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BIOMEDICAL AND BEHAVIORAL SCIENCES

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AGROTECHNOLOGY

NEW DEVELOPMENTS FOR PLANT PROTECTION

Moscow EKONOMICHESKAYA GAZETA in Russian No 32, Aug 83 p 2

[Review prepared by Agroindustrial-Complex Administration of the USSR State Committee on Science and Technology]

[Text] One of the main tasks of science in the realization of the Food Program is the creation of new, effective means for the protection of plants from pests, diseases and weeds. The importance of the problem continues to increase under the conditions of the specialization and concentration of agricultural production, the use of high doses of mineral fertilizers, the implementation of anti-erosion measures and soil amelioration and the transition to industrial techniques for cultivating agricultural crops.

Measures for plant protection effected recently have reduced the losses of grain, sugar beet, cotton, potatoes and vegetables. Nevertheless, the damage inflicted on the harvest by harmful organisms, diseases and weeds remains great, and a vast complex of efforts is required for its further reduction.

The goal-directed, comprehensive scientific-technical program "Creation, Development, Production and Application of Personally and Environmentally Safe Effective Chemical and Biological Means for Protecting Plants and Animals from Pests, Diseases and Weeds" has called for equipping agricultural specialists with powerful tools in the struggle for conserving the harvest. Dozens of scientific research and productional organizations in the Ministry of Mineral Fertilizer Production, the Ministry of the Chemical Industry, the USSR Ministry of Agriculture, the USSR Academy of Sciences, the Main Administration of the Microbiological Industry and, also, a number of other ministries and departments are participating in its realization.

The question is one of a comprehensive integrated system of protection, based on the use of agrotechnology (including the cultivation of varieties resistant to injury) in conjunction with chemical, biological, and microbiological methods and the development of the production of agents for plant protection.

Precise Diagnosis

The planning and organization of protective measures within the framework of the program are based on scientifically-substantiated forecasts of the distribution and development of harmful organisms. Of primary significance is the determination of the so-called economic thresholds of harmfulness. The treatment of fields is usefully carried out under a specified degree of threat of damage.

Observations and the analysis of pest and disease development are realized at 1,484 signalling and forecast points organized in various regions of the nation. The data are analyzed in 165 laboratories and, also, by the network of zonal scientific research institutes.

About 13 million rubles, including the expenditures by farms, are annually spent on developing forecasts and signals concerning the threat of damage. Such an expenditure is vindicated a hundredfold; the volumes of treatments for growing plantings have been halved. No less than a billion rubles are saved each year, and the pollution of the environment with chemicals is reduced.

The results of investigations conducted in accordance with the program made it possible to determine precisely the areas of plantings with average and strong weediness (more than 15 weed plants per square meter) for spring grains, winter grains, grain corn, silage corn, sugar beet, sunflower, potato and food roots. Also developed were the economic threshold of harmfulness for sitona, sweet-clover weevil and larch weevil; the optimal times were refined for conducting protective measures under condition of the RSFSR nonblack-earth zone.

Recommended for the control of clover pests is the use of such insecticides as aktellik, bazudin, volaton and ekamet at a usage norm of from 800 g to 1 kg per hectare. The economic effect relative to the earlier-used metaphos and chlorophos is 51-92 rubles net gain per hectare.

Instead of separate means of applying insecticides, fungicides and micro-fertilizers, a combined treatment of plants is recommended during the budding phase with mixtures of these preparations. In this way, clover pests and diseases are controlled simultaneously, the plants are provided with the necessary elements of nutrition, the repetition of clover treatment is halved and the insecticide expenditure is reduced by four- to eightfold. The costs for the combined treatment of clover with mixtures are reduced by 3.9-7.3 rubles per hectare. The seed harvest rises by an additional 15-24 kg per hectare. The economic effect by comparison with the reference variant is from 42 to 186 rubles net gain per hectare.

A most important direction is the breeding of resistant varieties. To determine sources of donors of resistance, the All-Union Scientific Research Institute of Plant Protection has developed a method whose use permitted the Kinel'skaya Breeding Station to create a large series of spring-wheat varieties, comprehensively resistant to twig borers, Swedish fly, brown rust and loose smut and are lightly damaged by leaf septoria and root rot. The "Kutulukskaya" variety is, furthermore, lightly damaged by powdery mildew.

The requirement for insecticides and fungicides drops sharply on plantings of immune and relatively resistance varieties; in many instances they can be renounced entirely. Preliminary calculations show that the use of such wheat, corn and leguminous varieties permits reducing the pesticide treatment by half and, for cotton, by 60-70 percent. There are great possibilities in this respect in vegetable growing, fruit growing and viticulture,

Introduction of Biomethods

A large portion of the efforts in the program is associated with the development of a biological method of plant protection and the conservation of the useful insect fauna. During the 10th Five-Year Plan the biomethod was employed on 14.6 million hectares, and is now employed on an area of more than 20 million hectares. In 1985, the total volume of application of the biological method for plant protection should increase to 33 million hectares. In not one nation in the world is there such a broad scale of introduction of biological methods.

A major direction here is the development of means for employing useful insects, the pest-destroying insect fauna. It has been established that the presence on the fields of a definite set of predators and parasites holds the numbers of aphids to an economically imperceptible level at which the chemical treatment of cereal crops is unnecessary.

Trichogramma is the most widely used against various species of pest insects. This small hymenopterous insect infects the eggs of cutworms and other agricultural pests, and Trichogramma larvae develop in place of the pest caterpillars. This method has been introduced to 80% of the areas protected by the biomethod.

The All-Union Scientific Research Institute of Plant Protection (VIZR) has developed a new technology and equipment for the industrial breeding of Trichogramma. The all-union association Agropribor has constructed and operates 22 biofactories with a total productivity of 100 billion individuals per season,

The biomethod has been especially widely introduced in the cotton-growing republics of Central Asia. A massive production of mechanized lines for breeding Trichogramma was rapidly organized in the Uzbek SSR. Such a biomethod makes it possible to reduce the application of toxic pesticides and to reduce pollution of the environment. The economic effectiveness of Trichogramma against the winter moth and boll worm in the kolkhozes and soykhozes of the Uzbek SSR averaged 40 rubles from each of the 662,000 hectares taken under protection,

Whereas the processes of massive Trichogramma breeding have been mechanized, the distribution of this useful entomophage in the field is, as a rule, done manually. In accordance with the tasks of the goal-directed comprehensive program, a number of the nation's scientific research institutions are developing various modifications of the apparatus both for the terrestrial and the aerial distribution of Trichogramma. Thus, special apparatus for dispersing Trichogramma from an airplane while spraying the fields with water

have been developed and tested at the Central Asian Scientific Research Institute of Plant Protection and the All-Union Scientific Research Institute for the Application of Aviation in the National Economy. The results of the experiments were positive. A technical process for Trichogramma dispersal using small-sized aircraft is under development at the All-Union Scientific Research Institute of Biological Methods for Plant Protection.

The use of biological methods of plant protection is extremely promising in sheltered-ground vegetable growing. The predatory mite, Phytoseiulus, successfully protects cucumbers in green houses by destroying tetranychids. Aphids and whiteflies inflict appreciable damage in green houses. A useful insect that destroys aphids is the aphid lion. The development of a technological process for the massive breeding of the aphid lion has been stipulated as a special task of the program. Aphid-lion larvae are also very effective against the Colorado potato beetle.

According to the data of the Central-Asian Scientific Research Institute of Plant Protection, the expenditure of highly toxic chemicals in the Uzbek SSR for the control of pests of agricultural crops declined by 40% relative to 1976, while that of moderately toxic chemicals declined by 17%. This is a result of the increase in the volumes of application of the biomethod. The costs associated with the protection of cotton have declined from 25 to 19 rubles per hectare planted.

Considerable attention in the program is given to the development of the microbiological means of plant protection.

Insects, as is known, are subject to massive outbreaks of various diseases. Isolated and artificially bred pathogens are employed, using sprayers, against various pest species, for example silkworm caterpillars in orchards and forests. The value of microbiological preparations is in their specific action, and they destroy only pests without damaging useful insects.

About 20 different ministries and departments participate in implementing the tasks for developing and introducing highly selective agents and methods of plant protection on the basis of the use of active substances and biological and genetic methods.

Some such biologically-active substances are the animal pheromones. These fragrant substances compel insects to collect together. Artificially-synthesized pheromones of harmful butterfly species are used in the practice of plant protection.

This method is especially effective for signalling and obtaining information on the dynamics of numbers and the qualitative composition of populations. The reduction of only one chemical treatment on the basis of using pheromone traps on a national scale will make it possible to save up to 6,000 tons insecticides. The introduction of a Soviet trap outfit for revealing foci of infestation with the Oriental peach moth in the southern orchard zone of the RSFSR, the Ukraine, Moldavia and the Transcaucasian republics yielded an economic effect estimated at 500,000 rubles.

The potato moth is classed with dangerous quarantine pests and is distributed in many regions of the world. In 1980, it was for the first time found in Crimea. While the numbers of this pest are small, it is extremely difficult to take notice of it. A potato-moth pheromone has been synthesized at the All-Union Scientific Research Institute of Biological Methods for Plant Protection. One trap substitutes for the labor of several investigators and permits the timely detection of the quarantine pest, determination of the degree of infestation and the timely implementation of chemical treatments, preventing the appearance of the pest in a new region.

Improvements Can and Must Be Made

All is not going smoothly in the creation and introduction of new chemical and biological means for plant protection. The Ministry of Mineral Fertilizer Production and the Ministry of the Chemical Industry are unsatisfactorily adopting an assortment of effective preparations. At the same time, obsolete methods of plant protection, to certain of which the pests and weeds have developed immunity, are carried out in large volumes.

The development of industrial synthesis, the preparation of traps and adhesives and, also, the organization of a state testing of pheromones are necessary for the wider introduction of pheromones into practice. However, the Ministry of Mineral Fertilizer Production has adopted a waiting stance, disrupting the schedule established by the program.

The scientists of the All-Union Scientific Research Institute of Agricultural Microbiology, the All-Union Scientific Research Institute of Plant Protection and the All-Union Scientific Research Institute of Bacterial Preparations have developed, and successfully tested against pest insects, about 12 Soviet microbiological preparations--bacterial, viral and fungal. Unfortunately, the Main Administration of the Microbiological Industry (R. Rychkov, head) still produces only bacterial preparations; moreover, their quality does not always correspond to the requirements of agriculture. The introduction of technological processes for the production of viral and fungal preparations has been delayed. The development of a biological method for controlling weeds and plant diseases progresses slowly.

Work is being conducted too slowly on the mechanized dispersal of Trichogramma and the technology of breeding the aphid lion. The All-Union Scientific Research Institute of Biological Plant Protection is responsible for this.

The implementation of the tasks of the goal-directed comprehensive program by scientists and industrialists will conserve the future harvests and make them more substantial.

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CURRENT PROBLEMS IN AMINOACID AND VITAMIN NUTRITION OF ANIMALS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 18, No 6,
Nov-Dec 82 (manuscript received 18 Jun 82) pp 778-791

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Sciences, Riga

[Abstract] Thanks to the revolutionary advances in biochemistry taking place in recent years, one does not evaluate the nutritional quality of various products by protein analysis anymore; now, analysis of essential aminoacids becomes the crucial factor in evaluating various nutrients. In this paper, an exhaustive review was presented of the biological quality of nutrient proteins and vitamins. Due to the fact that metabolism of the nutrients depletes the original levels of aminoacids and makes them unavailable for body consumption, it was proposed that concentrates prepared from plants and starch or cellulose-containing materials could be treated with microorganisms to provide additional protein sources for animal consumption. The absorption and transport of vitamins were discussed in light of the concepts of protein receptors and acceptors in blood and tissues of animals. The importance of vitamins in synthesis of proteins and their posttranslation modification was stressed. The interaction of aminoacids and vitamins in providing adequate nutritional level to animals was brought out. References 59: 46 Russian, 13 Western.
[609-7813]

ISOLATION AND CERTAIN PHYSICAL CHEMICAL PROPERTIES OF NEW NEUROSPECIFIC
PROTEIN 10-40-4 FROM HUMAN BRAIN

Moscow BIOKHIMIYA in Russian Vol 48, No 7, Jul 83
(manuscript received 21 Sep 82) pp 1203-1208

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[Abstract] A new neurospecific protein, designated 10-40-4, was isolated from extracts of water-soluble human brain protein using DEAE-cellulose chromatography, ammonium sulfate precipitation and immunoaffinity chromatography. The support for the latter was prepared from rabbit antiserum to the desired protein and Sepharose 4B. Final purification was by preparative polyacrylamide gel disk electrophoresis. Protein 10-40-4 gave one zone of precipitation in a double diffusion reaction with antiserum to fraction 10-40. Yield was 0.075 mg/g brain tissue. The molecular weight of the protein, as determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis, was 74,000±1000 dalton and its isoelectric point was 4.7 by isoelectrofocusing. Guinea pig and rat brain extracts did not cross-react with antiserum to human brain fraction 10-40. Protein 10-40-4 is not a glycoprotein and differs from the neuroproteins S-100 and glial fibrillar GFA. It does not possess enolase activity, distinguishing it from enolase 14-3-2. Studies to determine whether it is a component of neurofilaments are proceeding. Figures 6; references 15: 5 Russian, 10 Western.
[597-12126]

LOW MOLECULAR WEIGHT HUMAN KININOGEN: PRODUCTION OF PURIFIED PREPARATION
AND IMMUNOCHEMICAL STUDIES

Moscow BIOKHIMIYA in Russian Vol 48, No 7, Jul 83
(manuscript received 24 Sep 82) pp 1214-1220

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[Abstract] Low molecular weight human kininogen was purified from citrated serum using Sephadex and Biogel chromatography and ammonium sulfate precipitation, resulting in a 300-fold purification. Electrophoresis demonstrated that the preparation contained one main component and two minor ones, with a purity of 80-85%. Sodium dodecyl sulfate electrophoresis gave a molecular mass of 70,000+2000 daltons. Kinetic experiments with various kininogenases were conducted. The activity of swine pancreatic kallikrein was 100 µg/bradykinin equivalent, while trypsin and human plasma kallikrein were only 5 and 1.5 respectively. Antiserum to the purified low molecular weight kininogen was obtained by inoculating four chinchilla rabbits. This antiserum formed precipitation zones in double diffusion with both low and high molecular weight kininogen. It bound all the kininogen present in human plasma. Immuno-electrophoresis of the antiserum gave three arcs of precipitation with normal human plasma, corresponding to high molecular weight kininogen, its complex with precallikrein and low molecular weight kininogen. Figures 4; references 13; 1 Russian, 12 Western.
[597-12126]

UDC; 595.766.1+577.150.7

IMMOBILIZED LUCIFERASE OF LUCIOLA MINGRELICA FIREFLIES: KINETIC PROPERTIES
AND THERMAL STABILITY OF LUCIFERASE IMMOBILIZED ON CELLULOSE FILMS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 19, No 2,
Mar-Apr 83 (manuscript received 13 Apr 82) pp 209-216

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[Abstract] Firefly luciferase was used to determine microscopic quantities of ATP as well as the enzymes which synthesize and decompose ATP. The purpose of this work was to produce highly-active preparations of firefly luciferase immobilized on cellulose films (dialysis film from Union Carbide and Sigma and, also, Khimvolokno) and to study their kinetic properties, thermal stability and the possibility of repeated use of the preparations for determination of ATP. Cellulose was used for its strength and because it contains large numbers of OH groups easily activated by various reagents. The

activators used were cyanurochlorides and sodium periodate. The possibility was demonstrated of producing highly active cellulose films of immobilized firefly luciferase. The induction period for luciferase on cellulose films was only 12 seconds at 0.1 μ M ATP, and decreased with increasing ATP concentration. Measurements were in the kinetic area at least up to ATP concentrations of 1 mM. A calibration graph for the determination of ATP is presented. The luciferase films were used repeatedly. After 40 measurements, the activity of the film had dropped by not over 10%, within the limits of accuracy of measurement of activity. Figures 5; references 10: 6 Russian, 4 Western. [632-6508]

UDC 577.152.311'.1.042

REACTION OF METHYLSULFOMETHYLATES OF O-p-ALKYL-S-(β -ETHYLMERCAPTOETHYL)-METHYLTHIOPHOSPHONATES WITH VARIOUS CHOLINESTERASES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 8, Aug 83
(manuscript received 17 Dec 82; in revised form 28 Jan 83) pp 1040-1046

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[Abstract] Studies were conducted of the parameters determining inhibitory effectiveness of organophosphorus compounds with the general formula $(CH_3)(RO)P(O)SCH_2CH_2S^+(CH_3)C_2H_5.^-O_4SCH_3$, with the O-p- chain length of the alkyl R radical ranging from $^-CH_3$ to C_8H_{17} , on the activities of several cholinesterases. The results showed that the bimolecular reaction rate constant increased up to a certain level and then decreased. The length of the radical for which a maximum rate constant was determined was C_4H_9 for acetylcholinesterase (EC 3.1.1.7) from the electric organ of the ray *Torpedo marmorata*, C_5H_{11} for propionylcholinesterase (EC 3.1.1.8) from the neural ganglia of the mollusk *Lymnaea stagnalis*, and C_6H_{13} for butyrylcholinesterase (EC 3.1.1.8), the typical enzyme derived from equine serum and the atypical form from the visual ganglia of the squid *Todarodes sagittatus*. These findings reflected and were used to study the differences in the hydrophobic components of the enzyme active sites. Figures 1; references 22: 14 Russian, 8 Western. [693-12172]

MECHANISM OF HUMAN COMPLEMENT ACTIVATION BY IMMUNOSTIMULANTS FROM BACTERIAL CELL WALL

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 9, No 8, Aug 83
(manuscript received 18 Jan 83) pp 1047-1055

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[Abstract] Studies were conducted on the activation of human complement by a variety of bacterial cell wall preparations known to function as immunostimulants. The test materials consisted of lipopolysaccharides (LPS) and polysaccharides from *E. coli* and *Salmonella typhi* (pyrogenal, salmosan), *Bact. prodigiosum* (prodigiosan), and the *Lactobacillus bulgaricus* peptidoglycan blastolysin. *E. coli* LPS, pyrogenal, and salmosan bind Clq, the first component of complement, prevent its binding with specific antibody, and initiate the classical complement cascade. Prodigiosan had no effect on the classical pathway but initiated the alternative pathway of complement activation by binding to factor B in the presence of C3, while blastolysin was found active in binding Clq and in initiating the alternative pathway. It appears that the immunostimulant properties of these preparations may be due to their effects on the components of the complement system; with the activated components serving as the actual immune response mediators. Figures 3; references 28: 9 Russian, 19 Western.
[693-12172]

UDC 577.1+547.963

RECONSTRUCTION OF CHOLESTEROL SIDE CHAIN-CLEAVING SYSTEM USING IMMOBILIZED ADRENODOXIN

Moscow BIOKHIMIYA in Russian Vol 48, No 3, May 83
(manuscript received 23 Mar 82) pp 454-463

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[Abstract] A bovine adrenal system was used for in vitro studies on the interaction of cytochrome P-450 (CP-450) with adrenodoxin (AD) immobilized on Sepharose. The studies were conducted with high-spin CP-450 (I)--isolated as an enzyme-substrate complex containing cholesterol--, an 'enzymatic' low-spin CP-450 (II)--after hydroxylation of endogenous cholesterol--and a low-spin CP-450 (III)--induced by pregnenolone or addition of Tween-20.

High-affinity binding was seen regardless of whether the active site was occupied by cholesterol or the reaction product--pregnenolone--was added to the system. Binding of I or II to the immobilized AD had no effect on CP-450 spectral properties, while the binding of III was accompanied by spectral changes indicating transformation of the CP-450 hemoprotein into a high-spin state. Chemical or enzymatic reduction of the immobilized system did not lead to its dissociation. However, Tween-20 destabilized the system enough to cause a partial loss of the AD reductase (ADR) component and shift the equilibrium from the ADR-AD-CP-450 complex to ADR-AD and AD-CP-450 complexes. Although the triple protein complex accounted for 40% of the total adsorbed CP-450, the catalytic similarities of the immobilized and soluble systems suggest that the triple complex may be functionally important under physiologic conditions. Figures 7; references 26: 11 Russian, 15 Western. [681-12172]

UDC 577.152.3

NAD-GLYCOHYDROLASE ACTIVITY OF STAPHYLOCOCCAL ENTEROTOXINS

Moscow BIOKHIMIYA in Russian Vol 48, No 3, Mar 83
(manuscript received 20 Apr 82) pp 503-507

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[Abstract] Studies were conducted on the kinetic and catalytic properties of staphylococcal enterotoxin type A (SEA) NAD-glycohydrolase. Enzymatic activity was found to be dependent on the buffer employed and maximum activity occurred in 200 mM potassium phosphate buffer, pH 7. The activity fell off sharply as the pH departed from neutrality. V_{max} for the SEA enzyme was established at 80 nmoles nicotinamide/mg-toxin/min, and K_m was calculated as 2.5×10^{-3} M in the K-phosphate buffer at pH 7. Preliminary studies with partially-purified staphylococcal enterotoxins B and C demonstrated that they also possess NAD-glycohydrolase activities. Figures 5; references 9 (Western). [681-12172]

BIOTECHNOLOGY

EQUILIBRIUM DYNAMICS OF BIOPOLYMER STRUCTURES

Moscow MOLEKULYARNAYA BIOLOGIYA in Russian Vol 17, No 3, May-Jun 83
pp 451-454

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[Abstract] This issue of the journal presents materials from the symposium "Equilibrium dynamics of the structure of biopolymers" held in September of 1982 at the Institute of Biological Physics, USSR Academy of Sciences, Pushchino. Problems are discussed relating to fluctuation deviations from static structure of macromolecules with low energy, the existence of an equilibrium set of similar structures with identical energy for the identical macromolecule and relaxation of structure in response to its perturbation. The symposium for the first time discussed the dynamics of nucleic acids as well as proteins. A "speaker-opponent" system was used, allowing a selected opponent to read the text of each report in advance. The task of the opponent was critical analysis of the material of the report, suggestion of related problems and future paths for further investigation. About 100 researchers from some 25 scientific research institutions took part, reporting a wide variety of experimental and theoretical studies.
[630-6508]

CLINICAL AND EPIDEMIOLOGIC ASPECTS OF AN ORNITHOSIS OUTBREAK

Moscow SOVETSKAYA MEDITSINA in Russian No 6, Jun 83
(manuscript received 8 Jun 82) pp 105-106

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[Abstract] Ornithosis is an endemic diseases in the Voronezh oblast and a large percentage of the population carries serologic evidence of past clinical or subclinical infection. In 1981 an outbreak occurred at one of the large (1500 employees) poultry establishments which involved primarily workers at the slaughter house or workers that came in contact with it. Serologic studies showed the infection to be due to wild fowl coming in contact with the domestic breeds, and it was also determined that the establishment often received sick birds with suspicion of ornithosis. The clinical course of the patients was nonremarkable and typical of this disease, and the epidemiologic observations underscore once again the widespread nature of ornithosis in the Voronezh oblast. References 6 (Russian).
[691-12172]

FOOD TECHNOLOGY

SUMMARY OF DISSERTATIONS ON FOOD PROGRAM

Krasnodar PISHCHEVAYA TEKHNOLOGIYA in Russian No 4, Jul-Aug 82 pp 10-19

[Article by N. N. Lipatov, deputy chairman of the examination council of the Higher Certification Commission on engineering specializations in the agro-industrial complex: "A Brief Analysis of Dissertations Dealing with the Food Program"]

[Text] The program put forth by the 26th CPSU Congress to improve food production is at the center of attention of the party and the government today. The Plenum of the CPSU Central Committee, held on 24 May 1982, approved the USSR Food Program up to the year 1990, developed at the initiative of L. I. Brezhnev, and confirmed the decrees of the CPSU Central Committee and the USSR Council of Ministers on several specific issues related to this program.

Fulfilling the USSR Food Program is a complex creative task. It calls for uniting the efforts of agricultural workers, workers in the procurement system, specialists in refrigeration and storage of food raw materials, everyone working in sectors of the food industry and trade, as well as transportation workers involved in the shipment of raw materials and food.

The efforts of scientists working in these sectors of the national economy must be devoted to fulfilling this task.

There is a large army of scientists currently working in VUZes that train specialists and in scientific research institutes concerned with the food, meat and dairy, and fish industries, and the system of procurement and trade. There are few doctors of sciences among them, however (less than 200), and there are no more than 5000 candidates of sciences. New, developing sectors of the food industry and production that are moving to fundamentally new methods of processing raw materials are experiencing a severe shortage of highly qualified scientists. In this connection, the training and certification of scientific personnel for these sectors of the national economy are of great state importance.

The decree of the CPSU Central Committee and the USSR Council of Ministers of 18 October 1974 "On Measures for Further Improvement in the Certification of Scientific and Scientific Teaching Personnel", emphasizes that the defense of dissertations and training of scientific personnel aid in the formation of the country's scientific potential.

The status of training of scientific personnel can be evaluated on the basis of an analysis of dissertations that have been defended which the Higher Certification Commission conducts regularly.

A similar analysis also makes it possible to evaluate a sector's scientific potential, the timeliness and effectiveness of scientific research, the level of work being done by scientific and educational organizations, trends in the development of technology, and the extent to which scientific achievements are utilized in the national economy.

Each doctoral dissertation, in accordance with a provision of the USSR Higher Certification Commission, represents a long-range direction in science or the resolution of a major scientific problem that is of national economic importance. A candidate's dissertation is a new resolution of a pressing scientific problem that is of substantial theoretical and practical importance.

An analysis was made of 27 doctoral dissertations, defended in the 05.18 specialization category (see index at end of article for explanation of categories); 858 candidate's dissertations were analyzed, including specializations from the entire 05.18 category and the 05.02.14, 05.13.07, and 08.00.05 categories. These dissertations were approved by the Higher Certification Commission between 1976 and 1981. The statistical data are presented in tables: the number of dissertations per year is shown in table 1; the number of dissertations in the different specializations is shown in table 2; a profile of the dissertations' authors is shown in table 3; the places where dissertations were written and defended are shown in table 4; the number of dissertations completed in various regions and cities of the country is shown in table 5; a description of publication is shown in table 6; the number of dissertations the results of which have been implemented is shown in table 7; the number of dissertations that have had an economic effect is shown in table 8.

Well-trained, highly qualified specialists defended the doctoral dissertations. This group included experienced staff members of VUZes and scientific research institutes, assistant professors, department heads, laboratory and division directors, and deputy directors of scientific research institutes.

Table 1

Dissertations	1976	1977	1978	1979	1980	1981	Total
Doctoral	1	1	3	5	11	6	27
Candidate's	7	72	163	244	250	122	858

The majority of the authors of candidate's dissertations are graduate students (69 percent); the primary form of training scientific personnel is graduate school [aspirantur program].

The amount of graduate study done in various specializations ranges from 49 percent (category 05.02.14) to 100 percent (category 05.18.16).

The average proportion of competitors is a little more than 30 percent. The range among different specializations is from 0 to 51 percent. Among all the

competitors, the number working in industry is negligibly small and does not correspond to the current demands. The majority work in scientific research institutes. One can conclude that VUZes limit their activity in the training of scientific personnel from among industrial workers to correspondence graduate study alone. The number of competitors for the candidate's degree who are VUZ instructors accounts for one-third of the total.

Table 2

Specialization	Dissertations			
	Doctoral		Candidate's	
	Total	Percent	Total	Percent
05.18.01	1	3.7	45	5.2
05.18.02	2	7.4	41	4.8
05.18.03	1	3.7	26	3.0
05.18.04	1	3.7	127	14.8
05.18.05	--	--	28	3.3
05.18.06	1	3.7	32	3.7
05.18.13	2	7.4	31	3.6
05.18.14	--	--	19	2.2
05.18.15	1	3.7	57	6.6
05.18.16	--	--	29	3.4
05.18.17	1	3.7	18	2.1
05.18.07	--	--	58	6.8
05.18.08	2	7.4	60	7.0
05.18.09	--	--	7	0.8
05.18.10	4	14.9	29	3.4
05.18.11	--	--	--	--
05.18.12	11	40.7	97	11.3
05.02.14	--	--	75	8.7
05.13.07	--	--	43	5.0
08.00.05	--	--	36	4.1

The age of the authors is of considerable interest. The youngest ages are found among doctors in the 05.18.10 specialization. A total of 14.1 percent of the candidates of sciences defending dissertations were under 30 years old, although almost 70 percent of all those completing dissertations are graduate students. The average number of people over the age of 50 defending dissertations is quite low. But these are average figures. If one looks at the age composition of candidates in different specializations, the picture is less comforting. The number of people under the age of 30 defending dissertations in the 05.18.03; 12; 15; and 17 specializations ranges from 5 to 10 percent.

Table 3

Age	Doctors		Candidates	
	Number	Percent	Number	Percent
30 or under	--	--	121	14.1
31-40	3(40 yrs)	11	481	56.1
41-50	10	37	226	26.3
51-60	14	52	30	3.5
Over 60	--	--	--	--

The age composition of those completing dissertations is youngest among the 05.13.07 specialization; 65 percent of them are 40 years old or younger. Among the 05.18.06 specialization, over 16 percent of those defending dissertations are over 50; and among the 05.18.03 specialization, about 10 percent are between 40 and 50 years old.

An analysis shows that the least scientific potential in terms of the age indicator is found among the 05.18.03; 05.18.06; and 05.18.17 specializations. In these specializations graduate students account for 90 percent of those defending dissertations. This is evidence of the fact that the VUZes and scientific research institutes working in these important areas of science are not paying enough attention to the age composition of their graduate students.

The situation is even worse in the 08.00.05 specialization; 41 percent of those defending dissertations are between 41 and 50 years old, and 17.8 percent are between 51 and 60.

Starting in 1977, as table 1 shows, the number of people defending dissertations increases (these data do not take 1981 into account); this is evidence of the increased role of scientific personnel in resolving the food problem. The number of people defending dissertations in the important scientific specializations is not stable, and over the last 2-3 years it shows a declining trend.

Between 1977 and 1980, 18, 32, 32, and 18 percent, respectively, of the total number of candidate's dissertations approved were in the 05.18.02 specialization.

Even more alarming is the situation with dissertations in the 05.18.15 specialization. In 1978, 38 percent of the dissertations defended were in this specialization; in 1979, the figure was 28 percent; in 1980, 25 percent. In 1978, 13 dissertations were defended in the 05.13.07 specialization; this number was 11 in 1979, and 9 in 1980.

Places where dissertations were written and defended. Four doctoral dissertations were completed at the Moscow Food Industry Technological Institute and four were also completed at the Moscow Meat and Dairy Industry Institute. Three dissertations were completed at the Kiev Technological Food Industry Institute. Over the last six years, one dissertation has been written and defended at each of the following institutions: the Odessa Food Industry Technological Institute, the Voronezh Technological Institute, the Belorussian National Economic Institute, the Kharkov Public Catering Institute, the Far Eastern Fisheries Institute, the Kaliningrad Fisheries Institute, the Tallinn Polytechnical Institute, Kazakh State University, and the All-Union Food Industry Correspondence Institute.

Table 4	Doctoral				Candidate's			
	Place written		Place defended		Place written		Place defended	
Place	Total	Percent	Total	Percent	Total	Percent	Total	Percent
VUZes	20	74	25	92.5	443	51.6	649	75.8
Sci.Res.Inst.	7	26	2	7.5	410	47.5	209	24.2
Production	--	--	--	--	5	0.6		

When considering the question of where a dissertation was written, one should also focus one's attention on the subject matter. At the Moscow Meat and Dairy Industry Institute, all 4 dissertations were devoted to processes and equipment; 3 of the 4 written at the Moscow Food Industry Technological Institute also dealt with processes and equipment.

The proportion of approved candidate's dissertations in all specializations included in the group of food commodities technology (05.18), written at VUZes and scientific research institutes, is approximately the same--50 percent in each case. These are average indicators, however. Actually, the proportion of dissertations written at VUZes ranges from 8 to 100 percent. In the following specializations, less than 50 percent of the dissertations are written at VUZes: 05.18.08 (23 percent); 09 (30 percent); 10 (31 percent); 14 (32 percent), and several others. These data show that VUZes and faculties training specialists for these sectors of industry still have not become centers for training scientific personnel. Only 15 dissertations were written in the 05.18.04 specialization during the period under consideration at the Moscow Meat and Dairy Industry Institute; and only 2 were written at the Leningrad Refrigeration Industry Technological Institute. At the same time, 32 dissertations were prepared in the area of milk and dairy product technology alone at the Butter and Cheese Industry Scientific Research Institute in Uglich.

The training of personnel in the area of economic sciences is weak at the Moscow Meat and Dairy Industry Institute: in a 6 year period only 2-3 candidate's dissertations have been defended.

A review of the candidate's dissertations completed in different regions of the country and at different VUZes and scientific research institutes is of considerable interest. Not one dissertation was completed in Moscow during the period under consideration in the 05.18.09 and 14 specializations; and only 12 percent of the dissertations completed were in the 05.18.06 and 13 specializations.

It is natural that work is not being done in Moscow on tea and tobacco, but the absence of work on refrigeration technology cannot be explained the same way. Almost 100 percent of the dissertations in this specialization were done at the Leningrad Refrigeration Industry Technological Institute.

Table 5

Region, city	Doctoral		Candidate's	
	Number	Percent	Number	Percent
Eastern	2	7.4	15	1.7
Central Asia	--	--	30	3.5
Moscow	13	48.1	424	49.4
Leningrad	--	--	70	8.1
Kiev	3	11.1	64	7.5

Apparently, planning for training personnel in the 05.18.01; 02; 03; 15; and 08.00.05 specializations is not being handled correctly, since 70-89 percent of the dissertations are being written in Moscow. Training of scientific

personnel in these specializations should be organized more broadly to include other regions of the country that have a developed food industry.

Also interesting are the data describing in quantitative terms the candidate's dissertations defended in other cities in the country that have large VUZes training personnel for the food industry.

Of the total number of dissertations approved in these areas, 25, 7, and 40 percent were defended in the 05.18.01; 12; and 13 specializations, respectively, at the Odessa Food Institute. One-third of the dissertations in the 05.18.06 specialization were written in Krasnodar; over 30 percent of those in the 05.18.05 specialization were done in Astrakhan; and almost half of those in the 05.18.05 specialization were done in Kiev.

The question of preparing dissertations in the 05.13.07 specialization deserves some serious discussion. There is an immense need for scientists in this area. There are six VUZes in the country that offer graduate study in this specialization, but the number of candidates can be counted in single figures.

Out of the total number of doctoral dissertations, over 92 percent were defended in specialized councils of VUZes; and about 76 percent of the candidate's dissertations were defended in such councils. People seeking degrees at scientific research institutes in many specializations were forced to defend their dissertations at VUZes, and VUZ graduate students and others seeking degrees defend their dissertations only rarely in scientific research institute councils. A portion of the VUZ dissertations should be defended in councils of scientific research institutes that make higher demands in terms of the implementation aspects of the work.

The experience of the special council of the All-Union Meat Industry Scientific Research Institute deserves high praise; 67 of the 108 dissertations on the technology of meat and dairy products were defended there, while only 17 were defended at the Moscow Meat and Dairy Industry Technological Institute and only 20 at the Leningrad Refrigeration Industry Technological Institute.

Dissertations in various specializations. Of decisive importance in meeting the goals of the Food Program are sectors of the food industry that correspond to ten scientific specializations (05.18.01; 02; 03; 04; 05; 13; 14; 16; 17) [sic]. However, only 30 percent of the doctoral dissertations defended and 46 percent of the candidate's dissertations dealt with these decisive sectors. In addition to this, 13.8 percent of all the dissertations were in the 05.18.07 and 08 specializations, which to a lesser degree help in the resolution of the food problem.

Candidate's dissertations in the 05.18.12; 05.18.14; and 05.13.07 specializations are distributed unevenly among the sectors. Only a small proportion (about one-fourth) of the dissertations concern basic sectors of the food industry (grain-processing, meat, dairy, and sugar). Approximately 10 percent of the dissertations concern wine-making and the alcohol industry.

Almost 20 percent of the candidate's dissertations deal with economic problems in the wine-making industry in the 08.00.05 specialization. At the same time,

20 percent of the dissertations concern economic issues in the bread-baking, grain-processing, meat, and sugar industries.

Of the 11 doctoral dissertations defended in the 05.18.12 specialization, 4 dealt with processes and equipment in the meat industry, and 3 dealt with questions in alcohol and fermentation production.

Publication of material based on dissertations. It is positive that there has been an increase in the volume of publications based on material from doctoral and candidate's dissertations.

Table 6

Type of Publication	Doctoral	Candidate's
Books	24	22
Articles and theses	2000	6161
Patents	231	651

Monographs and books based on dissertations are published and the number of articles published per 1 dissertation has increased significantly--from 26 to 143.

Practically all of the dissertations have resulted in patents (15 of the dissertations have obtained 5 or more patents each; and 7 have obtained between 15 and 26 patents).

An average of 7 articles and short papers are published from each candidate's dissertation. But here a significant proportion of the publications are short papers given at different conferences, the majority of which are of a narrow, regional nature.

Certainly it cannot be demanded that people seeking these degrees publish monographs, but book publication is extremely desirable. Almost all of the books were written by those who did their dissertations at scientific research institutes. Over half of these are books dealing with the 08.00.05 specialization.

The majority of publications are in the 05.13.07 specialization. Here there are 593 publications from 43 dissertations.

People seeking degrees from scientific research institutes publish the largest volume of articles.

Inventions are an important indicator in candidates' work. An average of 75 percent of the authors have inventions.

It is somewhat disturbing, though, that in the 05.18.17 specialization, there is only 1 patent among 18 dissertations; and in the 05.18.15 specialization there is less than 1 patent for every 10 dissertations.

It must be pointed out that the largest number of patents are obtained from dissertations prepared at scientific research institutes.

The economic effectiveness of dissertations. In many sectors of the food industry the introduction of scientific research does not result in an economic effect expressed in monetary terms. The research does have, however, an enormous social effect that is tied to providing output of high quality food products which are guaranteed in terms of their sanitary and hygienic state.

Such products include bread and roll items, drinking milk, sour milk goods, sausage products, and so on.

This situation explains the fact that the volume of work actually introduced into practice significantly exceeds the number of dissertations that produce a real economic effect in monetary terms.

This is not a contradiction, but a natural situation that occurs and will always occur in the food industry. For many sectors of the food industry studies have been done that are justified, even though their implementation does not result in any profits, but just the opposite, requires additional expenditures; such studies should be welcomed. These studies involve the creation of new, precise analyses for determining harmful admixtures in food products and creating stiffer requirements in the policies for processing raw materials.

All this does not imply that we should not expect to obtain an economic effect in monetary terms from dissertations dealing with the production of food products. Many have produced a considerable economic effect.

Out of 27 doctoral dissertations, 20 have resulted in a substantial economic effect (between 50,000 and 11.5 million rubles). The total real economic effect is approximately 30 million rubles. The expected economic effect should be over 16 million rubles.

Many candidate's dissertations are distinguished by a substantial economic effectiveness.

Table 7

Nature of incorporation	Doctoral		Candidate's	
	Number	Percent	Number	Percent
Real incorporation	20	74	405	47.2
Projected incorporation	7	26	367	42.7
Not indicated	--	--	86	10.1

Table 8

Nature of effect	Doctoral		Candidate's	
	Number	Percent	Number	Percent
Real	20	74	299	34.9
Estimated	7	26	310	36.1
Not indicated	--	--	249	29.0

An analysis of dissertations and conclusions drawn from it by special councils show that the main reason for an absence of real incorporation is insufficient attention to these problems on the part of ministries and departments.

This situation requires serious consideration and implementation of the necessary measures.

The technical boards of ministries and departments that are involved in meeting the goals of the Food Program should demonstrate an interest in dissertations that have been defended and take steps to incorporate their results.

A qualitative description of dissertations. All the approved dissertations dealing with urgent problems correspond to the demands and tasks set forth in the decisions of the 25th and 26th CPSU Congresses, the November Plenum of the CPSU Central Committee and the decrees of the party and government.

The primary content of the majority of doctoral dissertations involves optimization and intensification of technological processes and creation of new production methods that promote full utilization of raw materials and improved quality of finished products. Some dissertations developed technological lines with combined methods of raw materials processing, and some proposed highly efficient equipment. Some of the dissertations suggested creation of fundamentally new production processes to obtain high quality products.

Almost all the dissertations contain new methods for research and analysis of food raw materials and finished products.

All the dissertations contain serious theoretical studies.

New scientific directions are created and formulated in several of the dissertations.

The results of half of the approved doctoral dissertations have already been reflected broadly in educational and scientific literature and have become available to scientific and technical personnel and students.

The latest research methods are also used in the candidate's dissertations, and many contain proposals for original analytic methods for studying the subjects under consideration.

As a rule, the experimental data are generalized using a mathematical approach to processing the results, with the aid of an electronic computer; and mathematical planning methods are applied broadly to the experiments.

The overwhelming majority of the dissertations represent solutions to concrete problems tied to improving production, creating new manufacturing processes, and developing progressive instruments, machinery, and equipment.

A significant portion of the studies deal with evaluation of food products and development of methods to improve their quality.

Many of the economic dissertations contain solutions to important problems involving the agroindustrial complex and management of the production of food products.

The quality of the approved candidate's dissertations was high overall, but there were some cases of duplication in topics, trivial themes, and lack of immediacy, that must be mentioned. Although these cases are rare, they are not acceptable.

Several dissertations defended dealt with the same topic (duplication), and involved application of curing preparations in the smoking of several meat and fish products, large and small fish, and fish from various sources.

There were some dissertations that considered properties and qualities of agricultural products that are not of primary importance. Included in this group are dissertations on fruits of relatively uncommon wild plants that have no medicinal or other specific uses. There is no immediacy in the dissertations dealing with the composition and storage of the wild onion, the quality of guinea fowl meat, smoking Caspian sprats, and so on.

It should be pointed out that the dissertations in the 05.18.15 specialization are weaker in terms of their basic quantity. The weakest work (of the same type) came through the special council of the Leningrad Soviet Trade Institute imeni Engels.

Violations of the "Signal Data" system represent a serious shortcoming in many candidate's dissertations.

Many scientific and technical directions that are important in fulfilling the goals of the Food Program have not been reflected in dissertation work. We will cite just a few facts.

1. One of the pressing problems in the Food Program is full utilization of raw materials on the basis of integration of agriculture with processing sectors of industry. The scientists' task is to develop the most efficient forms of communication and interaction among the processing sectors of industry and agriculture. This approach follows from the decisions of the 26th CPSU Congress and the directives of L. I. Brezhnev on the development of the country's agroindustrial complex. There are clearly not enough dissertations dealing with these problems.

2. Among all the dissertations analyzed, not one was in the 05.18.11 specialization.

An undesirable disproportion has developed here. Scientists working in the field of classical microbiology have achieved major successes in developing the theoretical foundations for microbiological synthesis of various substances. The development of industrial technologies and equipment for practical realization of this lags substantially behind today's demands.

3. Membrane methods for division and concentration of food products (ultrafiltration, reverse osmosis, electrodialysis) have been developed extensively in food industry in many countries over the last 5-8 years. Their application has many substantial advantages over traditional methods.

The area of application of membrane methods in foreign practice is expanding more and more, and fundamentally new food products for children and special dietary needs are being developed through their use.

In spite of the obvious long-range applications of work in the area of membrane technology, only one candidate's dissertation was written on this problem.

4. It is well known that the CPSU Central Committee and the Soviet government are devoting special attention to the expansion and development of production of children's food products. Over the past 5-10 years large specialized combines for the the production of children's food products have been created. However, of the dissertations considered here, only a few were devoted to problems involved in this production and they were dealing primarily with the dairy industry. Few dissertations dealt with the production of children's meat, fish and vegetable products.

5. Operations involving multiple placement, turning, and packaging of agricultural raw materials and finished products require immense labor expenditures. In many industrial sectors, manipulators and robots are already being used for these tasks, which unfortunately are not always appropriate for working with food products. In connection with this it is necessary to develop special manipulators and robots for the food industry. However, of the approved dissertations only one dealt with this most important problem.

6. In many countries of the world scientific research is being conducted on the creation of flavoring and aromatic substances that can be used to increase the organoleptic qualities of many food products.

The search for and industrial production of such substances are of extraordinary importance. Only one candidate's dissertation dealt with this problem, however, which is evidence of the obvious re-evaluation of this direction of scientific research.

7. There are few dissertations devoted to questions of reducing power expenditures and protecting the environment.

It is also alarming that little work is being done in the new, long-range directions for technological development that are becoming more and more widespread in developed countries.

Comparison of the dissertations written at VUZes and scientific research institutes. Dissertation work done at scientific research institutes encompasses a broader circle of the sector's scientific problems than does the work done at VUZes. The topics are more timely and more closely tied to actual practice, and most important, they better reflect the latest directions and trends in the development of science and technology in the industry in which the writer of the dissertation is working. Topics of dissertations defended at VUZes are often narrow and limited by the interests of the scientific advisor or department. Furthermore, research is done on particular questions whose resolution cannot serve as a base for substantial changes in existing scientific perceptions, or in the level of techniques and technology.

Dissertations of this kind are "safe and reliable" and will certainly pass, just as those before them did.

There is little work devoted to fundamentally new directions in science and technology. Far from all the topics involve urgent industrial problems. Dissertations written at scientific research institutes in their incorporation sections differ favorably from those prepared at VUZes. Their economic effectiveness is also higher. The experimental aspects of dissertations from scientific research institutes are usually richer than those of dissertations written at VUZes. As a rule, experiments are conducted not only under laboratory conditions, but also in industrial installations and under production conditions. At the same time, the review sections of dissertations written at VUZes are marked by a broader range of literature and a more in-depth analysis of it, than found in dissertations coming from scientific research institutes. The theoretical level and the depth of the generalization of the experimental data used to be higher among the dissertations prepared at VUZes. Today this difference is less noticeable. The amount of time spent on preparing dissertations is substantially shorter at VUZes than at scientific research institutes.

Summarizing everything that has been presented here, one can assert that the dissertations written between 1976 and 1981 have made a substantial contribution to the development and improvement of production and the storage of various food products, which has contributed to the resolution of various aspects of the production program and to the development of the entire national economy of the country.

At the same time, the analysis showed that at present problems of creating waste-free technology, complete utilization of raw materials, development of uninterrupted processes on the basis of mechanization and automation of production, and application of contemporary product processing methods, all demand primary attention and development. The materials of the analysis also revealed narrow areas in questions involving the training of scientific personnel, as well as in the scientific potential in various sectors of the national economy engaged in food production.

It would be advisable to make a detailed analysis of dissertations in each of the scientific specializations involved in the country's Food Program. This must be done on a country-wide scale, as well as at the level of each VUZ and scientific research institute. Further expansion of the front of scientific work and an increase in the quantity and quality of dissertations will help resolve the complex and diverse tasks of the Food Program approved by the May (1982) Plenum of the CPSU Central Committee.

M. N. Blagoveshchenskaya, M. A. Kotov, N. N. Luchkina, V. A. Mar'yin, T. N. Shchedushnova, and M. M. Islamov participated in the preparation of the statistical data and in the selection of the material for the analysis.

List of Dissertation Specializations

05.02.00--Machine building and engineering; 05.02.14--Food industry machinery and units; 05.13.00--Control, automation, and computing techniques;

05.13.07--Automatic control and regulation, control of manufacturing processes (by sector); 05.18.00--Food product technology; 05.18.01--Bread-baking, macaroni, and confectionery products technology; 05.18.02--Grain, bean, and groats products and mixed feed technology; 05.18.03--Storage of grain and other agricultural products (elevator and warehouse management); 05.18.04--Meat, dairy and fish products technology; 05.18.05--Technology of sugar and sugar substances; 05.16.06--Technology of fats, volatile oils, and perfume and cosmetic products; 05.18.07--Technology of fermentation products and non-alcoholic drinks; 05.18.08--Technology of grape, fruit, and berry drinks and wine; 05.18.09--Tea, tobacco, and tobacco products technology; 05.18.10--Technology of vitamin, enzyme and protein preparations; 05.18.11--Technical microbiology; 05.18.12--Processes and equipment of food production; 05.18.13--Technology of canning food products; 05.18.14--Food product refrigeration technology; 05.18.15--Food products commodity science; 05.18.16--Technology of public catering products; 05.18.17--Industrial fishing; 08.00.00--Economic sciences; 08.00.05--Economics, organization of control and planning of the national economy, including that done by sectors of the national economy.

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EFFICIENCY OF THE FOOD COMPLEX

Krasnodar PISHCHEVAYA TEKHOLOGIYA in Russian No 4, Jul-Aug 82 (manuscript received 20 Jul 81) pp 20-23

[Article by A. P. Vetrov and I. I. Golotina, Krasnodar Polytechnical Institute, Department of Economics and Organization of Food Commodities Industry]

[Text] Questions involving reliable supply of food and agricultural raw materials to the country occupy an important place in fulfilling our main task--a steady increase in the material and cultural level of the people's lives.

The Food Program, as was noted at the November (1979) Plenum of the CPSU Central Committee, cannot be considered in isolation from procurement, transport, storage and processing systems. This is a united food complex.

The interdepartmental character requires coordinated activity among all the sectors included in the food complex.

The oils and fats sector is one of the leading sectors of the food industry that is called on to provide prompt and high quality receipt of oil raw materials, and to preserve them in order to obtain processing of the greatest yields of high quality oils. Many of these questions can be resolved only in cooperation with other sectors. Thus, an organic connection between this sector and agricultural production makes it essential that harvests be completed within the optimal amount of time and that high quality raw materials be delivered.

In the "agriculture--transportation--oil plants" system, the transport connections are mutually dependent: prompt receipt and unloading of raw materials increases the efficiency of motor transport operations. An increase in the motor vehicle turnover rate helps reduce the time spent on harvesting, increase the volume of raw materials shipped, and provide prompt completion of technological processes for preserving and improving the quality of the raw materials.

The main raw material used in the oils and fats industry is sunflower seeds. There is uneven shipment of this raw material to oil plants over the course of the year. The largest receipt of raw materials (over 70 percent) occurs during the period between the beginning of the harvest and December. The process of receiving the raw materials includes selection and analysis of samples,

weighing of loaded and empty transport vehicles, unloading the seeds, and filling out documents. The organization, the equipment used, and the methods applied for fulfilling these operations, determine the amount of time they take. The duration of the receiving process is taken from the time needed to carry out the operations and transfer of transportation vehicles between operations. Questions involving the improvement of the operations of raw materials receiving have been considered [1].

Considerable loss of time occurs as a result of motor transport idle time while vehicles are waiting to be serviced. An accumulation of a large number of motor vehicles (when an oil plant's raw materials section has an adequate traffic capacity) is the result of a lack of work schedules for the motor transport.

We will examine changes in the amount of time motor vehicles were idle based on data from the Krasnodar Oils and Fats Combine.

Table 1 shows that the amount of time spent waiting in line increases toward the end of the shift and is over 3 hours.

Table 1

Time (hrs)	No. of requests (vehicles to be serviced)	Time spent waiting in line (min)		
		minimum	maximum	average
7-8	10	2	12	9.1
8-9	10	1	15	6.3
9-10	25	7	32	19.0
10-11	29	25	67	44.7
11-12	10	73	188	106.0
12-13	9	156	186	172.6
13-14	12	161	191	176.3
Total	105	1	191	76.3

In order to assess the loss suffered by the national economy as a result of motor transport standing idle, we can calculate the decrease in the freight turnover. With an average speed of 50 km/h, a motor vehicle with a 4 ton carrying capacity, and the data from table 1, over the course of the first shift the freight turnover decreased by $(50 \times 4 \times 1.27 \times 105) = 26,700$ ton/km. Between 10 and 11 o'clock the reduction in the delivery of the major part of the seeds to the oil plant [1] was 42,000 ton/km, which is equivalent to 26 motor vehicles standing idle for 8 hours. A decrease in the efficiency of utilization of motor transport has an effect on the organization and performance of the harvest and preservation of raw materials.

According to certain data [2], a 10-12 day delay in the delivery of the harvest leads to a reduction in quality and losses in sunflower seeds equal to an average of 3 quintals per hectare throughout the RSFSR, and in the Volga region, a third of the harvest is lost.

We will examine the nature of shipment of sunflower seeds to oil plants in the most representative regions of their cultivation.

The maximum deliveries (table 2) under the conditions of the Northern Caucasus and the Central Chernozem zone occur primarily in the second, third and fourth five-day weeks; and in Odessa Oblast, during the first, second, third and fourth five-day weeks. At the Atkarsk Oil Extracting Plant, the intensive deliveries occur during the fifth through the twelfth five-day weeks. If one takes into account the fact that the duration of the period with the maximum deliveries coincides with the sunflower harvest, it is not difficult to determine its length. The sunflower harvest in the Central Chernozem region is drawn out for 30 days or more; in the Volga region, it lasts for 60 days or more. In the Northern Caucasus and Odessa Oblast the harvest is drawn out under the most favorable weather conditions to 20-25 days or longer. Mass harvesting begins 5-10 days late; and in the Volga region, it is over 25 days late.

Proceeding from data on losses in the harvest when the harvest is completed in time periods that exceed the optimal ones, and from data on the area of the RSFSR planted with sunflowers, we will calculate the decrease in the gross harvest, and in the volume of oil processing and output.

The land area in the republic planted with sunflowers is 2,391,000 hectares [3]. The loss per hectare is 0.3 tons. Total harvest losses are 717,000 tons. The reduction in sunflower seed processing is 606,900 tons. The oil output is 44.72 percent of the seed mass. The reduction in oil output is 271,410 tons, or 190 million rubles.

Calculations have shown that the reduction in the gross harvest of sunflower seeds due to the harvest period being drawn out, was over 700,000 tons and the decrease in the amount processed was 606,900 tons. This quantity of oil seeds would be enough for an entire yearly load for 5 oil extracting plants with capacities of 400 tons/day each. The national economy lost 190 million rubles' worth of industrial products, and the labor of many workers turned into nonproductive work.

A significant portion of the oil seeds that are harvested is delivered to the threshing rooms of kolkhozes and sovkhoses, where the seeds undergo preliminary processing before reaching the oil plants.

Storage of the seeds under these conditions, as a rule, is accompanied by an increase in their moisture due to dampness in the air and atmospheric precipitation, which in turn leads to an increase in the temperature of the seeds and in the acid number. For example, storage of seeds with 16.9-18.3 percent moisture for 9-10 days leads to an average increase in the acid number of 3.1 mg KOH [1]. When seeds of this type are processed for oil, the oil is poor quality and in certain cases it is not suitable for consumption as food, and must be sent on for further industrial processing, or refining. From this it follows that the processing of seeds obtained through the "field--threshing room--oil plant" route lowers the efficiency of national production.

We will define additional losses and costs that occur during the refining process. We will make the calculations for 1 ton of oil; the increase in the acid number during storage of seeds in threshing rooms is 3.1 mg KOH; the oil neutralization coefficient is 1.5; the increase in wastes from oil with soap stock in neutralization (3.1:2 1.5) is 2.33 kg; the difference between

wholesale prices of oil and fat in soap stock is 400 rubles; losses from converting oil to soap stock (2.33×0.4) are 0.93 rubles; the soda input with a change in the acid number of 1 mg KOH is 0.785 kg; additional soda input is 2.43 kg; the cost of 1 ton of soda is 110 rubles; additional soda costs are 0.27 rubles; total additional costs for oil neutralization ($0.93 + 0.27$) are 1.20 rubles.

Table 2

		Shipments by five-day week; percent of total								
Economic region, enterprise	Beginning of deliveries	1	2	3	4	5	6	7	8	9-12
Northern Caucasus										
Armavir Oil and Fat										
Combine(OFC)	4 Sept	0.7	4.9	14.0	17.3	18.4	16.7	8.7	6.1	12.0
Krasnodar OFC	23-28 Aug	2.7	11.3	20.2	20.2	19.0	13.4	5.5	3.5	4.2
Georgiyevsk										
Oil Extracting										
Plant (OEP)	1 Sept	1.2	11.0	18.0	14.9	13.7	9.6	7.5	6.0	14.7
Kropotkin OEP	21-27 Aug	1.9	11.3	25.3	27.2	18.0	9.8	2.8	2.1	2.1
Volga										
Atkarsk OEP	26 Sept	0.3	0.6	0.6	2.8	8.6	11.6	14.3	8.7	49.5
Central Chernozem										
Georgiyu-Dezh										
OEP	5 Sept	1.9	6.0	14.2	22.1	23.5	20.0	7.4	4.9	--
Southern										
Odessa OFC	7 Sept	23.4	13.2	21.3	17.7	1.7	3.9	11.0	7.8	--

Table 3

Economic region, enterprise	Seed Ship-ment (tons)	Harvest		Average daily deliveries		Actual, maximum daily deliveries (tons)	Coefficient of uneven deliveries	Expected maximum daily deliveries (tons) in 11th Five-Year Plan
		Actual/In 11th Five-Year Plan		Actual/In 11th Five-Year Plan				
Northern Caucasus								
Armavir OFC	32,000	30	10	1070	3200	1500	1.40	4500
Krasnodar OFC	27,000	30	10	900	2700	1200	1.33	3600
Georgiyevsk OEP	31,000	30	10	1030	3100	1250	1.21	3800
Kropotkin OEP	27,000	30	10	900	2700	1700	1.89	5100
Volga								
Atkarsk OEP	16,000	60	15	270	1070	700	2.59	2800
Central Chernozem								

Georgiyu-Dezh								
OEP	14,000	30	15	470	930	500	1.06	1000
Southern								
Odessa OEP	2,000	20	10	100	200	120	1.20	250

Additional expenditures calculated for each oil extracting plant are no less than 7000 rubles. Furthermore, there is an increase in the losses of oil seeds during transfer from the harvesting combine to the threshing room, during the preliminary processing, during storage in the threshing room, and during transfer from the threshing room to the oil plant.

The basic directions for development of the oil and fat industry for 1981-1985 indicate that the sunflower harvest should last 10-15 days. A decrease in the harvest time will lead to an increase in the daily delivery of oil seeds to the plants.

The expected maximum daily deliveries will increase by a factor of 1.06-2.59 in the 11th Five-Year Plan. There is a need to re-equip the raw materials sections of oil plants (with equipment for all operations of receiving, cleaning, drying and storage), in order to guarantee proper organization of receiving, storage, and processing of sunflower seeds. Development of a material and technical base for the raw materials management and the oil plants will make it possible to receive all the seeds at the oil plants and eliminate the threshing room from the process.

In addition to this, it is necessary for agriculture and motor transport enterprises, on the basis of more productive utilization of technology and manpower, to guarantee well-organized harvesting and shipment of sunflower seeds.

Organization of efficient interaction among the sectors for completing the harvest within an optimal amount of time, for prompt shipment, proper receiving, storage and processing of sunflower seeds, will make it possible to increase the output of vegetable oil and improve its quality, which is an essential requirement for the successful realization of the Food Program.

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FOOD PROGRAM: FOOD INDUSTRY IN AGRICULTURAL-INDUSTRIAL COMPLEX SYSTEM

Krasnodar PISHCHEVAYA TEKHNLOGIYA in Russian No 2, Mar-Apr 83
(manuscript received 28 Oct 82) pp 6-9

KURAKINA, L. I. and KURAKINA, Ye. A., Chair of Political Economy, Krasnodar
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[Abstract] The agricultural-industrial complex (AIC) is a conglomerate of economic and industrial systems spreading over thousands of various undertakings and organizations. The nucleus of AIC rests in the food industry whether it is viewed at state level or locally. The ties between individual food production branches are very strong because of their inherent characteristics: the products spoil rapidly, they are consumed in a rather limited circle centered on the growth pattern, these products are of necessity being more often processed before consumption, etc. The basis of raw food materials is constantly increasing and therefore they will require increased industrial commitment. The important aspects of future developments in food industry include: minimum waste, automation of the processes with minimal level of manual operations and rational localization of various food-processing plants. Some analytical and prognostic aspects were discussed on the basis of the local situation in Krasnodar. References: 3 (Russian).
[600-7813]

UDC 658.5.011.56:636.085.002.5

CONTROL IMPROVEMENTS OF PREPARATORY TECHNOLOGICAL LINES IN MIXED FEED
PRODUCTION

Krasnodar PISHCHEVAYA TEKHNLOGIYA in Russian No 2, Mar-Apr 83
(manuscript received 17 May 82) pp 16-21

PLATONOV, P. N., PTASHCHUK, A. I., GONCHARENKO, A. Ye., FEDUNETS, A. D.
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Technological Institute of Food Production imeni M. V. Lomonosov

[Abstract] Effectiveness of mixed feed production depends to a large degree on proper control of the preparatory technological lines (PTL) which at this

time operate at about 40-70% efficiency. A mathematical model was proposed for analysis of possible time and effort losses based on three principles: universality, development and utilization of integral operational characteristics. The model could be related to the class of logical-dynamic models. Two interrelated tasks were found involved in the process: optimal control of the structure of PTL and optimal time related performance. Since the first aspect could not be handled at present, the time-related functions were modelled to calculate optimal times for starting and stopping the production lines. Based on the algorithms developed, considerable time saving could be achieved in real operations. Figure 1; references: 7 (Russian). [600-7813]

PARTICIPATION OF LATVIAN SOCIETY OF GENETICISTS AND BREEDERS IN ACCOMPLISHING "SCIENCE" SUBPROGRAM OF LaSSR FOOD SUPPLY PROGRAM

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 5, May 83 pp 111-112

DISHLER, V. YA.

[Abstract] The 142 individual and 14 collective members of the Latvian Society of Geneticists and Breeders are organized into two sections to maximize member participation. The Society organizes seminars on general and applied genetics and ecology, emphasizing issues in selection. The organization assists in the publication of works in the field of genetics and has brought out a review of terminology, a dictionary and various classics in genetics. The leadership center of the Society is the Institute of Biology of the LaSSR Academy of Sciences, whose genetic laboratories study plant selection. Collaboration between laboratories in the Society is encouraged. Successful results of the Society's programs can be seen in the twelve new sorts of field plants introduced in the past five years. Unfortunately, poor weather conditions have hampered seed production. A Baltic Sea selection center is also needed. Work in animal breeding is being conducted at the Central Analytical Breeding Station. [596-12126]

BIOCONVERSION OF PLANT STOCKS--FOOD SUPPLY PROGRAM

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 5, May 83 pp 133-135

YAKOBSON, YU. and KRISTAPSONS, M.

[Abstract] The Symposium on Plant Stock Bioconversion, conducted in Yurmala in 1982, is reviewed. At the plenary sessions use of microorganisms and enzymes, engineering requirements, fractionation and industrial processing were considered. The Symposium was divided into three sections: 1) microbiology and biochemistry, 2) biotechnology and apparatus and 3) biological

and zootechnical product evaluation. In the first section methodological questions, influence of physico-chemical pretreatment, theoretical aspects of cellulose bioconversion, energetic metabolism in microorganisms, thermodynamic characteristics of anaerobic cultures and the potential of various organisms in cellulose and lignin bioconversion were discussed. Poster sessions covered pretreatment in straw bioconversion, the need for an economical cellulase enzyme preparation and immobilized enzyme cellobiase fermentors. The second section dealt with ethanol production, methane formation, production of complete animal feeds, renewable starch sources, mushroom cultivation, nontraditional raw materials, solid substrate fermentation and technological automation. In the evaluation section differential approaches, fractionation, biological effectiveness, use of citric acid synthesis byproducts and evaluation of safety and toxicity were reported.
[596-12126]

UDC: 664.61:658.387.4

INTRODUCTION OF THE BRIGADE FORM OF ORGANIZATION AND STIMULUS OF LABOR AT SIMEROPOL' FLOUR COMBINE

Kiev PISHCHEVAYA PROMYSHLENNOST' in Russian No 3, Jul-Sep 83 pp 9-10

DORFMAN, R. M., and LEBEDEVA, Zh. L., Center for Scientific Organization of Labor and Control of Production, "Ukrpishcheproymekhanizatsiya" Scientific-Production Association

[Abstract] Introduction of the brigade, or team form, of organization and stimulus of labor is an important means of increasing the productivity of labor. Studies have shown, however, that teams in the baking industry do not always meet the new requirements placed on the brigade form of organization of labor. The existing organization of production and labor at a mechanical bakery in Simferopol' was studied, turning particular attention to production zones within which teams could be organized with wages based on results of production, as well as determination of the necessary number of workers, improvement of planning and accounting for production. As a result, four combined shift teams of 11 men each were organized. Paper forms used to account for team member's duties and team production results are described but not illustrated. Teams are rated by a factor which varies from 0 in case of gross violations of discipline, absence from work, etc., to 100% for perfect work. Use of the new teams has increased the productivity of labor by 2.1%, the output of finished products per worker by 8.4%, mean monthly pay by 1.1%, prizes from the wage fund by 0.8%. The economic effect of the introduction of this progressive form of organization and stimulus of labor in this section is 2300 rubles per year.
[637-6508]

RESERVES FOR INCREASING PRODUCTIVITY OF LABOR IN FOOD INDUSTRY

Kiev PISHCHEVAYA PROMYSHLENNOST' in Russian No 3, Jul-Sep 83 pp 17-19

SUPRUNOVICH, A. I., UkSSR Ministry of the Food Industry and KULAK, L. D.,
"Ukrpishcheproyektmekhanizatsiya" Scientific-Production Association

[Abstract] Mechanization is a major means of increasing productivity in the food industry. However, studies have shown that this method is not sufficiently used even today. Large numbers of supplementary workers are involved in loading-unloading and warehousing operations, representing about 1/3 of all workers involved in manual labor. The great expenditure of manual labor on these operations is a result of the insufficient mechanization of this type of work. Transportation of fluids without using containers is another important means of reducing manual labor in the food industry. Most supplementary operations are hard manual labor. Therefore, their mechanization solves not only economic, but also social problems. The lack of mechanical and automatic packaging equipment in the food industry results in excess expenditure of manual labor in packaging and delivery of food industry products, including mineral water, flour and pasta products. The Ministry has developed a combined program for reducing manual labor, to be implemented in 1981-1985. The expected economic effect of these measures is 35 million rubles, and the percentage of workers in the industry involved in manual labor will drop from 58.5% to 46.5%, which is still not considered satisfactory. [637-6508]

UDC: 621.678.532:536.24.031

PROMISING TRENDS IN INTENSIFICATION OF FOOD PRODUCTION TECHNOLOGICAL PROCESSES

Kiev PISHCHEVAYA PROMYSHLENNOST' in Russian No 3, Jul-Sep 83 pp 26-29

FEDOTKIN, I. M., doctor of technical sciences, Kiev Polytechnic Institute

[Abstract] The scientific basis of intensification of technological processes is establishment and utilization of new physical effects. For example, carbonation of juices is increased by the presence of condensing steam. Systematization of the effects of interaction of various fields using first order transfer laws has indicated the existence of 56 interaction effects, of which only 3 to 4 were previously mentioned in the literature. The effect of increased coefficient of diffusion of dissolved substances in an electric field and many others have been experimentally confirmed. Blowing of air and a saturation gas into the heating pipes of heat exchangers not only intensifies heat exchange, but also practically eliminates the formation of scale and, when natural circulation is used, eliminates power consumption for pumping of liquids through apparatus. A number of effective heat exchange and evaporation apparatuses have been created on the basis of the impact-jet effect, in which a thin film of fluid flowing at high speeds is generated. A

number of other effects used in the intensification of processes in the food industry are listed. No specific details of applications, locations or results are presented. References 10 (Russian).
[637-6508]

UDC: 658.51.011.4:665.1.013

OUR ACHIEVEMENTS AND UNUTILIZED RESERVES

Moscow MASLO-ZHIROVAYA PROMYSHLENNOST' in Russian No 4, Apr 83 pp 4-6

FYUT, A. K., Director, Oil Extraction Plant, Kirovograd Combine, candidate of technical sciences

[Abstract] The workers at the Kirovograd Oil Extraction Plant have begun fulfilling the Food Program of the USSR with a new labor uplift, a new sense of high responsibility for providing the population with vegetable oil. The efforts of the workers are directed toward improving the organization of production of vegetable oil by introducing advanced suggestions, intensifying production processes by the use of new equipment and technology. Indoctrination work to strengthen labor and technological discipline by acting collectively against all types of production rules violations has been intensified. Productivity of labor has risen by 2.2%, achieving an economic effect of 9,200 rubles and reducing the production staff by 23 persons. Creative cooperation with agricultural workers is maintained. An agreement has been drawn up with collective farm workers in a 50 kilometer range to perform an organized harvest, providing the sunflower seeds for the state. The harvest of sunflower seeds per hectare in the area has risen from 816 kg to 900 kg in one year. The capacity of the plant for processing of sunflower seeds has increased by 11% to 800 tons per day. However, there are still a number of bottlenecks which are now being actively worked on. A specialized 1000 ton per day drier for sunflower seeds is under development. An oil refining line using the method of neutralization in an alkaline soap medium is now being put into operation, and will soon be producing 120 tons per day. A new type DKVR 20/13 steam boiler is being installed, to be completed by the first quarter of this year. Low-quality sunflower seeds have resulted in deterioration in the quality of the sunflower oil produced and an increase in its acid number. This makes the production of table quality oil almost impossible, and indicates serious shortcomings in the stage of sunflower seed production, harvesting and storage. The problem results partially from the fact that neither the farm nor the preparatory organization bears material responsibility for the damage to the seeds. The author suggests that specialists should raise the quality of sunflower seeds produced in Kirovograd oblast to allow the production of better sunflower oil.
[638-6508]

REDUCING LOSSES OF RAW MATERIALS

Moscow MASLO-ZHIROVAYA PROMYSHLENNOST' in Russian No 5, May 83 pp 6-7

YEVDOKIMOV, V. I., Director, Alekseyev Combine

[Abstract] The workers at the Alekseyev Ethereal Oil-Extraction Combine are responding to the resolutions of the May and November (1982) Plenums of the Communist Party Central Committee [to contribute their share in realization of the Food Program]. The combine has completed the second year of the 11th Five Year Plan with good success, finishing the plan for volume of production on 27 December and producing 1.05 million rubles in excess of planned output. The workers of the combine constantly struggle to improve their technology and introduce new equipment to production. Polish TP1E5 crushing mills and a modernized miscelle distillation system including a DDP-60 titanium sectional evaporator have been put on stream, providing stable reduced solvent consumption. The workers have taken on obligations for 1983 including completion of the annual production plan by 29 December, producing 166,000 rubles above the plan by the end of year including 160 tons of fatty oils, 4 tons of essential oils, saving 13.9 TJ of heat energy, 1.3 TJ of electric power and 439 tons of standard fuel. The main problem the plant has is that of obtaining sufficient coriander raw material. Urgent measures are needed to increase the production of coriander, since the primary technological equipment is currently operating at only half capacity.

[639-6508]

GENETICS

PROSPECTS FOR GENETIC ENGINEERING IN PROTEIN BIOSYNTHESIS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 5, May 83 pp 32-37

GREN, E. Ya.

[Abstract] Genetic engineering, which has caused a revolution in biological sciences, has already advanced to the practical stage in the production of proteins for medicine. Due to their practical usefulness and the fact that they can only be obtained from human blood, hepatitis B virus and human leucocyte interferon are appropriate targets for recombinant DNA research. Vector plasmids are used to introduce foreign genes into a bacterial cell, after restrictase cleavage, introduction of the desired DNA via complementarity and ligase ring closure. Following bacterial transformation with the constructed plasmid, cells are cloned and the ones with the desired gene identified by such methods as molecular hybridization. An *E. coli* clone containing plasmid pBR 322 with the entire genome for hepatitis B virus has been obtained. Both surface and core antigen genes have been located and the former also sequenced. In the case of interferon, RNA was used as the template for DNA synthesis. Clones containing genes N and F have been produced and the genes sequenced. The product of gene N appears to be a new interferon, with similar antiviral activity to F. In order for the genes to function in the cell, appropriate regulatory signals must be provided. The surface antigen of hepatitis B has been mixed with the bacterial gene for chloramphenicol acetyltransferase, giving 80,000 molecules/cell of a hybrid protein immunologically similar to the viral protein. A tryptophan promoter portion was added to the leucocyte interferon N gene and the resulting cells produce 100,000 molecules of interferon N/cells. Figures 2, [596-12126]

METABOLIC REGULATION OF THREONINE OPERON TRANSCRIPTION IN E. COLI CELLS

Moscow BIOKHIMIYA in Russian Vol 48, No 7, Jul 83
(manuscript received 16 Jul 82) pp 1095-1102

KLYACHKO, Ye. V., BOCHKANOV, S. S. and SHAKULOV, R. S., All-Union
Scientific Research Institute of Genetics and Selection of Industrial
Microorganisms, Moscow

[Abstract] Metabolic regulation of threonine biosynthetic operon expression was investigated in eight strains of E. coli, maintained in balanced growth on minimal media. The rate of thr-mRNA synthesis was measured using a two minute ^3H -uracil pulse and hybridization of the isolated RNA with plasmid pYN 1107 DNA, which contains threonine genes A, B and C. Hybridization with plasmid pBR 322 served as a control. The rate of thr-mRNA was directly proportional to growth rate, as seen when varying the carbon source in the medium. Glucose gave maximal thr-mRNA synthesis with a growth rate of 0.7-0.8 doublings per hour. Addition of mixed amino acids increased growth rate but lowered thr-mRNA synthesis rate when growth was sufficiently rapid. In order to determine the role of guanosine-5'-diphosphate-3'-diphosphate (ppGpp) in regulating thr-mRNA production, strain BS 628(*relA*⁺), with one copy of *relA*, was compared to strain BS 629(pJC601) with 12 copies. The latter strain has more ppGpp and a lower rate of thr-mRNA synthesis, except when amino acids are added to the culture medium. The optimum ppGpp concentration was about 60 pmole/A₄₅₀. Strain W2(*spoT*⁻) had a lower rate of threonine operon transcription, due to its increased ppGpp content, when compared to strain W1(*spoT*⁺). The results indicate the biphasic role of ppGpp in threonine synthesis regulation. Results of experiments with D,L-serine hydroxamate and chloramphenicol confirm this conclusion. The positive effect of ppGpp at low concentrations is due to its positive role in the initiation of transcription, while its negative effects at high concentrations may be connected with changes in transcription attenuation and translation of leader RNA. Termination effectiveness may also be enhanced at high ppGpp concentrations. Figures 2; references 33: 5 Russian, 28 Western.
[597-12126]

DISTRIBUTION OF R PLASMIDS IN *S. TYPHI* ISOLATED IN THE LEFT-BANK UKRAINE IN 1970-1982

Moscow ANTIBIOTIKI in Russian Vol 28, No 4, Apr 83
(manuscript received 27 Oct 82) pp 282-285

MOROZOVA, N. S., YEMEL'YANOVA, O. I., KIBARDINA, N. N., KARMANOVA, G. I., SHMATKO, V. A. and LIMAN, N. G., Khar'kov Scientific Research Institute of Microbiology, Vaccines and Sera imeni I. I. Mechnikov

[Abstract] A study was made of the sensitivity, to antibiotics, of typhus abdominalis cultures isolated in the past decade in the left bank territory of the Ukraine. The task of the work included determination of the specific share of circulating antibiotic-resistant strains of *S. typhi*, a study of the spectrum, level and nature of resistance, determination of any relationship between the circulation of antibiotic-resistant strains of this pathogen and their nature, as well as the morbidity of typhus abdominalis. The sensitivity of 373 strains of *S. typhi* was studied, 230 strains isolated in sporadic disease outbreaks, 143 isolated from patients with group infections of typhus abdominalis. Nine antibiotics were tested; ampicillin, streptomycin, kanamycin, monomycin, neomycin, levomycetin (chloramphenicol), novobiocin, polymixin and tetracycline. Antibiotic-resistance was determined by the method of paper disks in conjunction with specified procedures (1976); the data obtained was processed by variational statistics. The appearance of antibiotic-resistant typhus abdominalis strains with transmissible R plasmid is reported, with a clear tendency toward increasing the specific share of such strains among patients. The R determinant spectrum of these strains confirms the method of propagation of antibiotic-resistance among typhus abdominalis cultures in the region due to the transmissible R plasmid. The absence of any significant increase in resistance of typhus abdominalis cultures to antibiotics broadly used for a long time in this area as etiotropic substances distinguishes typhus abdominalis pathogens from other representatives of the genus *Salmonella*. However, the appearance of resistance to β -lactam antibiotics (particularly ampicillin) presents new problems in the treatment of such patients. References 7: 2 Russian, 5 Western.
[631-6508]

HUMAN FACTORS

HUMAN THINKING AND COMPUTER INFORMATION PROCESSING

Moscow VOPROSY PSIKHOLOGII in Russian No 1, Jan-Feb 83
(manuscript received 15 Mar 82) pp 129-134

SHAPIRO, S. I., candidate of psychological sciences, Head, Chair of Psychology, Kursk Pedagogical Institute

[Abstract] An analysis and comparison was made between problem-solving patterns shown by students and computers, in which the algorithms of the data processing machines were based on the logical processes reported by the students. Human decision-making was found to rest not only on inherent psychological motivations and needs, but also logical determinants which lend themselves to programming. The situation in human thinking, however, is not bidominant, but forms a functionally single entity designated as a logical-psychological dimension. This dimension encompasses both anticipation and the formulation of mental processes adequate to meet predicted requirements. Human decision-making consists of a fusion of analytical operations and spatial images, the topology of which is a key factor in the formulation of algorithms. The algorithms, of course, are the fundamental underpinnings of modern computer programs. References 24: 22 Russian, 2 Western.
[657-12172]

PSYCHOLOGICAL CONCEPTS IN TRAINING PILOTS FOR EMERGENCY SITUATIONS

Moscow VOPROSY PSIKHOLOGII in Russian No 1, Jan-Feb 83
(manuscript received 10 Sep 82) pp 23-32

BEREGOVY, G. T., candidate of psychological sciences, Chief, Center for Cosmonaut Training, Moscow, and PONOMARENKO, V. A., doctor of medical sciences, Professor, Moscow

[Abstract] A discussion is presented of certain psychological principles underlying man-machine interactions and the training of pilots for handling emergency situations that may arise in flight. The training of pilots in physical mock-up models is all too often limited to mechanical factors simulating in-flight maneuvers without due attention to perceptive phenomena, psychoanalytical factors, somatosensory functions, decision-making strategies,

etc. The optimum approach to such training should include not only the formation and entrenchment of algorithms for manipulative activity, but also the facilitation of mental processes that assure rapid and accurate decision-making in the face of an emergency. The key to managing unexpected situation lies in rapid orientation as to what is transpiring and the use of previously-formed habits to meet the new challenge. Under such circumstances the emergency situation, after the initial emotional stress, is perceived as a familiar, albeit rare, situation and is handled accordingly. Consequently, pilot training should include realistic simulation of emergency situations, frequently enough to result in the development of appropriate habits and a certain degree of familiarity to minimize as much as possible the main stress factor--novelty. References 19 (Russian).
[657-12172]

LASER EFFECTS

USE OF LASER THERAPY OF PERIODONTOSIS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 5 Aug 83 p 3

[Article by I. Khromov, KAZAKHSTANSKAYA PRAVDA correspondent:
"Stomatologist's Laser"]

[Text] The majority of people lose teeth with age. However, their natural loss in old age as clinical experience has shown, is a very rare phenomenon. Its basic cause--periodontosis or alveolar pyorrhea--is one of the most widespread diseases of teeth. According to statistical data, it is encountered in 85 per cent of the inhabitants of civilized countries. This disease afflicts not only people of a mature or elderly age, but is often observed in young people, even in children.

Periodontosis is a chronic disease of the tissues surrounding the teeth. The tissues around the teeth gradually shrink, the teeth begin to loosen and fall out. The gums bleed and fester. And things can go on like this for years if the disease is neglected. The insidiousness of alveolar pyorrhea lies in the fact that it is difficult to treat. Medical practitioners from all countries have tried many things in the battle against it, including physiotherapeutic methods, in particular, light therapy. Until recently, however, that occupied an extremely modest place.

Many years have been spent under the direction of Professor David Lazarevich Korytniy at the Department of Therapeutic Stomatology of Alma-Ata Medical Institute on problems of periodontosis and on the search for new agents to treat it. A procedure for comprehensive alveolar pyorrhea therapy was developed here. Some of the therapeutic measures are: removal of deposits on teeth and scraping of the diseased gingival pockets, use of new anti-sclerotic compounds, improving the general condition of the body, etc.

But, mainly, the laser has become the reliable helper of the stomatologist. Laser therapy for disease of the teeth and mouth has been recognized as an invention. Its authors--D. L. Korytniy, I. I. Zhukova, L. Ya. Zozulevskaya and T. F. Inyushina--have been granted a patent. Specialists at the Department of Therapeutic Stomatology at Alma-Ata Medical Institute are pioneers in our country in the use of lasers for the treatment of periodontosis.

Thus, a disease that was previously considered to be incurable has begun to give way. True, success accompanied the physicians only halfway; 50 percent of the patients were cured. But, working out a new method is continuing.

"We are using a series helium-neon LG-75 laser made by the L'vov Polyaron Production Association" says Professor D. L. Korytniy. Radiant energy is supplied to the periodontal tissues by an optical fiber. An exposure meter was set up to keep track of time.

The patient takes up to 10 sessions on an average. After 3 to 4 sessions, the itching sensation, gum tension, bleeding, and gingival pain and edema disappear in the majority of patients. Toward the end of the course of therapy, inflammatory symptoms go away and the teeth are no longer loose.

The helium-neon laser retards development of the disease process and stimulates regeneration, i.e., tissue recovery; it does away with the allergic state and has an anti-inflammatory action. With laser therapy there are no side effects or individual lack of tolerance. The best result is observed in the beginning stages of the disease.

However, one must not think that periodontosis will yield simply, say, once a course of irradiation of the gums with the laser has been done. Once gone, the disease can "return" again. Thus, for a certain period of time repeated courses of laser therapy must be completed. In this regard, alveolar pyorrhea requires strict individual and overall treatment.

Nevertheless, the basically new, modern method of treating periodontosis--laser therapy--is indisputable progress in stomatology. It is, therefore, constantly finding more followers in different cities of our country. The progressive method has also been introduced to several Kazakhstan polyclinics. Lasers have been installed in the Republic Stomatology Polyclinic and in the Dzhezkazgan Oblast and Karatau City Stomatology Polyclinics.

The inventors themselves have not stopped halfway. They are now conducting experiments with another laser--the helium-cadmium LPM--11. The blue light of this laser, it turns out, gives a still greater effect. After reading in the central press of the success of Alma-Ata periodontists in curing this dangerous disease, hundreds of people are writing to them and asking for help.

Unfortunately, at present, the physicians themselves need specific help; however, for all practical purposes neither the Republic Stomatology Polyclinic Administration, nor the Kazakh SSR Ministry of Health are giving it. The researchers work in cramped quarters without financial support and at the present time are able to treat only a narrow circle of patients.

The researchers need a special laboratory in order to perfect the laser therapy, all the more so since they have the opportunity to obtain new laser equipment from our electronics industry.

A great deal of time has passed since the Alma-Ata physicians were granted the patent. Several candidate and doctoral dissertations and monographs have been written on this important topic, but this is not enough. Extensive introduction of laser therapy is needed in the interests of the matter.

12262

CSO: 1840/623

LASER TECHNOLOGY IN MEDICINE

Moscow LENINSKOYE ZNAMYA in Russian 24 Jul 83 p 4

[Article by A. Pankov: "Light Cures"]

[Text] Vision was becoming increasingly worse. And no treatment was of any help. The worker N, from the city of Ramenskoye entered the Ocular Department of the Moscow Oblast Scientific Research Clinical Institute imeni Vladimirskiy (MONIKI).

Above the open eye hung an apparatus, from the tube of which a light brightly flashed. Several minutes and the session was completed. The patient's vision improved sharply after five sessions: instead of tenths of percentages it now comprises 80%. What is this miraculous apparatus that gives a remarkable effect without any surgical intervention and without drugs?

"We have been treating maculodistrophy for about three years with a quantum generator of light pulses of low power," says Junior Scientific Associate and Candidate of Medical Sciences L. N. Kharchenko, who conducted this bloodless light operation, "The macula is the central, most important point of the fundus of the eye. The point by which a person sees. Our vision is dependent in many ways upon its condition. But it cannot be treated by the usual methods. Surgery cannot reach it; there are no reliable drugs. But a beam of light is painless, safe and, as our experience has shown, effective."

According to the department's averaged statistical data, vision has improved by 14% after laser treatment and in separate instances much more. But is vision long improved by such a brief treatment? All patients that received laser methods are under observation. And there has been no instance in which vision again worsened.

"In general, we began employing laser treatment at the Ocular Department as early as 10 years ago," continues Senior Scientific Associate and Candidate of Medical Sciences V. P. Mozherenkov. "We are also involved with welding the retina, with the destruction of tumors..."

When your son wears out the knees on his trousers you apply a patch. But what if the retina 'wears out' and becomes detached, which happens in traumas

and various illnesses (which, incidently, are facilitated by smoking and alcohol)? How then to penetrate within the eye and 'darn' the microscopic holes? A laser beam is used to burn the retina around the opening and weld it. This cannot be achieved by other methods.

We all know how painful simple hot water is for the eye. And is it possible to penetrate the eye with any kind of very hot object? Even to think about that is frightening--the eye will be destroyed. But, here, they penetrate. With a laser beam. Only they do this for very small fractions of a second. Nevertheless, during this time the beam can destroy a piece of altered tissue. Two to three dozens of light shots and the tumor (we refer to small tumors) is no more. Surgeons in such cases remove the entire eye; otherwise the person's death is unavoidable.

And the guarantee that the beam can destroy an entire tumor and that the disease is terminated?

"As in any other surgical intervention, there is no complete guarantee with such illnesses," says Viktor Petrovich. "But in most cases the method is effective. Ten years ago I conducted a laser treatment of a Moscow resident, we examine her annually, and everything is still fine. Many such examples can be cited."

V. P. Mozherenkov, although also an ophthalmologist, now works in another department at the institute--occupational diseases, in the Problems Laboratory supervised by Candidate of Medical Sciences. A. B. Chemnyi. Laser treatment is also employed here. But, whereas in the ocular department the apparatus is surgical, in the Problems Laboratory it is therapeutic. It does not cut or destroy, it cures and assists various organs and body parts to recover from nature the ransomed effects and condition. For example, a wide-spread occupational disease is vibrodisease. It arises in those that constantly deal with equipment that make oscillatory movements, that vibrate. Vegetative polyneurites may appear in people working with ultrasonic apparatus, in weavers and even in milkmaids. Such a disease is generally treated, but laser irradiation helps to do this more rapidly and reliably. Physiological processes are stimulated, blood flow is improved (capillaries even begin developing) and, thus, metabolism is improved.

Nine years ago the Institute associates assisted in setting up such a laser apparatus at the Podol'skiy Machine Construction Plant imeni Ordzhonikidze. During these years not one of the enterprise workers who, with the aim of preventing occupational disease, was regularly irradiated with laser light has had to abandon work because of invalidism.

Since the Problems Laboratory is sited next to the Skin Department of the Institute, the laser is frequently used to treat trophic ulcers of the extremities and other skin diseases. The epithelium begins restoration after only several sessions. And, whereas with the traditional methods it was possible to cure such a disease only after years, the laser cures after a month to a month and a half.

The laser also assists wound healing.

"As you see, there are very many possibilities for the use of the laser for therapeutic and prophylactic purposes," stressed the Institute's Deputy Director for Science G. A. Onopriyenko. "And its application is expanded every year. And, whereas in the Ocular Department about a thousand persons have undergone treatment, we began using quantum generators for the cicatrization of stomach and duodenal ulcers comparatively recently."

A laser beam penetrates the person along a special light path. The ulcer, as a rule, heals after two weeks. The treatment proceeds much more rapidly than with the use of drugs. And it is quite reliable. The method has been employed in the institute for a year (Candidate of Medical Sciences G. A. Romanov supervises these efforts), and during this time there has not been a single repeat treatment. Although the possibility of disease recidivism is not excluded (since an ulcer is a consequence of some disease of the body); the primary cause should be eliminated simultaneously: high acidity, disruption of nutritional regimen, excess nervousness, and so on.

In addition to the laser, monochromatic red light is used to treat ulcers. According to the scientists, it is even more effective than a laser beam.

The Institute is not a hospital, and, of course, primary involvement here is with the search for and verification (first on animals) of new treatment methods. This technology is comparatively new, and not all possibilities for its utilization have been studied. Physicians have precisely determined that lasers have three types of effect on the body. At a low power of illumination, the effect is biostimulatory (for example, during treatment of the ocular macula and occupational diseases). At moderate illumination, the effect is coagulatory, when blood clotting occurs and the tissues can be "welded". At a relatively high illumination, the temperature of the beam is so great that the tissue evaporates and a cutting effect appears; this is laser surgery, and it is bloodless because the beam simultaneously lightly cauterizes the vessels and stops the blood flow. The beam makes very fine incisions--tenths of a fraction of a millimeter in width. Thus it may penetrate to sites more inaccessible for the usual treatment methods. And at the same time it can expand and illuminate for them considerable surfaces (which is important in the treatment of wounds and skin diseases).

Scientists seek new variants of application of the beam-healer, new regimens and new applications. This search proceeds in cooperation with physicists, for example, those at the USSR Academy of Sciences Physics Institute and the USSR Academy of Sciences Spectroscopy Institute, who are working to improve laser technology and to create quantum generators especially for medicine. And this is done in cooperation with the urban Moscow physicians, who increasingly attract the proposals of scientists, making it possible to cure patients by more reliable and rapid means.

UDC 617-001.4-002.3-085.849.19

CO₂-LASER IN COMBINED TREATMENT OF PURULENT WOUNDS

Moscow SOVETSKAYA MEDITSINA in Russian No 5, May 83
(manuscript received 4 May 82) pp 51-52

UDOD, V. M., STOROZHUK, V. T., KARSTEN, E. G., UTEMISOV, A. A. and
MARKELOV, S. I., Chair of General Surgery, Tselinograd Medical Institute

[Abstract] A combined modality of treating purulent wounds has been devised which consists of an ultrasonication--laser--secondary sutures--ozocerite sequence. The initial treatment with ultrasound preparatory for subsequent CO₂-laser treatment requires ultrasonication of a 10-15 cm diameter area with 830 kHz sound at a power output of 0.6-0.8 Watts/cm² for 5-10 min over 2-4 sessions. Subsequent steps include CO₂-laser irradiation of 15-30 cm, application of secondary sutures and, two days later, treatment with ozocerite at 45-50°C for 45 min for 2-5 treatments. Studies with 39 patients showed that such a therapeutic approach shortened the duration of hospitalization by 6 days on the average and the overall duration of disability by 8 days.

References 2 (Russian).

[690-12172]

UDC; 617-001.4-002.3-085.849.19

CARBON DIOXIDE LASER TREATMENT OF PURULENT WOUNDS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 8, Aug 83
(manuscript received 2 Feb 83) pp 92-95

SKOBELKIN, O. K., BREKHOV, Ye. I., CHEGIN, V. M. and DERBENEV, V. A.,
Moscow

[Abstract] Soviet series-produced "Skal'pel'-I" and "Romashka" continuous lasers with power outputs of 25 and 100 W were used in surgical treatment of 468 patients with purulent wounds, abscesses, phlegmons, purulent mastitis, carbuncles and furuncles, cysts, osteomyelitis, trophic ulcers, purulent bursitis, suppurating atheroma, paronychias and soft tissue fistulas. In

74% of cases staphylococcus aureus was found, E. coli in 10%, pseudomonas pyocyanea in 8%, proteus and klebsiella in 1% each. Association of micro-organisms was found in 6% of cases: staphylococcus with pseudomonas pyocyanea in 2%, with corynebacteria in 2%, with proteus in 1% and proteus with corynebacteria, 1%. Laser necrectomy is accompanied by sterilization of the wound surface, is bloodless and prevents local spread of the infection. Purulent wounds treated in this manner heal as clean wounds. The use of the laser can reduce the duration of treatment of such patients by a factor of 1.5 to 2. The higher powered laser was found to be more suitable for purulent wound necrectomy. References 4: 3 Russian, 1 Western.
[643-6508]

UDC 613.632+613.644]-07

COMBINED ACTION OF VIBRATION AND TOXIC SUBSTANCES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3,
Mar 83 (manuscript received 17 Aug 82) pp 11-14

TARTAKOVSKAYA, L. Ya., Institute of Industrial Hygiene and Occupational
Diseases, Sverdlovsk

[Abstract] Evaluation of the health of miners at lead, mercury, and arsenic mines exposed to similar vibration factors showed marked differences in the incidence and severity of vibration sickness, ascribable to exposure to the different metals in aerosol and vapor forms. These differences were accompanied by different neurologic, hematologic, and biochemical manifestations. Animal (species unspecified) studies under short- and long-term conditions on the effect of vibration alone and in combination with exposure to these elements and manganese and their compounds showed that the latter aggravated vibration sickness. Similarly, vibration (31.5 and 63 Hz, 2-4 h/day for up to 9 months) in general potentiated the toxicity seen with these elements, although at certain periods of time alleviation of some pathologic parameters was obtained. References 15 (Russian).
[649-12172]

UDC 613.646

SETTING WORK PLACE MICROENVIRONMENTAL STANDARDS IN RELATION TO CONTROL
PANEL OPERATORS' WORK INTENSITY

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 83
(manuscript received 25 Jan 83) pp 9-11

SHLEYFMAN, F. M., ZAKHARENKO, M. I. and LASHCHUK, A. A., Kiev Scientific
Research Institute of Labor Hygiene and Occupational Diseases

[Abstract] Physiologic studies were conducted on 23 to 35 year old control-panel operators engaged in grade I, II or III intensity work to define optimum microenvironmental conditions at work site. The physiologic findings

on thermoregulation, cardiovascular function, CNS performance, cerebral hemodynamics, and work capacity indicated that under optimal temperature conditions relative humidity should range from 40 to 60%, with an air movement of 0.1-0.2 m/sec. The optimum temperature was defined as that under which 80-85% of the subjects felt comfortable at work.

References 22: 14 Russian, 8 Western.

[653-12172]

UDC 613.643:626.02]-07:612.274.017.2

PHYSICAL TRAINING UNDER HYPERBARIC CONDITIONS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4,
Apr 83 (manuscript received 25 Jan 83) pp 45-46

GRINEVICH, V. A.

[Abstract] A scheme was devised for training individuals for work under hyperbaric conditions (divers, surgeons, etc.), taking into consideration individual susceptibility to decompression sickness. Preliminary studies showed that individuals could be divided into three groups on the basis of that criterion: one group (8-11% of subjects) developed mild signs of decompression sickness after 6 h at a depth equivalent of 8-12.5 m, another group (65-68%) after 6 h at 12.6-20 m, and a third group (18-21%)--regarded as highly resistant to decompression sickness--at 20.1-25 m. On the basis of these observations differential diving conditions were determined at 100 m, using a 15 min training period under 10 kgs/cm² to allow the divers sufficient time to acquire some degree of adaptation to nitrogen narcosis and complete assigned routines in 6-7 min. The decompression times for individuals highly susceptible to decompression sickness, moderately susceptible, and relatively resistant were, respectively, 7 h and 27 min, 6 h and 11 min, and 5 h and 4 min. References 2 (Russian);

[645-12172]

EFFECT OF SYMMETRICAL BIOLOGICALLY ACTIVE POINT ELECTRICAL STIMULATION ON HUMAN PHYSIOLOGICAL REACTIONS

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 5, May 83
(manuscript received 19 Jul 82) pp 94-96

KOLODYNSKA, V. V. and KOLODYNISKIY, A. A., Latvian Scientific Research Institute of Experimental and Clinical Medicine, LaSSR Ministry of Health, Institute of Philosophy and Law, LaSSR Academy of Sciences

[Abstract] Electrical stimulation of symmetrical biologically active points was studied in 25 right-handed volunteers aged 23-38. Khe-Gu points on the right or left hand were stimulated for five minutes using a 10 Hz square wave. Polarity was changed every five seconds. A statistically significant lowering of heart rate was found even in the first minute of the experiment. Bilateral and left-hand stimulation had a greater effect than right-hand. Changes in respiration frequency were not seen. Left-eyed subjects had initial electrodermigram amplitudes significantly higher than right-eyed subjects and a greater difference between the two hands. In both types of subjects the amplitude was greater in the right hand. Bilateral stimulation lowered this asymmetry in both types of subjects, while right-hand stimulation changed its direction. Similar tendencies were seen in the electrooculogram. The results indicate that unilateral stimulation of the Khe-Gu points selectively acts on the contralateral part of the brain. The changes in electrodermogram asymmetry reflect the asymmetrical activity of the central sympathetic nervous system. Figures 2; references 5 (Russian).
[596-12126]

UDC: 613.64:612.014.4+614.89];061.3(47+57)"1982"

FIRST ALL-UNION CONFERENCE "PHYSIOLOGY OF EXTREME STATES AND INDIVIDUAL PROTECTION OF THE INDIVIDUAL"

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 6, Jun 83 pp 59-60

SALIVON, S. G., Moscow

[Abstract] The title All-Union Conference was held 12 and 13 May, 1982 in Moscow. About 700 persons from 98 organizations subordinate to various ministries and departments took part in the conference. Over 100 scientific reports were heard. The primary problems discussed at the conference concerned the effects of unfavorable temperatures, changes in barometric pressure, toxic factors, noise and vibration, psychophysiological specifics of the reaction of human beings to these effects and general problems of the physiology of extreme effects and protection from them. Reports were read by academician L. A. Il'in (on the need to explore areas where the conditions

for normal life are not to be found, such as space and the sea), cosmonaut V. G. Lazarev (on the great contribution of Soviet scientists to space biology and medicine), polar-expedition chief B. I. Shparo (on problems of medical support of human life in the Arctic) and many others. During the discussions and in the resolutions of the conference, the most important research trends during the 11th Five Year Plan in the area of the physiology of extreme states and individual protection were defined.
[613-6508]

MICROBIOLOGY

METAL OBTAINED FROM WATER

Moscow SOVETSKAYA ROSSIYA in Russian 10 Aug 83 p 4

[Article by A. Istrin]

[Text] One of my acquaintances said that microbes can extract metals from various ores. At first I began to laugh, and then I remembered that somewhere before, it seemed, I had read something similar. If this is so, then why not organize mining of useful minerals with the aid of microbes?

S. Kulyab'ev,
Student,

Long ago people noted that water which accumulates in mines contains solutions of non-ferrous metals (more exactly, their salts). If an iron object were to fall into this water, in a certain amount of time a deposit of copper, zinc or another metal, depending upon the type of mine, would appear on its surface. Mine waters have begun to be used to obtain an additional quantity of copper. At one time, people attempted to irrigate ore with water, even artificially in some places; they were hoping to "flush" the metal out of it, but this was unsuccessful. Then they still did not know that the matter was not in the water, which itself could not dissolve metals, but in a particular species of bacteria. With their help, insoluble metal salts are converted to soluble compounds from which it is then possible to obtain a pure metal.

This process today has received the name microbiological lixiviation. Chemical lixiviation is also well known. However, microbes handle their work several times more quickly than sulfuric acid. With the microbiological lixiviation method, it is possible to extract copper, zinc, nickel, tin, aluminum, arsenic, gold, uranium and other chemical elements from ore. For this, it is not necessary at all to construct mine shafts and pits--a solution saturated with microbes can be rolled directly under the ground to the place where useful minerals are deposited, or the ore terraces are poured into them, and then, having accumulated in the sedimentation tank, the metal can be extracted from it.

Unfortunately, when using underground or mound (from the tailings) methods of bacterial lixiviation, man's power over microbes ends as soon as they fall into the ore. People are still not able to aid the unusual metallurgists, nor to control their activity. Another matter is the tank method of microbiological metal extraction. It got its name from "tank"--the vessel into which ore is filled. Here, one can create the most favorable conditions for the work of bacteria.

In our country, an experimental industrial apparatus has been created for tank lixiviation of metals from ore of rare and nonferrous metals which contain arsenic. Complete removal from ore of this extremely toxic substance which often occurs in deposits of copper, zinc, tin, gold and other metals is not successful, and even to work with it is dangerous. A bacterial variant, isolated by scientists, successfully neutralizes the poison without any harm to itself and allows one to extract from arsenopyrite (that is, containing arsenic) concentrations up to 90 percent of the metal, while in the same time ordinary methods are able to extract ten-eleven percent.

Questions of underground lixiviation of ore are being successfully resolved with the aid of microorganisms. Methods developed by specialists of the Sverdlovsk institute "Unipromed" have already made it possible to obtain the first hundred tons of copper from mining enterprises in the Urals and Northern Kazakhstan,

12473

CSO: 1840/641

BIOSYNTHESIS OF BIOLOGICALLY-ACTIVE COMPOUNDS BASED ON MIXED CULTURES
OF MICROORGANISMS

Moscow PRIKLADNAYA BIOKHIMIYA I MIKROBIOLOGIYA in Russian Vol 18, No 6,
Nov-Dec 82 (manuscript received 1 Jul 82) pp 835-849

YEGOROV, N. S. and LANDAU, N. S., Moscow State University

[Abstract] Mixed cultures of microorganisms have been effectively used in recent years in biosynthesis of biologically active materials. This article is a detailed review of literature and personal experience which addresses the potential of using mixed microbial cultures in biotechnology. Literature data show the advantages of coculturing specially selected microorganisms when synthesizing new biologically-active products. To maximize that approach, it is necessary to find proper associations among these microbes and to create conditions suitable to their optimal productivity. Many factors affect this aspect and one must be very careful in selecting both the conditions and the agents. Although the mechanisms of action of these mixtures have not been adequately studied as yet, it can be stated that their action is due to formation of hybrids or through the interaction among individual species and their metabolites. Several studies showed that productivity of these microbiological syntheses may be intensified through proper analysis of growth regulations and development of cultures in associations. References 123: 74 Russian, 49 Western.
[609-7813]

OPTIMUM SIZE FOR MICROBIOLOGICAL SAFETY HOODS

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 83
(manuscript received 15 Feb 83) pp 61-63

BORTKEVICH, V. S., VOTYAKOV, V. I. and MOROZ, A. G., Belorussian
Scientific Research Institute of Epidemiology and Microbiology, Minsk

[Abstract] Technical considerations are provided for the modification of radioisotope safety hoods--models 2BP2-OS and 5BP2-OS--into microbiological safety hoods for work with pathogens. Optimum size of the latter hoods should be as follows: 70 cm width, 200 cm length, 97,7 cm height. These size specifications allow for convenient access into the hood and manipulation of the pathogenic material. Figures 2; references 3: 1 Russian, 2 Western.
[653-12172]

EFFECT OF SHIPBOARD NOISE ON SEAMEN DURING LONG VOYAGES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3,
Mar 83 (manuscript received 2 Aug 82) pp 48-50

[Article by S. A. Radziyevskiy, A. A. Volkov, A. V. Igrevskiy, L. N. Kyshtymova and V. A. Skrupskiy, Institute of Maritime Transport Hygiene, USSR Ministry of Health, Moscow]

[Text] One of the most important distinctions of shipboard noise is that the ship's crew is exposed to it for long periods of time, not infrequently for many months.

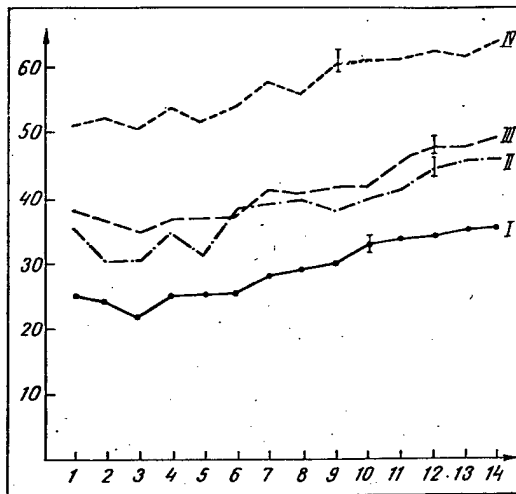
In spite of the fact that noise levels in crew's quarters, lounges and service areas of ships has dropped by 0.5-14 dB A, at the present time the noise level in most ships, particularly of an old construction, is still high and exceeds substantially the levels that are allowed in the Soviet health standards.

Under such conditions, in the case of a long voyage, there are rather substantial changes in a number of physiological parameters of seamen. The Figure illustrates the results of a study of parameters of tonal audiometry in different occupational groups of seamen aboard a krill-processing factory during a 6-month continuous voyage. The studies were pursued directly on shipboard under acoustic conditions (noise level was 50 dB A in the room used for the tests) which, while they did not meet the requirements for demonstration of absolute thresholds of auditory sensibility, made it possible to assess differences in hearing of representatives of different occupational groups of seamen and a control group, which consisted of 12 subjects with normal hearing according to a preliminary screening on shore (scientific group), who had not been exposed to intensive noise either previously or in the course of the voyage in question, and to assess dynamics of changes in hearing over the period of the entire voyage. We used a clinical MA-30 audiometer at frequencies of 125, 250, 500, 1000, 2000, 4000 and 8000 Hz for these tests.

The Figure illustrates the dynamics of changes in hearing threshold at a frequency of 4000 Hz, which was found to be the most demonstrative for detecting early changes in function of the auditory analyzer of the subjects. We see that the maximum constant elevation of hearing thresholds was

observed in representatives of the engine room crew with long work tenure, who were exposed to noise of 95-101 dB A during work hours. Less significant loss of hearing was noted in representatives of processing shops, and the extent of such loss conformed well to the noise level at the work places.

There was also substantial elevation, as compared to the control, of thresholds at frequencies of 6000 and 8000 Hz, to the extent of total loss of hearing in 32% of the tested engine room personnel and 13% of processing shop personnel.



Dynamics of hearing sensibility of crew in the course of 6-month voyage

Y-axis, dynamics of acoustic sensibility (dB); x-axis, cycles:

- I) control group
- II) fish meal processing line (90-93 dB A)
- III) freezer department (94-95 dB A)
- IV) engine room (95-101 dB A)

Analysis of the dynamics of changes in hearing of the crew in the course of the 6-month voyage revealed (see Figure) that there was a tendency in all tested groups, during the first few weeks, toward some sharpening of auditory sensibility, though it was statistically unreliable, which was in the nature of an adaptation response and followed by a state of relatively stable function of the acoustic analyzer. Starting in the 3d-4th month of the voyage, there was gradually progressing elevation of hearing threshold, and in the 4th-5th month of the voyage it became statistically reliable, as compared to the start of the voyage.

These data are consistent with the results of other studies, which indicated that hearing impairment was not uncommon in representatives of

not only the engine room crew, but deck hands who were exposed to moderate noise during work (I. I. Varenikov et al.; L. S. Godin et al.; R. Gerrmani et al.).

Experimental studies of animals, both in the laboratory and aboard ships, revealed signs in common for intensive noise (85 dB A) and moderate noise (55 dB A). There was demonstration of metabolic disturbances associated with prolonged exposure to noise: depression of carbohydrate metabolism, activation of lipolysis, impaired biosynthesis of ascorbic acid in viscera. Decline of general resistance of experimental animals to extreme loads (hypoxia) and marked depression of several parameters of reproductive function (S. S. Markaryan et al.) were also important results of this study.

On the whole, the results of these investigations are indicative of complex and nonlinear adaptation to noise on board ship, which presents basic differences from adaptation to the noise of industrial enterprises, where noise levels below 70 dB A are considered harmless to hearing (G. S. Zvereva et al.).

We used intervalocardiography to assess the mechanisms of regulation of the cardiovascular system and, indirectly, the condition of seamen as a whole. The studies revealed that the tension index changed dissimilarly in the course of a shift in subjects referable to different occupational groups. For example, it dropped by 35% in mechanics and 18% in the engine mechanics, whereas in seamen it showed virtually no change. The maximum change in this parameter for mechanics is apparently attributable to fatigue, which develops at the end of the shift due to exposure to intensive noise combined with the great tension of the job (grade III) and increased responsibility for safety of the ship. At the same time, the differences that were found between engine mechanics and deck hands were related chiefly to exposure of the former to engine room noise, since there is no appreciable difference in nature of work done by these occupational groups of seamen (grade II intensity and difficulty).

In the course of a watch, the changes in intervalographic parameters were associated with decrease in heart rate and blood pressure drop by 5-14%, as well as decrease in cerebrovascular tonus (according to results of rheoencephalography), which were the most marked in representatives of the engine room crew.

Such changes in parameters of the cardiovascular system are inherent in primary responses to noise, and they can apparently be interpreted as mobilization of adaptive mechanisms of the body of the parasympathetic type, aimed at attenuating the body's reaction to noise.

The noise levels that presently exist on sea-faring ships cause a high degree of mobilization of adaptation mechanisms in ship crews, and this could lead to speedy depletion of these mechanisms, as well as development of pathological changes in the body.

At the present time, on the basis of many years of combined physiological and hygienic studies, new standards have been set for shipboard noise levels (SN 2498-81). According to the results of the studies, the suggested levels of noise in ship compartments, provided the entire set of antinoise measures is used, should cause formation of proper and long-term adaptation of seamen to the combined effect of shipboard factors and preserve their health and work capacity.

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CSO: 1840/646

UDC 615.153.96-097:577.112.824]-07

CONFORMATIONAL CHANGES IN SERUM ALBUMIN ON BINDING LOW MOLECULAR WEIGHT TOXIC AGENTS

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 4, Apr 83
(manuscript received 24 Jul 81) pp 62-67

LUYK, A. I., BRAVER-CHERNOBUL'SKAYA, B. S. and LUK'YANCHUK, V. D., Kiev

[Abstract] Polarographic and spectrofluorometric studies were conducted on the conformational changes in human serum albumin resulting from binding low molecular weight toxic agents consisting of nitrophenols, organochlorine compounds, and organophosphorus agents. The results showed that binding demonstrated by equilibrium dialysis was accompanied by distinct conformation alterations in the albumin molecule. One compound that failed to bind (4-nitro-2-aminophenol) also failed to induce structural changes. In situations involving binding of aliphatic compounds conformation changes occurred in parallel with the degree of binding, while in the case of cyclic compounds conformational changes preceded actual binding to specific receptors on the albumin molecule. These findings were interpreted to indicate that the flexible structure of the aliphatic compounds accommodated themselves to the molecular structure of the albumin molecule and did not themselves induce conformational changes until they occupied their specific binding sites. On the other hand, the rigid cyclic compounds required structural changes in the albumin for penetration to their specific sites. The reversible binding of various toxic agents by albumin can be regarded as an evolutionary development of a mechanism of detoxification. Figures 2; references 9:
1 Ukrainian, 5 Russian, 3 Western.
[692-12172]

INTERACTION OF BLACK WIDOW SPIDER TOXIN WITH BILAYER PHOSPHOLIPID MEMBRANES

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 55, No 2, Mar-Apr 83
(manuscript received 23 Jul 82) pp 179-184

SOKOLOV, Yu. V., USHKAREV, Yu. A., GRASSO, A., GRISHIN, Ye. V. and LISHKO, V. K., Institute of Physiology imeni A. A. Bogomolets, USSR Academy of Sciences, Kiev; Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow; Institute of Cell Biology, Rome, Italy; Institute of Biochemistry imeni A. V. Palladin, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A study is made of the conditions of interaction of latrotoxin with bilayer membranes, as well as the properties of the channels thus formed. Flat membranes were formed by the standard method of Muller et al. from a solution of a mixture of phosphatidyl choline and cholesterol in n-heptane. Membranes were formed from solutions of chromatographically-pure phospholipids. Electrical measurements were performed at room temperature, 20-22°C. In the presence of latrotoxin and Ca^{2+} (10 mM) there is a discrete change in the conductivity of the flat membrane. An analogous effect of latrotoxin was observed in solutions containing other bivalent cations as well. Latrotoxin denatured by heating to 60°C for 10 minutes was ineffective. The volt-ampere characteristics of membranes modified by latrotoxin are clearly non-linear. The channels formed transmit primarily Ca^{2+} through the channel into the cell, stimulating secretion of the mediator. The interaction of the potential-dependent, Ca-selective channels formed by latrotoxin with Cd^{2+} was studied, indicating that Cd^{2+} was a powerful inhibitor of the channels. The blocking effect of Cd^{2+} is particularly strong if the electric field facilitates the entry of these ions into the channel. Apparently the mechanism of introduction of the latrotoxin protein to the membrane is a peculiarity of its structure, the study of which might be important for an understanding of mechanisms of lipid-protein interaction. Figures 7; references 10: 5 Russian, 5 Western.
[627-6508]

UDC: 616.214.2.015.23:615.31:547.468.3

NEUROLEPTICS AS GAMMA-AMINOBUTYRIC ACID ANTAGONISTS

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 46, No 1, Jan-Feb 83
(manuscript received 9 Dec 81) pp 9-13

ABRAMETS, I. I. and KOMISSAROV, I. V., Department of Pharmacology (headed by Professor I. V. Komissarov), Donetsk Medical Institute imeni M. Gor'kiy

[Abstract] It was the purpose of this work to show by indirect experiment that neuroleptics are GABA antagonists. The experiments were performed on

isolated rat spinal columns 9 to 14 days of age. In series 1 of experiments the electrotonic potentials of the ventral and dorsal radicles arising during superfusion of the spinal cord for 30 to 60 seconds with a saline solution containing GABA at 10^{-5} - 10^{-3} M were recorded, as well as the influence of solutions containing a neuroleptic or picrotoxin (10^{-6} - 10^{-5} M) for preliminary (10 minutes) superfusion. In series 2 the degree of antagonism of neuroleptics with GABA was quantitatively estimated, expressed by the quantity PD'_2 , determined by the method of van den Brink. A decrease in the slope and maximum of the curves of concentration-effect of GABA by the neuroleptics indicates a noncompetitive antagonism between the substances. It may result from interaction of the neuroleptics with the allosteric center of the GABA receptors or interaction of the neuroleptics with chlorine ionophors conjugate with the GABA receptors in the cytoplasmic membranes of the nerve cells. The neuroleptic-GABA antagonism is probably manifested not only in GABA-ergic synapses of the spinal cord, but also at other levels of the central nervous system. The GABA-lytic properties of neuroleptics may be very significant in the mechanism of their antipsychotic and cataleptic effect. Figures 3; references 23: 7 Russian, 16 Western.

[628-6508]

PUBLIC HEALTH

EVALUATION OF BENDERY OPEN LETTER DAY GIVEN

Kishinev SOVETSKAYA MOLDAVIYA in Russian 10 Aug 83 p 3

[Article by B. Belen'kiy: "There Is Still More To Be Done"]

[Text] The "City and The Health Service"--this was the title of the account of Open Letter Day, which was held in Bendery. Its organizers, the MSSR Ministry of Health and the party gorkom and city soviet ispolkom, presented the task: to bring to light the most acute problems of the city health service, to take into consideration the wishes of the workers, and through joint efforts to devise measures to eliminate shortcomings in the organization of the work of the institutions and to solve effectively the problems that were particularly irritating to the townspeople.

Three months have passed. This is certainly not a long enough period for the suggestions to have been fully realized, but it is certainly enough for a partial review of solutions to those problems which required prompt action. [dated] 6 May 1983.

First of all--3 short interviews. To what extent have the suggestions offered by the public been implemented? What has been done to improve the level of the city health service?

MSSR Minister of Health K. Draganyuk: "I have before me a list of questions raised in one form or another at the meeting in Bendery. It is not a short list. We divided it into 2 parts: a group of problems falling within the sphere of the Ministry of Health and problems that need to be solved by the ispolkom and city health department.

"Our most complex, if you will, problem is that of personnel. One of the causes of the serious shortcomings in the operation of polyclinics, uchastok service and organization of labor of the "narrow" specialists is the shortage of physicians and mid-level medical personnel. Full resolution of this problem is not possible today; we will, however give priority to the rural health department when sending out young specialists. Something, nevertheless, has been done. Seventeen physicians and 93 mid-level medical workers have

already been sent to Bendery and the city will get 28 more physicians next year... This makes it possible for the most important unit--the uchastok service--to be practically fully guaranteed of personnel.

"Another group of problems involves improving the material base and the technical equipment of the therapeutic institutions. I have taken on myself the problem of expansion of the city hospital, the opening of a medical physiotherapy preventive dispensary, and the construction of living quarters for city medical personnel. The chairman of the gorispolkom will apparently have something to say about how these problems are being resolved. An additional amount of equipment and medical machinery has been set aside by the ministry.

"It was stressed at the meeting that certain physicians are relying on outdated medical knowledge and that mid-level medical personnel are not familiar enough with therapeutic apparatus. This is a true observation, and measures have been taken. Already this year 58 physicians and 160 nurses and feldshers have taken courses to improve their skills at various union and republic establishments.

An important question about the level of consultation care was raised. The first such day of consultation appointments was conducted, using the competencies Kishinev Medical Institute professors. Consultations were afforded for more than 70 patients. Such measures will be carried out on a regular basis in the future.

"I note that similar Open Letter Days were also held in Tiraspol and Dubossary. This helped to bring to light shortcomings typical of the health service. Health care organizers from all cities and rayons of the republic are presently oriented toward getting rid of them.

"Quite a bit has been done in three months in Bendery as well as in Tiraspol, but these are only the first steps toward qualitative reorganization of the health service. There is a significant amount of work left for us to do."

City Soviet Ispolkom Chairman N. Popov: "Materials from the Open Letter Day were discussed at an ispolkom session. A number of important decisions were made, including that of the work schedule for medical institutions. Due to popular demand, the central polyclinic is now open until 9:00 p.m. and all the rest are open until 8:00 p.m. Saturday and Sunday hours of operation were revised.

"Just criticism of living conditions in several hospitals and the overcrowding and congestion in therapeutic institutions necessitated the adoption of energetic measures to improve existing institutions and to open new ones. Within a short period the city hospital waiting room, a pediatric polyclinic, a women's consultation and a pediatric hospital building were all renovated. The question of expansion of the city hospital was decided in principle. In 1984, construction of a main building will be begun using funds of an industrial plant.

"A site was chosen for opening of a medical physiotherapy preventive dispensary. The question of building living quarters with 240 places for medical personnel has been decided. This year 110,000 rubles will be set aside and next year construction of the living quarters will be started.

"Workers belonging to the silk combine spoke of the need for opening a branch pediatric hospital in a settlement and this question was resolved positively.

"Two problems still remain to be solved: the new maternity home and a physiotherapy clinic [lechebnitsa]. We will consider the question of their construction as other health service buildings are finished,

"We carefully studied the nature of complaints dealing with the work of the emergency service [skoraya pomosch]. Organizational measures were taken; the emergency service has now been set apart as an independent medical institution and has been given more transportation and personnel."

Chief of the City Health Department, I. Karakash: "The majority of claims were directed to the city polyclinic. We gave maximum attention to this unit.

"A system has been developed at the polyclinic which determines appointment times for initial and recurring illnesses, and calls for self-registration and accurate work on the part of pre-physician-reception offices.

"It was reported, on the Open Letter Day, that conferences of physicians, all possible kinds of conferences were being held during working hours. We reduced the number of these occurrences to a minimum, limiting them to 30 minutes; their schedule makes it impossible for medical personnel to be distracted from seeing patients. Adjustments were made in the system for interchanging medical personnel and in the service of pharmaceutical information for physicians and the public.

"Important work is now being done in the labor collectives. Its focus is on improving exactingness, responsibility and executive discipline,"

* * *

We visited the therapeutic and preventive institutions of the city and spoke with medical employees and patients. There has indubitably been a shift for the better. Much has changed, particularly in the city polyclinic. The lines in physicians' waiting rooms have thinned out considerably. Meanwhile, to this day, many public health organizers consider this problem a practically insoluble one; they say that carefulness and sensitivity to the patient are in contradiction with appointment times of standardized length. As it turns out, this problem, too, can be resolved with the desire to do careful work. Obviously the Ministry of Health should carefully study the Bendery experience and disseminate it everywhere.

I was interested to see how many complaints were sent from Bendery to the letter department of the Ministry of Health for these 3 months. They

answered me: in May--14, in June--7, and in July 5, and they observed in this regard that there is a certain tendentious note. True, there is that tendency, but let us turn to the character of the letters. In one of them questions are raised that could have been answered on the spot; others were the consequence of inattention to a person and of unwillingness to get to the heart of his difficulties. What does this mean? It means that quality reorganization of the level of the health service requires first of all moral restructuring of those upon whom this level depends.

A high degree of professionalism on the part of the physician, nurse, and orderly [sanitarka] and thoughtfulness and attention to the patient on their part and a high degree of responsibility--these are the things that add up to a successful undertaking. The Bendery medical personnel still have a lot of hard work to do in this regard.

When evaluating Open Letter Day, many city workers are observing that it was good, if it is not just an episode. Perhaps it would make sense to carry out similar measures not only on such a large scale but directly in the labor collectives or where people live?... Good suggestion. It apparently should be listened to.

12262

CSO: 1840/618

QUANTITATIVE EVALUATION OF CORRELATION BETWEEN INDICATORS OF CHILDREN'S HEALTH STATUS AND ENVIRONMENTAL FACTORS

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 83 (manuscript received 24 Dec 82) pp 18-20

[Article by T. S. Khachatryan, Yerevan Institute for Advanced Training of Physicians]

[Text] At the present time special attention is being given to determination of quantitative correlations between indicators of public health and levels of environmental factors, and development on this basis of methods of forecasting public health status as a function of the sanitary [health] situation (G. I. Sidorenko; M. G. Shandala et al.). This is attributable to the fact that quantitative epidemiological studies, the results of which permit assessment of the environment-health relationship, serve as the basis for hygienic recommendations to eliminate the influence of environmental factors on health, as well as to evaluate and calculate the economic effectiveness of environmental protection measures.

In our previous studies (T. S. Khachatryan et al.; T. S. Khachatryan), using one- and two-factor mathematical regression models, we established a system of priorities of different factors according to their influence on health status of preschool children for exposure to either an isolated factor or the combination of those used in the model. Our objective here was to determine the quantitative relationship between the health parameters used and factor levels.

Data gathered in 1972-1979 from 5 microregions of Yerevan served as base material. We studied 51 parameters of health status of preschool children: overall morbidity, morbidity referable to different classes of diseases, physical development, several indicators of infant development in the first year of life, etc. We considered 32 features of the environment as factors: biological, sociohygienic, architectural-planning, hygienic and environmental-climatic. The methods used to gather and assess the base material were described by T. S. Khachatryan. [1982]

The base data were summarized for each of the 5 microregions, so that in performing regression analysis the total number of cases was 5. For each health parameter Y and all possible sets of one factor X_1 and two factors

X_1 , X_2 , we constructed regression models such as $Y = C_0 + C_1X_1$ and $Y = C_0 + C_1X_1 + C_2X_2$, of which we took the most informative ones. We used multiple coefficient of correlation R as an indicator of adequacy of the model. We selected models among the competing ones, which had the same (and rather high, at least 0.95) R , that were of the greatest interest from the standpoint of meaningful interpretation of the obtained patterns. For the selected models, we calculated coefficients of regression C_0 , C_1 , C_2 and the corresponding 95% confidence intervals $C_0 \pm \Delta C_0$, $C_1 \pm \Delta C_1$, $C_2 \pm \Delta C_2$.

Table 1. Quantitative evaluation of health index

Factor and its change level	Health index rise (%)	Parameter of model		
		$C_0 \pm \Delta C_0$	$C_1 \pm \Delta C_1$	$C_2 \pm \Delta C_2$
Decline of average number of children whose mothers work (X_1), by 10%	5.3-16.5*	111.8 $\pm$ 21.8	-0.91 $\pm$ 0.28	-
Decline of atmospheric air pollution (P , X_1) to one-half + decline in number of children born to mothers with complications of the gestation period and parturition (X_2), by 3%	10.7-13.1 15.9**	68.6 $\pm$ 2.9	-1.2 $\pm$ 0.1	-1.7 $\pm$ 0.8
Decline of housing density (X_1) to one-half + increase in number of children born to healthy parents (X_2), by 20%	3.0-8.0 17.2	-11.8 $\pm$ 0.9	-0.003 $\pm$ 0.0006	0.7 $\pm$ 0.1
Decline of density of highway network (X_1) to one-half + decrease in number of premature babies (X_2), to one-half	8.0-9.7	65.1 $\pm$ 4.8	-0.99 $\pm$ 0.1	-4.0 $\pm$ 1.2

*Range of rise of health index for different microregions of the city.

**Health index computed for one microregion.

Thus, for each of the indicators of health status considered, we singled out a set of factors that had the strongest influence on it and determined the corresponding patterns. Some of the results are submitted here.

Table 1 lists the effects of certain factors on the integral "health index." Thus, while a decline of highway system density to one-half leads to an 8.0-9.7% rise of health index, with concurrent decline of number of prematurely born children (also to one-half) the health index increases by 16.5-21.5%.

Respiratory diseases were in first place in overall morbidity (according to requests for attention), and differences in their incidence reached 150-180% in different parts of the city. Reduction of population density, enlargement of landscaped areas and average age of enrollment in preschool institutions

should be included among the main factors of prevention of this class of diseases. However, a detailed analysis of the structure of morbidity referable to respiratory organs yields somewhat different results. Atmospheric pollution and highway system density were factors, the adverse effect of which on incidence of acute respiratory diseases (ARD) was manifested the most. The highest incidence of ARD was found in microregions with greater air pollution (X_1), and the influence of the latter was enhanced if the infant was born to parents who were not in good health (X_2): $C_0 = 138.6 \pm 34.6$, $C_1 = 1.6 \pm 0.5$. Thus a decline of air pollution to one-half led to decline of incidence of ARD (per 100 cases) by 26.6-34.2. Some impact of environmental factors was also demonstrated for the combination of "highway system density + mother's age at time of infant's birth": a reduction of highway density to one-half leads to a decline of ARD by 30.4-31.5 per 100 cases ($C_0 = 671.1 \pm 191.6$, $C_1 = 3.7 \pm 0.9$, $C_2 = -25.2 \pm 7.5$). Air pollution combined with other factors (climate, population and housing density, premature birth, family's budget, etc.) is also the deciding factor in incidence of catarrh of the upper respiratory tract (CURT); however, the relationship is reversed here: a decline of atmospheric pollution leads to rise in morbidity. In our opinion, this seemingly paradoxical statement is attributable to the fact that, when there was a milder course of illness the diagnosis of CURT was made, whereas with a longer course and clinically marked symptoms, they were diagnosed as ARD, so that ARD is recorded more often in polluted regions than CURT. Indeed, a reduction of air pollution combined with other factors leads to a rise in incidence of CURT with concurrent decline of ARD. Similar findings are made when we assess the "highway system density" factor, a reduction of which to one-half leads to increase in CURT cases by 17.8-18.5 and concurrent decrease in ARD by 30.4-31.5 (per 100 cases). Landscaped areas have been found to be very important to prevention of acute respiratory infections (ARI), and when they are doubled there is a decline of 6.0-12.7/100 in cases of ARI. The average enrollment age in a preschool institution also plays an important part, since it is the principal active factor, combined with the natural-climate factors and altitude. An increase of 6 months in average age of enrollment in preschool institutions leads to a 15.1 decrease in incidence of ARI.

Table 2. Quantitative evaluation of influence of parent health on a group of children with poor physical development

Factor and level of change	Decline in number of children with poor physical development, %	Parameters of model $Y = C_0 + C_1 X_1$	
		$C_0 \pm \Delta C_0$	$C_1 \pm \Delta C_1$
Increase in number of children born to healthy parents (X_1), %:			
5	1.3		
10	2.7		
15	4.0	27.8 ± 8.1	-0.3 ± 0.09
20	5.4		
25	6.8		

Table 3. Quantitative evaluation of physical development of preschool children in Yerevan

Parameter and its change	Change in number of children with proportionate physical development (Y_1 , increase) and excess weight (Y_2 , drop), %		Parameter of model		
	Y_1	Y_2	$C_0 \pm \Delta C_0$	$C_1 \pm \Delta C_1$	$C_2 \pm \Delta C_2$
Decline of atmospheric pollution (P , X_1) to one-half + decrease in number of children born to mothers with complications of pregnancy and parturition (X_2), to one-half	11.5-13.0 18.2		102.7 $\pm$ 3.7	-1.3 $\pm$ 0.2	-1.6 $\pm$ 0.4
Decline of highway system density (X_1) to one-half + decrease in number of premature babies (X_2), by 2%	6.9-9.8 18.2		100.9 $\pm$ 4.9	-0.97 $\pm$ 0.16	-4.7 $\pm$ 1.2
Decline of highway density (X_1): to one-half to one-third		4.1-4.2 5.3-5.5	6.8 $\pm$ 1.6	0.49 $\pm$ 0.1	-
Decline of atmospheric pollution (sum of scores, X_1) to one-half + decrease in number of children with single parent (X_2), by 2%		2.1-2.2 3.1-5.3	-0.97 $\pm$ 0.3	0.17 $\pm$ 0.04	1.6 $\pm$ 0.5

Quantitative assessment of the effect of environmental factors on the integral parameter, "physical condition," particularly on children in a good physical state, revealed that air pollution is one of the factors that has a strong effect on a child's physical condition. Several factors, for example, premature birth and parents' health, enhance this influence. Thus, while a reduction to one-half in atmospheric pollution leads to 43.5-44.7% increase in number of children in good physical condition, with concurrent decline in number of prematurely born children it increases to 48.7-63.9%. It has been demonstrated that the altitude of the area is relevant to the physical state of children: the higher the area is above sea level, the more children there are in good physical condition. However, the beneficial effect of altitude is diminished substantially if the infant is born to unhealthy parents, or if there were complications of pregnancy and parturition. This is particularly evident in one of the microregions, where there were twice as many infants born to mothers with complications of pregnancy and parturition and 1.3 times fewer children born to healthy parents, as compared to microregions with

the best indicators. For example, in the first of these microregions there were 2.4 times more children in a good physical condition, as compared to the second. We should also mention the relevance of highway density to the physical condition of children. A decline thereof (X_1) to one-half leads to 9.9% increase in number of children in good physical condition, whereas if there is concurrent expansion of preventive measures against premature birth (X_2) by 2%, the number of children in good physical condition would increase by 16% ($C_0 = 87.7 \pm 19.0$, $C_1 = -1.2 \pm 0.4$, $C_2 = -11.4 \pm 2.9$).

Sociohygienic factors were the principal ones that caused worsening of physical condition of children the most. Quantitative evaluation of the condition of children in this group as a function of one of the sociohygienic factors is listed in Table 2. An increase in number of children born to healthy parents leads to appreciable decrease in number of children with poor physical development.

A quantitative evaluation was also made of the influence of environmental factors on children with proportionate physical development and excessive weight (Table 3). In addition to those listed in Table 3, we should mention population density, landscaped area, presence of both parents and age at which the child is enrolled in a preschool institution.

Thus, the results of these studies put some tasks to the therapeutic-preventive and sanitary-epidemiological institutions of this city. Prompt prevention of complications of pregnancy and parturition, including premature birth, along with improvement of the environment and a number of planning factors, constitute a most important step for improving the health status of preschool children.

Our study enabled us to single out several deleterious environmental factors in different microregions of the city in question, in order to work out hygienic recommendations to improve the health of children that reside there.

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10,657

CSO: 1840/652

TRADE UNION SANATORIUMS

Moscow SOVETSKAYA LATVIYA in Russian 18 Aug 83 p 2

[Conversation conducted by Yuriy Katsnel'son]

[Text] EXPANDING—Millions of Soviet people vacation in sanatoriums which belong to trade unions. For rest and treatment of workers, more than 1.7 billion rubles from the budget of government social insurance, which is controlled by the trade unions, will be spent this year, in comparison to 1.5 billion in 1982.

"In our country, there are more than 13 thousand trade union sanatoriums, holiday homes and pensions [rooming houses]," relates Vladimir Poltoranov, First Deputy Chairman of the Central Council for directing trade union health resorts. "In 1983, ten million people will vacation in them. By the end of this Five-Year Plan, sanatoriums and holiday homes will be constructed in 60 thousand more places. They will be able to accept an additional million vacationists."

It is notable that trade unions give white- and blue-collar workers every fifth trip to sanatoriums and every tenth to a holiday home or tourist center free, while the majority of the rest are sold for 30 percent of their actual cost. In these cases, income is supplemented by the same social insurance budget which is formed from insurance payments of enterprises and governmental subsidies.

Since we have begun to speak of the role of enterprises in the organization of vacation and treatment for their workers, I will also mention sanatorium-clinics, where one can go through a course of medical treatment and prophylaxis without time off from basic work. The number of these institutions increased to be a third greater in the tenth Five-Year Plan. Today there are more than 2600 of them. Here, in 1983, the health of more than three million workers will be corrected. Trade unions have the means for this goal--again, it is the government social insurance budget: we are able to grant every fifth trip free to a clinic for a period of 24 hours, while the rest are sold for 15-17 rubles.

"In recent years," continues Vladimir Poltoranov, "we have expanded so-called 'family sanatoriums', i.e., sanatoriums and pensions for vacations of parents

and children. This year they will accept almost 1.2 million people. That is approximately one thousand greater than in 1982."

I would also like to note one more feature of this year, which affects the vacation of school children in summer pioneer camps. This year, about 15 million children will spend their vacations there. The All-Union Central Council of Trade Unions introduced supplemental benefits for payment of vacation at pioneer camps: half of them are granted at no cost (first of all to families with two or more children), and the rest--for twenty percent of the actual cost. Almost 70 million rubles of state grant are used for this.

And in conclusion, there is a new tendency characteristic for the development of the trade union vacation industry. This has to do with the expansion of its geography. Relatively recently, vacation and treatment for many were mainly linked with such traditional health resort spots as the Black Sea coast and the Baltic. But these places, as physicians have explained, are by far not beneficial for everyone. The adaptation period (and readaptation upon the return home) does not always proceed painlessly,

Of course, today also each person is free to travel for rest and treatment wherever he or she wishes. But the expanding network of trade union sanatoriums in such regions as the Central European USSR, Kazakhstan, Siberia, the Far East, etc., enables workers and members of their families to improve their health with greater effectiveness in climates to which they are accustomed.

12473

CSO: 1840/641

BRIEFS

NEW TASHKENT CHILDREN'S POLYCLINIC--A centrally-located children's consulting-diagnostic city polyclinic has been opened on Karl Marx Street in Tashkent. The seven-story building which houses it was built by the collective of Glavtashkentstroy Trust No 8. The new medical center has 30 departments, including allergy, endocrinology, stomatology, psycho-neurology, neurosurgery, and others. In them, children will be able to have examinations and get help in recovering their health. For example, the department of social pediatrics will study the influence of social factors on the health of mother and child. Various consultations are organized there. The polyclinic was built to handle 1,700 visits per day. [Interview by A. Zann] [Text] [Tashkent PRAYDA VOSTOKA in Russian 9 Jul 83 p 4 (24)] 12255

REMOTE CARDIOVASCULAR DIAGNOSIS--In Taldy-Kurgan Oblast Hospital's office of functional diagnostics, there was a telephone call from Alakul'skiy Rayon. It was the physicians of the rayon hospital, more than 300 kilometers away, asking leading cardiologists to "take a listen" to the heart of a patient in serious condition. After a few minutes, the physicians had analyzed the electrocardiogram which came through the wires. This enabled them to give their rural colleagues recommendations for treating the shepherd. The help came much sooner than an ambulance plane could have flown to the distant village. The system of long-distance diagnosis of cardiovascular disorders which has been implemented in Taldy-Kurgan is built to handle telephone electrocardiograms from all rayon hospitals of the oblast. It will make it possible to raise the effectiveness of prevention and treatment of cardiovascular disorders. [By TASS Correspondent V. Ganzha] [Text] [Dushanbe KOMMUNIST TADZHIKISTANA in Russian 29 May 83 p 3] 12255

HEALTH IMPROVEMENT IN CHILDREN IN URBAN PIONEER CAMPS

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 83
(manuscript received 20 Dec 82) pp 23-25

GREBANYAK, N. P. and TKACH, B. A., Donetsk Medical Institute
imeni M. Gorky

[Abstract] A study was made of the effects of a 23 day stay in an urban pioneer camp on the health of 63 9-10 year old school children in terms of physiological and psychological parameters. The activities in the camp provided for supervised recreational activities, dietary control, and a maximum of out-of-doors physical activity and leisure. Improvements in the health were indicated by changes in cardiovascular parameters (decreased pulse rate by 1.7 beats/min, increased systolic volume by 2.2 ml), greater sense of wellbeing and physical coordination. Psychological tests revealed an improvement in the attention span, information processing, and higher scores on memory tests. These observations provide additional proof for the positive role of urban pioneer camps in improving the physical and mental health of school-age children. References 4 (Russian).
[653-12172]

SOCIAL AND HYGIENIC ASPECTS IN ORGANIZATION OF OUTPATIENT POLYCLINICS FOR RURAL POPULATION OF KAZAKHSTAN

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 8, Aug 83
(manuscript received 2 Aug 82) pp 7-12

PETROV, P. P., doctor of medical sciences, KALZHEKOV, T. K., candidate of medical sciences, and ARYMBAYEV, K. A., Department of Social Hygiene, Public Health Administration and History of Medicine of the Scientific Research Institute of Regional Pathology, Kazakh SSR Ministry of Health, Alma-Ata

[Abstract] An analysis was made of the function of outpatient medical services in five rural rayons of Kazakhstan in terms of patient visits to the clinics and home visits by physicians. The recent increase in the number of ambulatory-polyclinic establishments in Kazakhstan (from 2088 in 1975 to 2278 in 1980) as well as the increase in the number of physicians (from 21.8 per 10,000 population in 1970 to 31.7 in 1980) has resulted in a markedly improved standard of living and health of the rural population. Current statistics show that the present level of morbidity per 1000 population is 968.5 cases with 1556.5 clinic visits; most visits are due to respiratory diseases (22.8%), cardiovascular problems (14.4%), infections (10.0%), urologic diseases (8.8%), neurologic conditions (7.8%), and gastrointestinal problems (7.5%). Of the total number of patient-physician contacts only 7.2% involved home visits by the physicians. Furthermore, the fact that only 14.4% of the visits to the clinics were for preventive purposes points to the need for more effective education of the rural population in matters of health. Tabular data are provided on the visit and morbidity patterns by age, sex, and disease.
[654-12172]

UDC 617-001:313.13

AUTOMATED SYSTEM FOR ANALYSIS OF INCIDENCE OF TRAUMA, MORBIDITY AND LOSS OF WORKTIME

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 8, Aug 83
(manuscript received 27 Dec 82) pp 20-24

SHUSTER, L. A., MANASTYRSKIY, R. Ya., KIRILYUK, V. G., and VISHNEVKIN, A. M., Lvov Oblast Department of Health

[Abstract] A computer-based system was devised for monitoring the incidence of trauma, morbidity and loss of worktime at industrial and other enterprises in Lvov, Ukraine. The program for the system was written in COBOL and has provisions for 437 individual clinical entities that are most likely to be encountered in this area. The data base is updated on a quarterly schedule and provides a full statistical analysis on the incidence of trauma, morbidity, verified diagnosis, loss of worktime, economic losses, and correlation with the type of occupation, family status, age, sex, etc.
References 8 (Russian).
[654-12172]

MATERNAL WORKTIME LOSS DUE TO CARE FOR SICKLY CHILDREN

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 8, Aug 83
(manuscript received 7 Dec 82) pp 28-31

AL'BITSKIY, V. Yu., BARANOV, A. A., PURTOV, I. I. and OGNEVA, M. L.,
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[Abstract] An analysis was made of the pattern of worktime loss by mothers caring for well and sickly children at a Gorky oblast chemical plant. The results showed that, on the average, a female worker lost 4.2 days for each incidence in the care of a sick child. On the whole, 11.6% of the children were identified as sickly (4 or more diseases per year) and accounted for 31.4% of all the cases of lost worktime and 32.6% of actual lost workdays. The morbidity pattern between the well and sickly group of children did not differ; however, in the sickly group 91.7% of the lost days were due to caring for children 1-6 years old, and in the normally-healthy group the corresponding figure was 59.6%. Direct economic losses to the plant were calculated at 1,242,777 rubles in 1981, without considering administrative and allied costs. As a result of special efforts in managing the sickly children at the Gorky Pediatric Institute, 50.7% such children showed sufficient improvement to be reclassified into the normally healthy category. References 6 (Russian). [654-12172]

ORGANIZATION OF AMBULATORY POLYCLINICS FOR RURAL POPULATIONS

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 8, Aug 83
(manuscript received 22 Jun 82) pp 32-35

TAZHBE NOV, S. U., Dzhambul Oblast Hospital

[Abstract] Consideration is given to the health services provided in the Dzhambul oblast of Kazakhstan for the rural population. The population of the oblast is approximately one million, of whom 53% fall into the rural category. Of the 109 ambulatory-polyclinics in the oblast, 70% are located in rural areas, and there are 290 feldsher-midwife points. At the present time, there are 12.2 physicians per 10,000 rural population, which is higher than the mean for Kazakhstan as a whole. Currently, most effort is expended on the establishment of physician-staffed ambulatoria in villages with a population of 3000 or more; today there are 26 such ambulatoria in the oblast, most of them staffed with two or three physicians. Plans call for establishing an additional ten clinics of this type before the end of the 10th Five Year Plan. Beginning with 1979, a drug addiction program has been put into effect and currently such services are available in eight rayons. Despite the progressive decrease in the morbidity of the rural population, not all of the clinics and dispensaries function in a satisfactory manner, and there are some

with inadequate facilities and shortages of critical equipment and supplies. Rural physicians only infrequently visit the patients at home, and considerable improvements must be made in the practice of preventive medicine. Every effort will be made by the oblast health authorities to correct existing shortcomings and assure the population excellent medical care.
[654-12172]

UDC: 613.632.4-07

IMPROVEMENT OF METHODS OF MONITORING HARMFUL SUBSTANCES IN THE AIR OF THE WORKPLACE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 6, Jun 83 (manuscript received 17 Feb 82) pp 39-42

MURAV'EVA, S. I., Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow

[Abstract] There has been a need to develop highly effective accelerated methods of sampling, using sensitive methods to measure the amounts of harmful substances present in the air. A new method has been developed for sampling of toxic vapor and aerosol using AFAS-U filters (carbon type analytic aerosol adsorption filters). These filters have high adsorption capacity of various organic compounds widely used in leading branches of industry. They can adsorb mixtures of chemical substances as well. The authors studied the chromatographic behavior of substances adsorbed by these filters from various solid carriers and liquid stationary phases at various temperatures and under various conditions. The data obtained were used to select optimal conditions for separation of these substances. Calibration graphs were constructed for chromatography of the substances. References 8: 7 Russian, 1 Western.
[613-6508]

UDC: 613.632.4-073:535.243

DETERMINATION OF THE ELEMENTAL COMPOSITION OF INDUSTRIAL AEROSOLS BY LASER MASS SPECTROMETRY

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 6, Jun 83 (manuscript received 18 Jan 82) pp 54-56

AREF'EV, I. M., BORISKIN, A. I., BRYUKHANOV, A. S., KOMLEVA, A. K., UTYAMYSHEV, R. I. and CHISTOV, Ye. D., All-Union Scientific Research and Testing Institute of Medical Equipment; All-Union Central Scientific Research Institute of Protection of Labor, All-Union Central Council of Trade Unions, Moscow

[Abstract] Laser mass spectrometry has a number of significant advantages: it does not require special preparation of samples, is universal, has high

concentration sensitivity and allows quantitative analysis without the use of standards. The method was used to determine the elemental composition of aerosols liberated into the workplace during laser-cutting of metals. The laser operated in the pulsed mode, pulse length 10^{-3} s, pulse energy up to 20 J at 1.06 μm wavelength. Air samples were collected by an aspirator on a filter located 30 cm from the target. The results of analysis with the EMAL-2 laser energy mass analyzer agreed well with the chemical composition of the material being cut. The method of laser mass spectrometry is therefore promising for determination of the elemental composition of dispersed aerosols, rapidly producing results with high sensitivity and accuracy. Figures 1; references 4 (Russian).
[613-6508]

SYNERGISM IN RADIOBIOLOGY

Moscow IZVESTIYA AKADEMII NAUK SSSR. SERIYA BIOLOGICHESKAYA in Russian
No 4, Jul-Aug 83 (manuscript received 19 May 82) pp 485-502

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Pushchino

[Abstract] A literature survey is presented of synergism in radiobiology, defined as enhancement of the effects of ionizing radiation by various physical and chemical factors. Distinction is made between synergism and additive effects in which the sum of effects represents simply addition of the effects seen with the different factors alone, and between synergisms and sensitization in which the other agent has no telling effect of its own other than to render (sensitize) the biological test system more susceptible to the effects of ionizing radiation. Synergism involving ionizing radiation has been demonstrated with such physical factors as ultrasound, high pressure, and elevated temperatures, as well as with chemicals (mutagens, carcinogens, various venoms, radiotoxins, etc.). Examples are presented on the synergistic effects achieved with ionizing radiation and hyperthermia and with various chemicals in the hope that it will stimulate further research and a better appreciation of the mechanisms of damaging and therapeutic effects of radiation. Figures 7; references 69: 25 Russian, 44 Western.
[660-12172]

PSYCHOLOGY

FIRST WORKSHOP OF YOUNG SPECIALISTS IN MEDICAL PSYCHOLOGY

Moscow VOPROSY PSIKHOLOGII in Russian No 4, Jul-Aug 83 pp 169-171

MIKADZE, Yu. V., Moscow

[Abstract] The First Workshop of Young Specialists in Medical Psychology was held in March 1-6, 1983 in Pushchino under the title "Medical Psychology and Protection of Mental Health". The workshop was organized by the USSR Ministry of Higher and Intermediate Special Education and the Moscow State University. The workshop was conducted by leading specialists in various areas of medical psychology and attended by more than 120 young specialists from various scientific and educational establishments in the Russian SFSR, Ukraine, Lithuania, Latvia, Georgia, Armenia, and Estonia. The educational program consisted of 15 lectures and six seminars, as well as round-table discussions of key problems in medical psychology and pathopsychology. The discussions ended with discourses on the status of medical psychology and the need for medical psychologists to maintain active contacts among themselves. [694-12172]

OBSERVERS' USE OF ACOUSTIC AND MODALLY-NONSPECIFIC FEATURES OF SOUND IN DIFFERENTIATION OF AUDITORY SIGNALS

Moscow PSIKHOLOGICHESKIY ZHURNAL in Russian Vol 4, No 4, Jul-Aug 83 pp 48-57

BARDIN, K. V., doctor of psychological sciences, and GORBACHEVA, T. P., Institute of Psychology, USSR Academy of Sciences

[Abstract] Previous studies have shown that when observers cannot differentiate sound on the basis of loudness, other identifying features come into play in the form of similes ("higher sound-lower sound", "dull--like hitting a tree, clear--like hitting a metal"). Continuation of these studies with five students attending the 4 to 5th courses at an institute were tested by exposure to 1000 Hz ranging in intensity from 3 to 0.25 dB below the standard sound for comparison with a standard level of 70 dB. Analysis of the results confirmed use of acoustic and modally-nonspecific features for differentiation.

These findings were interpreted in the light of recent theories on the multi-dimensional nature of perception and other mental phenomena, and of adaptation to multidimensional sensory input. Figures 2; references 16: 15 Russian, 1 Western.
[696-12172]

CONFERENCES

BRIEFS

FINNISH-RUSSIAN MEDICAL TRADE EXPANDS--Yesterday medical workers of our city gathered in the offices of the Finnish-Soviet Chamber of Commerce in Leningrad. A symposium opened here which dealt with application and development of modern medical equipment for intensive therapy and clinical chemistry. It was organized by the Finnish joint-stock Kone Company and representatives of the Finnish-Soviet Chamber of Commerce in Leningrad with the assistance of the Leningrad department of the USSR Chamber of Commerce and Industry. The Kone firm has been cooperating with the Soviet Union for many years with fruitful results. Elevators and hoisting cranes bearing its trademark can be seen today in public buildings, industrial enterprises, and establishments of many of our cities. But this time, the instrument-making department displayed its analyses and systems for determining various of the patient's biophysiological parameters, helping physicians to make quick and accurate diagnoses. The scientific-technical cooperation of the firm with Soviet scientists is also being expanded. Already a joint system has been worked out for automatic analysis of electrocardiograms, which has captured the interest not only of Soviet and Finnish physicians, but also those of other countries. "We attach profound significance to the development of economic-trade ties with the Soviet Union; they are the clearest evidence of good-neighbor relations between two countries," emphasized S. Syaylya, representative of the Kone firm. "The Soviet Union is our most important and reliable trade partner. Favorable prospects are also opening up for the further expansion of mutually beneficial cooperation." [By V. Tarasenko] [Text] [Leningrad LENINGRADSKAYA PRAVDA in Russian 2 Jun 83 p 3 (29)] 12255

MISCELLANEOUS

UDC 614.71:615.322.017;615,28]-074;543.544

GAS CHROMATOGRAPHIC DETERMINATION OF ATMOSPHERIC PHYTONCIDES

Moscow GIGIYENA IN SANITARIYA in Russian No 7, Jul 83
(manuscript received 9 Feb 83) pp 43-45

DMITRIYEV, M. T., MISHCHIKHIN, V. A. and STEPANOV, E. V., Scientific
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[Abstract] Details are presented for the gas chromatographic determination of atmospheric concentration of phytoncides (fir, spruce, cedar, pine). Using AW-HMDS adsorbent, 11-19 peaks were obtained for each species, with a sensitivity sufficient to detect 2-5 ng. Calculations yielded air phytoncide concentrations of 0.5-1 mcg/m³ using 5 liter samples, with an error of determination of 5-10%. Figures 2; references 8 (Russian).
[653-12172]

UDC 614.894.2

GAS MASKS WITH ION EXCHANGE FILTERS AND VISUAL INDICATORS OF SPENT ADSORBENT

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 7,
Jul 83 (manuscript received 22 Nov 82) pp 55-56

KATS, B. M., OLONTSEV, V. F., VIKHLYANTSEV, A. V., ARTYUSHIN, G. A.,
LAZAREV, M. Yu., DLUBOVSKIY, R. M. and BARINOVA, N. V., University
imeni I. I. Mechnikov, Odessa

[Abstract] A special gas mask has been designed which allows for visual determination of spent adsorbent, and thereby promotes maximum safety and utilization of the mask. The canister is made of transparent material which allows determination of the depth of color change in an ion exchange adsorbent as the latter becomes saturated with noxious gases. Experimental gas masks (MKPi and MKPFi) are currently undergoing tests for protection against ammonia and amines. Figures 1; references 2 (Russian).
[644-12172]

- END -