and prevention of infectious and parasitic diseases. Medical assistance to the LDC by the USSR is provided on a gratis basis or on favorable terms.

One of the forms of cooperation between the USSR and the LDC is the transfer of knowledge regarding public health administration and prevention of a number of diseases. Public health administrators from the LDC countries in Asia, Africa and Latin America have the opportunity of acquiring detailed

knowledge on the Soviet public health system and the functions of the Soviet therapeutic and prophylactic organizations.

Of considerable importance in this respect was the international WHO/UNICEF conference on primary medical and sanitary assistance held in Alma-Ata in September 1978; it enabled the administrators and executive officers of public health services of more than eighty developing countries, including the LDC, to become familiar with achievements in public health of the Central Asian Soviet Republics.

Representatives of the LDC at the World-Wide Health Assembly in 1979 gave high marks to this conference. For example, the delegation from Botswana called this conference an epoch-making event and from the rostrum of the Assembly congratulated the WHO, UNICEF and the Soviet Government on its success. The delegation from Bangladesh noted that the "Alma-Ata Declaration gave new hope to 4/5th of the earth's population, who have no access to regular medical and community health services and are disappointed in the services rendered by the existing health systems" [11]. At the subsequent sessions of the Assembly the delegations of many of the LDC told of reforms in health services made on the basis of the recommendations provided by the Alma-Ata conference.

The Soviet Union has direct contact with 21 of the LDC countries in providing for the development of national public health services, strengthening their material and technological foundations, improving health care delivery, training of native medical personnel, and in eradicating the most widespread infectious and parasitic diseases.

Approximately a third of the Soviet medical specialists working abroad are assigned to medical facilities in the LDC of Africa and Asia. The Soviet specialists function as advisers to health ministries (Afghanistan), teach at medical colleges (Afghanistan, Guinea, LNDR [expansion unknown], Mali, Ethiopia), perform research (Guinea, Mali), and serve as consultants in various specialties. The amount of work that they do and their expertise, kindness and concern for patients have earned them the gratitude of the people and public health administrators.

An important factor in the health care system of the LDC is the training of native medical personnel. Again, the USSR is actively engaged in such activities. During the 10th Five Year Plan (1976-1980) hundreds of specialists from the LDC have received their training in the USSR. About 500 representatives of these countries have become physicians, and more than 100 have had postgraduate medical training and residencies in the USSR. At the present time approximately 20,000 representatives of the LDC are studying at Soviet medical institutions.

No less important are the efforts of the USSR in training native cadres in their own countries. More than a thousand students are currently enrolled at the medical and pharmaceutical faculties of the Polytechnic

Institute in Conakry (Guinea), which was established with the assistance of the USSR. Hundred of graduates with medical and pharmaceutical diplomas are now working for the good of their people. A large group of Soviet teachers, together with their Guinean colleagues, provide the Guinean specialists with the best educational opportunities available.

The USSR participated in the construction and provided equipment for the medical school in Bamako, Mali. More than a thousand Mali specialists have received intermediate-level medical education as fieldshers, midwives, laboratory technicians and sanitation and hygiene technicians. Along with Mali specialists, Soviet physicians also participate in the teaching program.

A significant number of Soviet teachers are also involved in the training of physicians in Afghanistan, Laos, Mali, Ethiopia and other LDGs.

The USSR also assists the LDC in developing a strong public health system by participating in planning, construction and delivery of modern equipment to the health service enterprises. The USSR was technically involved in the construction of some twenty medical facilities, including a 400-bed hospital in Afghanistan and a 400-bed tuberculosis hospital in the Sudan, a 100-bed hospital in the YAR [Yemen], as well as hospitals in Laos, Nepal, and so forth.

Currently, the USSR is involved in the construction and equipping of medical facilities in Afghanistan, Laos, Mali and NDRY. In the LDC the total number of beds in hospitals constructed with the assistance of the USSR stands at more than three thousand [12]. It should be pointed out that the medical facilities constructed by the USSR in the LDC are planned with local conditions in mind and represent the latest state of knowledge and technology.

In addition, the LDC benefit from the drugs, medical equipment and instruments, and general medical supplies provided by the USSR since, as a rule, their pharmaceutical industry is not well developed. Such deliveries have been made regularly during the last Five-Year Plan to Benin, Burundi, Guinea-Bissau, YAR, Laos, Mali, Niger and other countries.

The LDC also benefit greatly from the assistance that the USSR renders in the prevention of widely distributed infectious and parasitic diseases. This is achieved by sending Soviet specialists in infectious diseases and epidemiology, and bacteriologists and parasitologists to these countries to serve as consultants, teachers, and to conduct research.

The LDC also receive vaccines and antisera. On a bilateral basis, as well as via WHO, the LDC and other developing countries receive Soviet vaccines against smallpox, cholera, tetanus, poliomyelitis, and measles and other Soviet preparations.

Comrade Yu.V. Andropov, General Secretary of the CC of the CPSU, stated in his address at the June 1983 Plenum of the CC CPSU that "We feel closest to those countries in the former colonial world that have chosen a socialist orientation. We are united with them not only on the basis of a common anti-imperialism and love for peace in our foreign policy, but also on the basis of common ideals with regard to social justice and progress" [13].

Since health services in the LDC that adhere to the socialist orientation are based on social justice and are accessible to all, they are particularly interested in the experience of the USSR where these principles are exemplified to the fullest. Despite the very difficult conditions prevalent in these countries, they are making great progress in health care delivery. This fact was confirmed by the delegates of Afghanistan, Laos and Ethiopia at the sessions of the World-Wide Health Assembly in 1983 [14]. The LNDR delegation declared from the rostrum of the Assembly that the success that they had achieved in seven years after devastating military aggression by the forces of imperialism were made possible only by the mobilization of the entire people and support from the Soviet Union and other socialist countries, as well as the assistance from other friendly countries and certain international organizations [15].

The USSR and the LDC with a socialist orientation follow a single foreign policy in calling for a reduction in expenditures for armaments and to use the freed resources for assistance, including medical assistance, to the newly-independent countries, including the LDC. [16].

The resolution "Basic Trends in the Economic and Social Development of the USSR in the 1981-1985 Period and to 1990" passed by the 26th Congress of the CPSU foresees further development of the economic and scientific and technical cooperation between the USSR and the developing countries, including the LDC.

Comrade Yu.V. Andropov, General Secretary of the CC CPSU, in his speech at the June 1983 Plenum of the CC CPSU, remarking on the need for full recognition, as equal partners of the newly-liberated countries, stated that "Obviously, our basic policy is to have mutually beneficial relationships with these countries with full respect for their sovereignty and noninterference in their affairs" [17]. These words fully apply to the cooperation between the USSR and the LDC in the field of health care.

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CSO: 1840/385

ANNUAL MEDICAL SCREENING

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian
No 11, Nov 83 pp 3-6

YULDASHEV, Sh. G., candidate of medical sciences, Uzbek SSR Ministry of Health

[Abstract] At the present time 54.4% of the Soviet population is encompassed in annual medical screening [dispensarization] programs, with plans being made to improve further the scope of this program by including the entire population of the USSR. In Uzbekistan, a special commission has been created at the Uzbek SSR Ministry of Health, with analogous commissions being established at various lower and local levels, to oversee the practical implementation of this program which will go into effect on July 1, 1984 in the USSR. It is the duty and responsibility of such commissions to see to it that the appropriate guidelines and directives are followed, and that the mass screening program is implemented to the fullest extent possible by means of appropriate allocations of personnel, facilities, and equipment and other resources.
[409-12172]

UDC 616-036.2:91(477)

MEDICAL CARTOGRAPHY IN UKRAINE

Kiev VRACHEBNOYE DELO in Russian No 11, Nov 83 pp 1-5

SINYAK, K. M., RUDICHENKO, V. F., PARKHOMENKO, GO. O., SHEVCHENKO, V. S., and BARANOVSKIY, V. A., Chair of Epidemiology, Kiev Institute for the Advanced Training of Physicians; Department of Geography, Institute of Geophysics, Ukrainian SSR Academy of Sciences

[Abstract] A discussion is presented of the current status of medical geography in Ukraine, and of plans for medical cartography in the future. An interdepartmental commission has been established to supervise the preparation of a medical atlas of the Ukraine, and preparations have commenced to train local health personnel in the acquisition and evaluation of the pertinent data. One of the best known coordinating centers for medical geography in Ukraine is located in Poltava, and plans are underway to create similar centers in Kiev, Lvov, Kharkov and Odessa. Such additional centers should go a long way to facilitate the entire operation and maintain quality control over the data gathering process.
[416-12172]

UDC 636.3:[591.112.2+591.111.05]

EKG AND ENZYMATIC INDICATORS OF OVINE CARDIAC STATUS IN EXPERIMENTAL
IRRADIATION

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 12, Dec 83
(manuscript received 17 Mar 83) pp 79-82

KRUGLIKOV, B. P., IPATOVA, A. G. and UL'YANENKO, L. N., All-Union Scientific
Research Institute of Agricultural Radiology, USSR Ministry of Agriculture,
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[Abstract] EKG and enzymatic indicators of ovine cardiac status were evaluated in a situation in which Precos sheep were gamma irradiated with either a 0.258 or a 0.085 KR/kg dose; the parameters of interest were monitored for a period of 15 days in relation to the dose. The EKG patterns revealed pronounced contractile abnormalities in sheep irradiated with the higher dose, which reflected irradiation-induced degenerative changes in the myocardium. In the animals receiving the lower dose only transient changes were noted with essential normal EKG readings by the 15th day. Analysis of serum aspartate and alanine amino-transferase activities similarly reflected extensive metabolic derangements in the myocardium of the animals subjected to the higher dose of radiation, which persisted throughout the period of observation. In the animals exposed to the lower dose, both enzymatic parameters reverted to essentially control values by the 15th day. These observations on the Precos sheep indicate that ovine response even to minimal level radiation-induced stress involves myocardial nitrogen metabolism, and that the degree of myocardial involvement in radiation-induced stress can be followed by EKG readings and clinical enzymology. Figures 1; references 9: 7 Russian, 2 Western.
[1011-12172]

GLUTARYL ALDEHYDE ACTION OF STAPHYLOCOCCUS AUREUS

Moscow VETERINARIYA in Russian No 12, Dec 83 pp 28-31

BUTKO, M. P., SHURDUBA, N. A. and SHALUYEV, N. A., All Union Scientific Research Institute of Veterinary Sanitation

[Abstract] Glutaryl aldehyde has found a wide application in recent years as a disinfecting and sterilizing agent. The goal of the present study was to evaluate the effect of pH, concentration of 2,3,5-triphenyl-tetrazolium chloride (TTC), sodium azide and glutaryl aldehyde on the oxidation-reduction activity of enzyme systems and on survival of Staphylococcus aureus. It was shown that the initial action of glutaryl aldehyde on staphylococcus cells occurred even at low concentrations of the disinfectant. Glutaryl aldehyde attacks the transport proteins affecting the input and removal of various substances affecting cell viability. With high concentrations of glutaryl aldehyde the respiratory and energetic functions are affected along with the transport ability, leading to a much stronger bactericidal effect. Figures 4.
[346-7813]

PATHOGENESIS AND DIAGNOSIS OF MIXED AVIAN RESPIRATORY INFECTIONS

Moscow VETERINARIYA in Russian No 12, Dec 83 pp 33-37

IBRAGIMOV, A. A., All-Union Correspondence Institute of Agriculture, OSKOLKOV, V. S. and GOLOD, Ya. R., All-Union Main Scientific Control Institute of Veterinary Preparations

[Abstract] Etiopathogenesis of mixed avian respiratory infections often involve mycoplasma, infectious bronchitis virus, adenoviruses, coli bacteria, etc. Pathomorphogenesis and diagnosis of mixed respiratory infection was studied on 30-day-old chickens. All study groups showed similar changes after infection; the disease symptoms appeared 18-24 days after exposure. Detailed macroscopic, histologic and clinical changes were described. It was concluded that the principal role in etiology of mixed avian respiratory infection is played by mycoplasma infection. Mycoplasma and/or viral infection creates the pathogenic basis for development of colisepticemia. Figures 3.
[346-7813]

UDC 619:616.981.46-091:636.4

HEMOPHILIC PLEUROPNEUMONIA OF PIGLETS

Moscow VETERINARIYA in Russian No 12, Dec 83 pp 37-39

SHUBIN, V. A. and TATRISHVILI, I. P., All-Union Institute of Experimental Veterinary Medicine

[Abstract] Pathoanatomical examination of animals deceased from hemophilic pleuropneumonia showed changes principally in chest cavity, in lungs, costal and lung pleura and in regional lymph nodes: bronchial, mediastinal and jugular nodes. Three groups of animals could be identified related to the course of disease: extremely acute course, acute and subacute. For each stage detailed pathological and macroscopic findings were described on individual organs: lungs, bronchi, alveoli, nasal and tracheal membranes, pleura, spleen liver, kidneys, heart, etc. It was concluded that hemorrhagic pneumonia, hyperemia in chest cavity, fibrinous pleuritis coupled with mononuclear reaction in the lungs are diagnostic indices of hemophilic pleuropneumonia. Figure 4.
[346-7813]

UDC 619:616.993.17+616.34-002+616.981.49:636.4

BALANTIDIOSIS COMBINED WITH INFECTIOUS GASTROENTERITIS AND SALMONELLOSIS IN PIGS

Moscow VETERINARIYA in Russian No 12, Dec 83 pp 41-43

MANZHOS, A. F., SUMTSOV, V. S., SOBOLEV, N. M., SLIN'KO, V. G. and PRIKHOD'KO, Yu. A., Ukrainian Scientific Research Institute of Experimental Veterinary Medicine

[Abstract] Experimentally-induced balantidiosis was studied in pigs under conditions of concurrent infection with salmonellosis and viral gastroenteritis. The results showed that all three agents resulted in disturbed activity of digestive tract and that they differed in respect to the severity of their individual effects: salmonellosis resulted in an acute course of disease, balantidiosis had a milder course and gastroenteritis was the mildest of these three infections. Infection with multiple agents increased the severity of the disease proportionately to the number of agents involved. Both the severity of the disease and its duration were intensified accordingly.
[346-7813]

MISCELLANEOUS

UDC 594.21:592/599:001.4

MODERN SCAPHOPODA CLASS MOLLUSCS OF ENTALINIDAE FAMILY (SCAPHOPODA, GADILIDA). Part 4. SUBFAMILY BATHOXIPHINAE

Moscow ZOOLOGICHESKIYE ZHURNAL in Russian No 2, Feb 83
(manuscript received 9 Oct 81, pp 181-189)

CHISTIKOV, S. D., Institute of Oceanology, USSR Academy of Sciences, Moscow

[Abstract] This article is the last part of a series of publications presenting a revision of the Entalinidae Christikov family. The subfamily Bathoxiphine, including two genera, Bathixiphus Pilsbry and Sharo with subgenera Bathoxiphus s. str. (three species) and Rhomboxiphua subgen. n. (a single type species, Dentalium tricarinatum Boissevain) and Solenoxiphus gen. p. with a single species S. striatulus sp. p. from the Island slopes of Samoa and Palau. The new species are described and new taxa of generic rank are diagnosed. Figures 4; references 10: 1 Russian, 9 Western.

[

UDC 594.382 Bradybaena: 592/599:001.4

TAXONOMIC RANK OF SOME CENTRAL ASIA LAND MOLLUSCS FROM GROUP BRADYBAENA PLECTOTROPIS (GASTROPODA, STYLOMMATOPHORA)

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 2, Feb 83
(manuscript received 20 Nov 81) pp 165-174

LIKHAREV, I. M. and RYMZHANOV, T. S., Zoological Institute, USSR Academy of Sciences, Leningrad; Institute of Zoology, KaSSR Academy of Sciences, Alma-Ata

[Abstract] Morphology of the shells and genitalia of 4 species of the genus Bradybaena, found in Western Tyan'-Shan (B. plectotropis (Martens), B. almaatina (Skvortzov), B. phaeozona (Martens) and B. stschukini (Lindholm)) was studied. Mateykin, 1972, and Shileyko, 1978, considered these snails to be indistinct intraspecies forms or "semispecies" of the polymorphic

"superspecies" *B. plectotropis*. Distinct and constant differences between some features (size, shape, color) of the shells were seen. Differences between the distal parts of the genitalia were also seen. No crossbreeding between *B. plectotropis* and *B. phaezona* was observed in nature or in captivity. The four molluscs studied were assumed to be independent species with clearly different morphological traits. This has practical as well as theoretical significance since many *Bradybaena* of Central Asia and Kazakhstan serve as intermediate hosts in life cycles of parasitic worms which are pathogenic for domestic and industrial animals. Figures 2; references 9: 8 Russian, 1 Western.
[1004-2791]

UDC 594:595.122.2:594.1/3

ROLE OF NEW AND LITTLE KNOWN SPECIES OF FRESHWATER MOLLUSCS OF UKRAINIAN FAUNA IN LIFE CYCLES OF TREMATODES

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 2, Feb 83
(manuscript received 2 Dec 81), pp 175-180

STADNICHENKO, A. P., Zhitomir Pedagogic Institute

[Abstract] The role of 33 species of freshwater molluscs in realizing the life cycle of trematodes as their intermediate or supplemental hosts was established for the first time. *Lymnaea atra*, *L. turricula* and *L. fragilis*, invaded by 7, 6 and 4 species of trematodes respectively, were the most important in this respect. The other species considered were of less importance as trematode hosts. A table lists the species of molluscs, the number of individuals examined and the number infected, the percentage of overall extensiveness of invasion and the species and stage of development of the invading trematodes. References 4 (Russian).
[1004-2791]

UDC 594.381.5:591.4

MORPHOLOGY AND TAXONOMY OF EUROPEAN REPRESENTATIVES OF SUBGENUS PEREGRIANA
OF THE GENUS LYMNAEA (GASTROPODA, PULMONATA)

Moscow ZOOLOGICHESKIY ZHURNAL in Russian No 10, Oct 83
(manuscript received 31 May 82) pp 1462-1473

KRUGLOV, N. D. and STARBOGATOV, Ya. I., Smolensk Pedagogic Institute,
Zoological Institute, USSR Academy of Sciences

[Abstract] Detailed study of the conchology and genital system of European representatives of the subgenus Peregriana provided a basis for radical revision of the taxonomy of the subspecies proposed by Hubendick in 1951. It was found that the subspecies Peregriana includes 19 species in Europe. Intrasubspecies groups, sections, were isolated for the first time and typical species of sections were designated and their synonymy was presented in view of new ideas concerning diagnostic characteristics of Peregriana species. One species, previously unknown to science, *L. carelica* sp. n., was described. A neotype, *L. balthica* L. (= *L. inflata* Kob.) was established. The distribution of the 19 European subspecies of Peregriana was discussed and keys for identifying them were presented. Figures 3; references 13: 4 Russian, 9 Western.
[1002-2791]

UDC 594.1(Unionidae)

FRESH WATER BIVALVULAR MOLLUSKS (BIVALVIA, UNIONIDAE) OF UKRAINIAN SSR FAUNA

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[Abstract] From the early papers dating back to 1830 devoted to fresh water malacofauna, very few studies were devoted specifically to mollusks; the composition of their species has not been elaborated. On the basis of long years of observations through Ukrainian water resources, coupled with material from Zoological collections of the Ukraine, a systematic analysis of Unionidae mollusks was carried out: 22 different species and subspecies were identified among Bivalvia Unionidae and their locations were listed. Figures 2; references 19: 12 Russian, 7 Western.
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