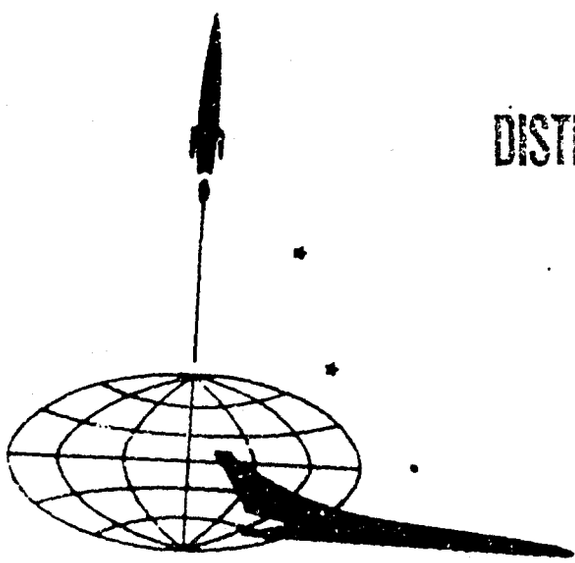
ATD Report 66-28

C B E FACTORS

Monthly Survey No. 4



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ATD Report 66-28

CBE FACTORS

Monthly Survey No. 4

ATD Work Assignment No. 50

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FOREWORD

This report is the fourth in a series of monthly surveys covering the following areas:

I. CHEMICAL FACTORS
   - Pesticides
   - Herbicides
   - Fertilizers
   - Psychotomimetics
   - Other Chemicals

II. BIOLOGICAL FACTORS
   - Pathogens

III. ENVIRONMENTAL FACTORS
   - Aerosols
   - Ecology
   - Micrometeorology
   - Soil Science

Available translations of additional sources pertinent to these subject areas are listed in Appendixes 1—3. Titles of publications cited in Sections I—III are listed alphabetically in Appendix 4.

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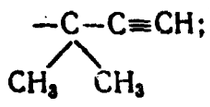
SYNTHESIS OF UNSATURATED ESTERS OF METHYLCYCLOHEXYLPHOSPHONIC ACID

Aliyev, M. I., I. A. Shikhiyev, S. A. Balezin, S. Z. Israfilova, and N. I. Podobayev. Azerbaydzhanskiy khimicheskiy zhurnal, no. 5, 1965, 44-47.

The esters were prepared by the reaction of methylcyclohexylphosphonyl dichloride with unsaturated alcohols:

$$CH_3C_6H_{10}POCl_2 \xrightarrow{ROH} CH_3C_6H_{10}PO(OR)_2,$$

where R = $-CH_2-CH=CH_2$ (I); $-CH_2-C\equiv CH$ (II); $-CH_2-CH=CH-Si(C_2H_5)_3$ (VI);



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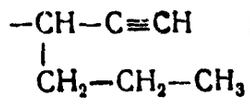

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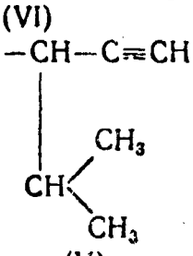


(V)

The reaction was conducted in absolute diethyl ether, in the presence of triethylamine. The product yields ranged from 30 to 55%. Infrared spectral data support the indicated product structures.

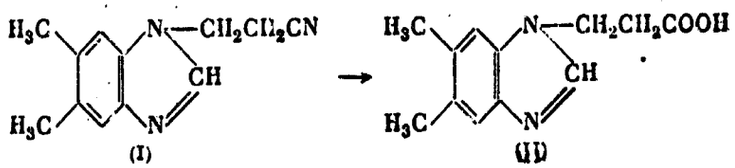
ASSOCIATION: INKhP AN AzerSSR [VS]

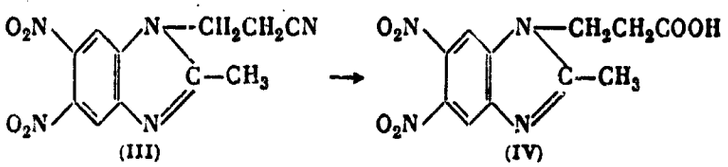
CYANOETHYLATION OF NITROGEN-CONTAINING HETEROCYCLIC COMPOUNDS

Efros, L. S. Cyanoethylation of nitrogen-containing heterocyclic compounds. III. Zhurnal organicheskoy khimii, v. 2, no. 1, 1966, 178-179.

As part of the continuing search for physiologically active compounds, 5,6-dimethyl- and 2-methyl-5,6-dinitrobenzimidazole were subjected to cyanoethylation. The above compounds were allowed to react with acrylonitrile in dioxane at

55—60 °C, in the presence of triethylbenzylammonium hydroxide. The reaction products were subsequently hydrolyzed to the corresponding carboxylic acids:





ASSOCIATION: Leningradskiy sel'skokhozyaystvennyy institut (Leningrad Agricultural Institute) [VS]

SYNTHESIS AND PROPERTIES OF SOME NEW TERTIARY ARSINE SULFIDES

Gamilov, Yu. F., and G. Kamau. Zhurnal obshchey khimii, v. 36, no. 1, 1966, 55-57.

The arsine sulfides tabulated below were prepared from the corresponding arsines by heating with elemental sulfur in benzene. With the exception of the oils, all products are white, crystalline substances, soluble in methanol, ethanol, propanol, acetone, ethyl acetate, and benzene. They are poorly soluble in cyclohexane, and insoluble in n-heptane. Arsine sulfides show fungicidal activity toward some fungi *(Trichophyton gypseum, Epidermophyton)*. The fungicidal activity increases on transition from the lower

to the higher homologs. The correlation of fungicidal properties with the nature of the substituents will be the subject of future work.

R	Yield (in %)	mp	Found %		Formula	Calculated %	
			As	S		As	S
CH_3*	89.3	55—57°	32.61	14.48	$C_9H_{13}AsS$	32.85	14.05
C_2H_5	63.8	44—45	31.03	13.71	$C_{10}H_{15}AsS$	30.95	13.24
n.-C_3H_7	71.2	53—54	28.85	12.63	$C_{11}H_{17}AsS$	28.91	12.52
n.-C_4H_9	68.9	49—50	27.62	12.13	$C_{12}H_{19}AsS$	27.73	11.87
n.-C_5H_{11}	—	oils	26.24	11.87	$C_{13}H_{21}AsS$	26.31	11.41
n.-C_6H_{13}	—		25.21	11.06	$C_{14}H_{23}AsS$	25.12	10.88
n.-C_7H_{15}	—		23.95	10.83	$C_{15}H_{25}AsS$	24.03	10.40
n.-C_8H_{17}	—		22.77	10.15	$C_{16}H_{27}AsS$	22.97	9.99
n.-C_9H_{19}	—		22.18	9.79	$C_{17}H_{29}AsS$	22.09	9.54

Formula	Yield (in %)	mp	Found %		Formula	Calculated %	
			As	S		As	S
CH_3, C_2H_5—As→S, n-$CH_3C_6H_4$	73.4	64—65°	31.13	13.39	$C_{10}H_{15}AsS$	30.95	13.03
C_8H_{17}, C_2H_5—As→S, n-$CH_3C_6H_4$	—	oils	22.05	9.83	$C_{17}H_{29}AsS$	22.09	9.54
CH_2=CH—CH_2, C_2H_5—As→S, C_6H_5	—		29.51	12.31	$C_{11}H_{15}AsS$	29.52	12.20
CH_2=CH—CH_2, C_6H_5—As→S, CH_2=CH—CH_2	—		28.11	12.27	$C_{12}H_{15}AsS$	28.19	12.20
C_6H_5, C_6H_5—As→S, C_6H_5	84.7	166	22.24	9.79	$C_{18}H_{15}AsS$	22.09	9.60

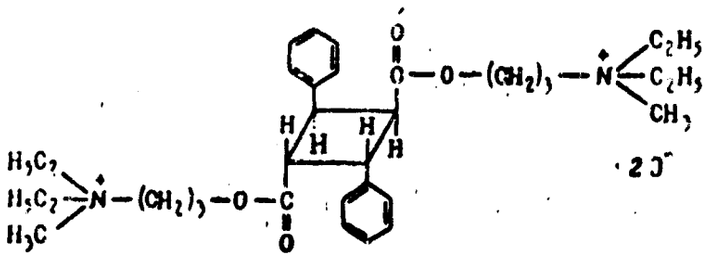
ASSOCIATION: Institut organicheskoy khimii, Akademii nauk SSSR, Kazan' (Institute of Organic Chemistry, Academy of Science, SSSR)

[VS]

THE PHARMACOLOGY OF CYCLOBUTONIUM, A NEW NONDEPOLARIZING MUSCLE RELAXANT

Kharkevich, D. A. Farmakologiya i toksikologiya, no. 1, 1966, 47-53.

Cyclobutonium, diethylaminopropyl α-truxillate dimethoidide,



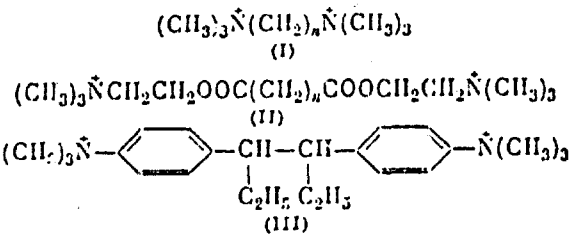
induces head drooping in rabbits when administered in doses of 32.4 to 43.3 μg/kg. It blocks transmission of excitation from the feline sciatic nerve to the gastrocnemius for 3—8 minutes on administration of 130—150 μg/kg. Moderate ganglio-blocking and blocking of excitation transmission from the vagus to the heart are observed. The drug also eliminates acetylcholine-induced bradycardia; the hypotensive effect of acetylcholine remains unaffected. Cyclobutonium has low toxicity and is antagonistic to neostigmine methyl sulfate.

ASSOCIATION: Laboratoriya farmakologii nervnoy sistemy (zav.—deystv. chlen AMN SSSR Prof. V. V. Zakusov), Instituta farmakologii i khimioterapii AMN SSSR i kafedra farmakologii (zav.—Prof. D. A. Kharkevich), I Moskovskogo ordena Lenina meditsinskogo instituta im. I. M. Sechenova [Laboratory of Pharmacology of the Nervous System (director and active member of the AMN SSSR, Prof. V. V. Zakusov) of the Institute of Pharmacology and Chemotherapy of the AMN SSSR and Pharmacology Chair (director and Prof. D. A. Kharkevich) of the First Moscow Order of Lenin Medical Institute] [VS]

CURARE-LIKE COMPOUNDS

Khromov-Borisov, N. V., and M. L. Indenbom. Substituted biphenyl-4,4'-disulfonamides with two quaternary ammonium groups ~20Å apart. Zhurnal organicheskoy khimii, v. 2, no. no. 1, 1966, 125-129.

Compounds with strong curare activity often contain two quaternary ammonium groups separated by a distance of ~14Å. This is exemplified by "dekamethonium" (I, n=10), "ditilin" (II, n=2), and "paramion" (III):

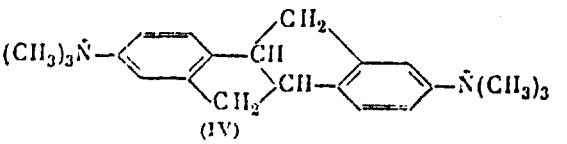


(I)

(II)

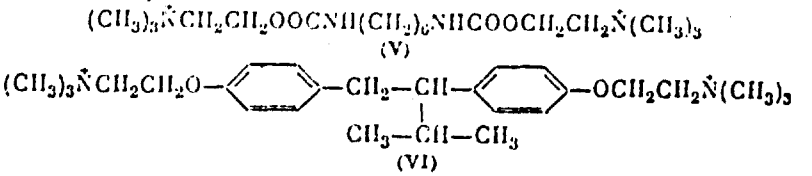
(III)

All the above compounds have flexible molecular skeletons. The indicated spacing (~14Å) corresponds to the most extended conformation. In fused polynuclear systems the molecule is deprived of flexibility and the N^+-N^+ distance is fixed:



(IV)

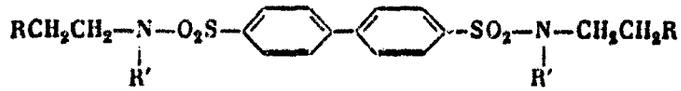
The rigid molecule IV, however, has only one-tenth the curare activity of compound III. Other compounds with N^+-N^+ spacing of ~20Å have high curare activity: "hexadekamethonium" (I, n=16), bischoline sebacate (II, n=8), "imbertil" (V), "mediatonal" (VI), and other compounds.



(V)

(VI)

In this work a number of substituted biphenyl-4,4'-disulfonamides (VII) were synthesized from biphenyl-4,4'-disulfonyl dichloride and dialkylaminoethylamines:



(VII)

where R are ammonium groups containing H, CH_3, C_2H_5, and R' are H, CH_3, or C_2H_5. Graphic analysis showed that in these compounds the N^+-N^+ spacing is equal to 20.0±0.2Å for the most extended conformation. Pharmacological studies show curare activity.

R	R'	Crystallized from	m.p.	Dose mmole/kg*	Found %			Formula	Calculated %		
In formula (VII)					N	S	Halogen		N	S	Halogen
H	H	50% ethanol	217—217.5°	—	7.74, 7.71	17.20, 17.08	—	$C_{16}H_{20}N_2O_4S_2$	7.60	17.40	
$N(CH_3)_2$	H		151—153.5	—	12.27, 12.04	14.23, 14.45	—	$C_{20}H_{30}N_4O_4S_2$	12.32	14.08	—
$N(CH_3)_2 \cdot HCl$	H	methanol	272—274 decomp.	>15.0	10.66, 10.64	12.20, 12.39	Cl 12.90, 12.94	$C_{20}H_{30}N_4O_4S_2 \cdot 2HCl$	10.62	12.14	Cl 13.41
$\overset{+}{N}(CH_3)_3J^-$	H		243—244	0.05	7.42, 7.46	8.43, 8.60	J 34.40, 34.42	$C_{22}H_{36}J_2N_4O_4S_2$	7.59	8.68	J 34.37
$\overset{+}{N}(CH_3)_2C_2H_5J^-$	H		235—236 decomp.	0.15	7.28, 7.12	8.86, 8.82	J 32.71, 32.70	$C_{24}H_{40}J_2N_4O_4S_2$	7.31	8.37	J 33.12
$\overset{+}{N}(CH_3)_2J^-$	CH_3		260—262	3.0	7.05, 7.31	8.27, 8.41	J 32.99, 32.98	$C_{24}H_{40}J_2N_4O_4S_2$	7.31	8.37	J 33.12
$N(C_2H_5)_2$	H	50% ethanol	93		11.19, 11.19	12.81, 12.84	—	$C_{24}H_{38}N_4O_4S_2$	10.97	12.56	—
$N(C_2H_5)_2 \cdot HCl$	H	ethanol	239—240	>15.0	9.42, 9.43	10.90, 10.85	Cl 11.90, 12.01	$C_{24}H_{38}N_4O_4S_2 \cdot 2HCl$	9.60	10.99	Cl 12.15
$\overset{+}{N}(C_2H_5)_2CH_3J^-$	H		216—218 decomp.	3.0	7.09, 6.98	8.34, 8.20	J 31.89, 31.91	$C_{26}H_{44}J_2N_4O_4S_2$	7.06	8.08	J 31.89
$\overset{+}{N}(C_2H_5)_3J^-$	H	methanol	230 decomp.	>3.0	6.91, 7.23	7.92, 7.98	J 30.93, 31.16	$C_{28}H_{48}J_2N_4O_4S_2$	6.81	7.79	J 30.85
$\overset{+}{N}(C_2H_5)_3J^-$	C_2H_5	was not crystallized	115—118 decomp.	—	6.35, 6.34	7.65, 7.71	J 28.84, 28.75	$C_{32}H_{56}J_2N_4O_4S_2$	6.38	7.28	J 28.88

* A dose producing 50% blocking of neuro-muscular conductivity in feline gastrocnemius muscle. Ditilin, 0.1; imbertil, 0.005; tubocurarin, 0.3.

ASSOCIATION: Institut eksperimental'noy meditsiny, Akademii meditsinskikh nauk SSSR, Leningrad (Institute of Experimental Medicine of the Academy of Medical Sciences SSSR) [VS]

PROMISING PESTICIDES

Korolev, P., and A. Nikiforov. Zashchita rasteniy, no. 1, 1966, 35-38.

In recent years, the production and use of a number of pesticides, seed disinfectants, and rodenticides have been recommended by the State Commission on Pesticides, Fungicides, and Weed Killers of the Ministry of Agriculture USSR. Characteristics and uses of the recommended chemicals are summarized in Table 1.

Table 1. Recommended pesticides and their characteristics

Name		Chemical Composition	Potential use	Toxicity
English	Russian			
γ-BHC	Geksakhlortsiklogeksan (GKhTsG)	90% γ-BHC	Pesticide, seed disinfectant	[not given]
Heptachlor	Geptakhlor	Min. 65% heptachlor	Pesticide, seed disinfectant	LD_{50} for mice 90 mg/kg very toxic for men and animals
	Polikhlorbutan-80 (PKhB-80)	Chlorine substituted butane, 80% combined chlorine	Pesticide (against philloxera)	Less toxic than hexachlorbutadiene, LD undetermined
Hexachlorobutadiene	Geksakhlorbutadien	96% active substance	Pesticide (against philloxera)	LD_{50} for mice 20, for rats-100 mg/kg
Kelthane	Khloretanol (Kel'ton)	Chlorinated DDT	Pesticide substitute for methyldemeton	LD_{50} for white mice and rats-730 mg/kg
Hexachlorobenzene	Geksakhlorbenzol (GKhB)		Seed disinfectant	Practically nontoxic for men and animals
	Fentiuram	40% TMTD, 10% copper trichlorophenate 20% γ-BHC	Seed disinfectant	Slightly toxic to man and animals
	Fentiuram-molibdat	Fentiuram + 4.6% ammonium molybdate	Seed disinfectant	Slightly toxic to man and animals

Table 1. (Cont.)

Name		Chemical Composition	Potential use	Toxicity
English	Russian			
	Pararodan-anilin	25% p-(thiocyanato)-aniline in polyethylene-glycol (OP-7)	Seed disinfectant	Slightly toxic to man and animals, may cause skin irritation
Malathion	Karbofos	30% techn. grade malathion, 30% OP-7 or OP-10, 40% xylene + solvent	Insecticide and acaricide	LD_{50} for various animals 200—1400 mg/kg
Dimethyl (ethoxy-carbonyl) methyl thio-phosphate	Metilat-setofos	80% pure metilatsetofos	Insecticide and acaricide highly effective against the fly	LD_{50} for animals 1020—1250 mg/kg versus 14 mg/kg for parathion
Dimethyl-nitrophenyl-thiophos-phate	Metil-nitrofos	20% active ingredient	Insecticide and acaricide	LD_{50} for white mice-330 mg/kg, for rats-510 mg/kg
Parathion + methyl-parathion	Trirhlor-metafos 3	50% emulsion in OP-7 or sapal	Insecticide and acaricide	LD_{50} for mice 400—450 mg/kg
O,O-di-methyl-S-[(N-methyl-ureido) methyl] phospho-rodithioate	Fosfamid (Rogor, B-58)	40% con-centrate	Insecticide and acaricide	LD_{50} for mouse 135 mg/kg, for rats 230 mg/kg
Sevin	Sevin	Carbamate	Insecticide	LD_{50} for mice 365, for white rats, 450—700 mg/kg
	Ratindan-2	0.18% 2-(di-phenylacetyl) -1,3-indan-dione	Rodent poison	Minimum LD for gray rats 4— mg/kg

[JK]

THE RANGE OF THERAPEUTIC ACTION AND DURATION OF CURAREFORM EFFECT PRODUCED BY BIS-QUATERNARY DIALKYLAMINOALKYL TRUXILLATES

Kravchuk, L. A. Farmakologiya i toksikologiya, no. 1, 1966, 53-60.

In experiments conducted with intact mice the bis-quaternary series of symmetric truxillic acid derivatives, as contrasted with myorelaxants—diplacin, ditilin, and d-tubocurarine truxillonium were investigated. It was demonstrated that the curareform activity, as judged by the drooping of the head, and the spectrum of therapeutic action produced by the agents during artificial respiration and without it in this series of chemical compounds change in a nonuniform fashion, following modifications in the spatial configuration, in the number of carbon atoms in the side chains and in the nature of radicals at the nitrogen atoms. Derivatives of α-truxillic acid with 2 to 5 carbon atoms in the side chains and those of γ-truxillic acid produce a long-term curareform effect, whereas that of γ-truxillic acid with 7 atoms in the carbon side chains and of ε-truxillic acid—is short-lived.

ASSOCIATION: Laboratoriya farmakologii nervnoy sistemy (zav.—deystv chlen AMN SSSR, Prof. V. V. Zakusov) Instituta farmakologii i khimioterapii AMN SSSR, Moskva [Laboratory of Pharmacology of the Nervous System (director—active member of the AMN SSSR, Prof. V. V. Zakusov) of the Institute of Pharmacology and Chemotherapy of the AMN SSSR] [VS]

STORAGE OF CHEMICAL FERTILIZERS AND PLANT PROTECTION CHEMICALS

Lapinskiy, L. G. (Chief Specialist of Glavsel'stroyproyekt). Byulleten' stroitel'noy tekhniki, no. 2, 1966, 29-30.

Delivery of chemical fertilizers is expected to reach 46.8 million tons in 1970, including 3 million tons of liquid nitrogen fertilizers and 1.2 million tons of plant protection chemicals. About 40 varieties of chemical fertilizers will be produced. An increase in the production of composite fertilizers is planned. [JK]

THE KINETICS OF THE REACTION OF ARMINE AND PHOSPHACOL WITH CHOLINESTERASES OF VARIOUS ORGANS AND TISSUES

Markov, S. M., N. A. Loshadkin, and M. A. Imasheva. Farmakologiya i toksikologiya, no.1, 1966, 72-76.

The kinetics of the *in vitro* reaction of 0,0-diethyl p-nitrophenyl phosphate (Phosphacol) and 0-ethyl p-nitrophenyl ethylphosphonate (Armin) with the cholinesterases of various organs and tissues were investigated. Their affinities for various cholinesterases differ; the phosphonate has a more pronounced affinity for true cholinesterase than for pseudocholinesterase, while the phosphate has a reverse effect. The two compounds react with the cholinesterases of various portions of the feline brain at different rates. The kinetic data were compared with results of *in vivo* experiments. The different affinities of the phosphate and the phosphonate for various cholinesterases agree between experiments *in vitro* and those *in vivo*. Investigation of the effect of small doses of Phosphacol on the activity of the cholinesterases of the different portions of the feline brain indicates that, in addition to the innibition, a small but definite increase in activity is observed in some areas of the brain during the initial period after administration of the drug.

[VS]

HERBICIDES TESTED FOR PREVENTING WEED FOULING OF CANALS

Parshutin, S. M. Results of the effect of certain herbicides on the vegetation of the collector-drainage network in Turkmeniya. IN: Akademiya nauk Turkmenskoy SSR. Izvestiya. Seriya biologicheskikh nauk, no. 5, 1965, 47-52.

Field tests were made to find an effective chemical for keeping canal networks free of cattails and reeds and in-

hibiting the spread of weeds from canal banks to adjacent crop plantings. Atrazine, diuron, esteran-99, sodium trichloroacetate, and dalapon were tested in heavily overgrown areas of a Turkmenian oasis. Various doses of each were tried. Three applications were made during the growth season. Results, including the appearance of the leaves and stalks, number of stalks, and the number of new sprouts, were recorded daily for the first 10 days after each application and every 5 to 10 days thereafter until December. Preliminary tests established that the herbicides had no toxic effect on aquatic fauna. Atrazine had little toxic effect at 20 and 30 kg/ha. Better results were obtained with diuron, esteran-99, and sodium trichloroacetate in doses of 36, 45, and 75 kg/ha, respectively. The last treatment did not usually add much to the effect of the other two. Best results were seen with dalapon at 24 and 36 kg/ha. Dalapon killed the weeds completely in 3 applications, and almost completely inhibited new sprouting. Treatment of plants on banks and approaches with diuron (24—36 kg/ha), esteran-99 (30—45 kg/ha), and sodium trichloroacetate (50—75 kg/ha) gave good results. It is recommended that testing be continued for more precise determination of dosages, number of treatments, and spraying periods, and to test other herbicides.

ASSOCIATION: Turkmenskiy nauchno-issledovatel'skiy institut vodnykh problem i gidrotekhniki (Turkmenian Scientific Research Institute for Water Problems and Hydraulic Engineering) [DP]

USE OF HERBICIDES IN VIETNAM CONDEMNED

Stubbe, H. National Zeitung (E. Germany), 1966, p. 3, cols. 1-2.

Prof. Dr. H. Stubbe appeals to scientists of the world to object to the use of bacteriological and chemical agents

against the Vietnamese people. According to Stubbe, US forces have used herbicides (hormin dust, hormit spray, selest, hedolit), originally developed to aid agriculture, to destroy plant life in Vietnam. Stubbe states that a research institute has been established in South Vietnam which is subordinate to the 406th American Brigade for the Research of Bacteriological and Chemical Warfare, stationed in Sagamihara, Japan. Stubbe appeals to American and West German scientists not to lend their services to such activities. [DM]

THE ELECTROLYTIC REDUCTION OF DIETHYL KETONE, PINACOLONE, HEXYL METHYL KETONE, AND CYCLOHEXANONE

Tomilov, A. P., and L. A. Ignat'yeva. Zhurnal prikladnoy khimii, v. 38, no. 12, 1965, 2715-2719.

In the fourth communication of a continuing series of studies on electrolytic reduction of aliphatic ketones, the effect of variables has been determined on the yield of dimeric products of cathodic reduction of higher ketones. The purpose was to clarify the effect of substituents adjacent to the carbonyl group on formation of dimeric products. The experimental method was described in three earlier communications of this series: electrolysis was conducted in a diaphragm-cell with different metal cathodes. The electrolyte was sodium hydroxide solution. The data were tabulated on the yields of hydrogen and the reduction products (alcohols and pinacols) under varied conditions of electrolysis. The maximum yield of pinacols was obtained in

0.5—2.0 N NaOH at 5—15°C with a zinc cathode and current densities not higher than 0.01—0.02 amp/cm^2. The yields of pinacols were comparatively low with all ketones studied. The highest yield (about 15% of the product) was achieved in the reduction of cyclohexanone under optimum conditions. The effect of variables (cathode material, current density, NaOH concentration, and temperature) on the yield of dimeric product (pinacol) in reduction of cyclohexanone was similar to that previously determined in the reduction of acetone and ethyl methyl ketone (2-butanone). Comparison of the electrolytic reducibility of various ketones shows that cathodic dimerization is not practical in the case of higher aliphatic ketones, such as diethyl ketone (3-pentanone), pinacolone (3,3-dimethyl-2-butanone), and hexyl methyl ketone (2-octanone), because of the increasing negative value of the inductive effect of the substituents adjacent to the carbonyl group. Introduction of substituents with a positive induction effect may significantly increase the yield of dimeric products. [JK]

PREPARATION OF GRANULATED POTASSIUM METAPHOSPHATE

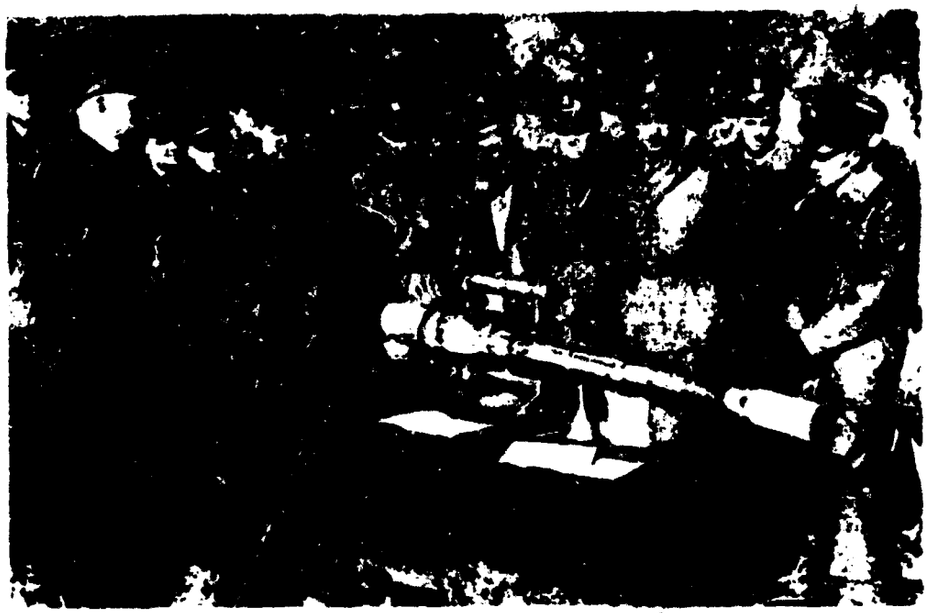
Vol'fkovich, S. I., M. V. Lykov, A. S. Cherepanova, G. V. Kryukov, E. G. Poliyevktova, and V. V. Doronin. Preparation of granulated potassium metaphosphate in fluidized bed unit. Zhurnal prikladnoy khimii, v. 39, no. 1, 1966, 3-7.

Pilot plant experiments at the Scientific Institute for Fertilizers, Insecticides, and Fungicides have demonstrated the feasibility of producing granulated potassium metaphosphate $(KPO_3)_n$ fertilizer from potassium chloride solution in phosphoric acid. The product contained 56—60% P_2O_5 and 38—40% K_2O.

ASSOCIATION: Nauchnyy institut po udobreniyam i insektofugitsidam imeni Ya. V. Samoylova (Scientific Institute for Fertilizers, Insecticides, and Fungicides) [JK]

TRAINING OF POLISH ARMY CHEMICAL CORPS

Zolnierz Polski, no. 1, 1966, 10.



Participants in a training course for personnel of the Polish-Army Chemical Corps get acquainted with an aerosol gun. The gun is loaded with a fog-forming toxic compound. Trainees are officers from all military branches being schooled for future instructors in chemical warfare including radioactive decontamination. [EW]

SOVIET AIR FORCE DECONTAMINATION SQUAD AT WORK

Aviatsiya i kosmonavtika, no. 1, 1966, p. 66.

Fig. 1. After a chemical attack, the airfield CW detection team marks contaminated areas and objects (Sgts. A. Mukhtarov and V. Petrishin from the chemical squad commanded by Capt. A. Knunyants).

Fig. 2. Service flight personnel, under the command of their CO Capt. A. Monyakov, decontaminate their aircraft after a CW attack.

[EW]

TULAREMIA IN AZERBAYDZHAN

Akhundov, M. G., and D. D. Dzhebrailov. An epizootic and epidemic of tularemia in 3 rayons of the Azerbaydzhan SSR. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 12, 1965, 63-70.

The first conspicuous tularemia manifestations in the Azerbaydzhan SSR occurred in 1958, when epizootics were recorded in the Pushkinskiy rayon and the Nakhichevanskaya ASSR, which is considered part of Azerbaydzhan although separated from it by a strip of Armenian territory. While tularemia recrudesced in the Pushkinskiy rayon only in 1959, the infection persists today in the Nakhichevan' area. Early in 1964 tularemia was observed in man as well as in rodents in the Kazakhskiy, Shamkhorskiy, and Khanlarskiy rayons of Azerbaydzhan. The epizootics, which lasted a little more than a month and involved an area of around 10,000 hectares, affected the following species:

Species	Number examined	Found infected
Meriones erythrourus	603	2
Microtus socialis	529	17
Mus musculus	597	2
Ceratophyllus consimilis	3731	7
Ctenophthalmus secundus	1318	3
Gamasidae	5246	3

Total strains isolated = 34

Forty-seven of the 58 human attacks occurred in the Shamkhorskiy rayon, 8 in the Khanlarskiy rayon and 3 in the Kazakhskiy rayon. An overwhelming majority of the patients suffered from the anginose-bubonic form of the disease. It is considered that these tularemia cases were contracted by eating food, especially bread, which had been contaminated by tularemia-infected rodents. The following points concerning the origin of the epizootics are considered noteworthy: a) the territory of the three affected rayons bordered on uchastki in Armenia and the Georgian SSR in which natural tularemia foci were known to exist, and b) in recent years the alpine pastures of Armenia were used by Azerbaydzhan cattle breeders to pasture their sheep and goats. The herds were brought back into Azerbaydzhan with the onset of cold weather. It is important to note that the animals were washed and freed from ticks both before entering Armenia and before returning to Azerbaydzhan. In order to combat the outbreaks, more than 400,000 people were vaccinated with dry anti-tularemia vaccine. Other prophylactic measures included rat and insect extermination in the settlements, instruction of the local

medical personnel in the recognition, treatment and prevention of tularemia, and health education of the population. It is stated that the authors' observations in 1964 proved the existence of natural tularemia foci in Azerbaydzhan.

ASSOCIATION: Azerbaydzhanskaya protivochumnaya stantsiya Ministerstva zdravookhraneniya SSSR (Azerbaydzhan Anti-Plague Station of the USSR Ministry of Health) [JS]

VIRULENT SHIGELLA SELECTION

Andreyeva, Z. M., Ye. A. Yel'chinova, and N. S. Akatova. Selection of virulent Shigella variants. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 129-130.

To select variants for effective vaccine preparation, 100 strains of Shigella flexneri and Shigella sonnei isolated from patients between 1953 and 1956 were studied. Virulence was determined by keratoconjunctival testing in white mice. The oblique lighting method was used for selecting variants. Of 42 active strains found, 14 produced positive results in mice and guinea pigs. Oblique lighting selection on 1.5% yeast agar cultures distinguished 2 Shigella flexneri variants and 1 Shigella sonei variant. The variant cultures retained their properties for 6 months, though one of the Shigella flexneri variants was later found to be nonvirulent. The Shigella sonnei was highly virulent in the spherical stage in mice and less so in guinea pigs. The antigen properties of the virulent and nonvirulent Shigella flexneri strains were identical: both caused antibody production against O-antigen. They were also identical in polysaccharide titer. It was concluded that the oblique lighting method can be used to distinguish variants which differ in virulence and pathogenicity. In the Shigella flexneri variants, O-antigen content and virulence and pathogenicity were not parallel.

ASSOCIATION: Gosudarstvennyy kontrol'nyy institut meditsinskikh biologicheskikh preparatov im. Tarasevicha (State Control Institute of Medical Biological Preparations) [DP]

FUNGUS VINEYARD PESTS

Frolov, I. P. Fungus diseases of grapevines in Turkmenia. IN: Akademiya nauk Turkmenskoy SSR. Izvestiya. Seriya biologicheskikh nauk, no. 5, 1965, 29-35.

Fungus pests occurring in the important vineyard regions of Turkmenia were studied in 1963-1964. The principal fungus pathogens are listed in order of importance together with their distribution, conditions favorable to their occurrence, symptoms of infection, incubation periods, and the varieties of grapes most susceptible to each. The most important pest was Uncinula necator Burril., particularly in subtropical areas having 50% to 80% humidity and high temperatures. Second were the leaf spot diseases caused by Scolecotrichum vitiphyllum and Ragnihildiana rosleri. Both leaf spot diseases often afflicted the same leaf, especially in July when humidity is high, irrigation is excessive, and many weeds infest the vineyards. Mildew (Plasmopara viticola) is less important in the subtropical areas; optimal moisture conditions for it occur in the late summer and early fall. Anthracnosis (Gloeosporium ampelinum) is worse in wet years and during spring rains. Grape rot (Aspergillus niger, Penicillium glaucum, Rhizopus stolonifer) occurs throughout the region, especially if the vines are overirrigated during ripening. It is concluded that the main predisposing factor for these diseases is the poor agrotechnical conditions obtaining in the vineyards.

ASSOCIATION: Institut botaniki AN Turkmenskoy SSR (Botanical Institute, AN Turkmen SSR) [DP]

PHAGOCYTOSIS OF ANTHRAX BACILLI BY MACROPHAGES

Ginsburg, N. N., and T. N. Maslova. Quantitative determination of the phagocytosis in vitro of anthrax bacilli of different virulence by macrophages. Report II: Results of quantitative calculations. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 1, 1966, 125-130.

In the course of work with anthrax strains STI-1 and Tsenkovskiy 71/13, it was found that: 1) The intensity of phagocytosis did not differ when either normal or immune macrophages were used for the determinations; however, the immune cells impeded the growth of anthrax bacilli more effectively. 2) Macrophages were equally effective against avirulent and virulent anthrax bacilli.

ASSOCIATION: Institut epidemiologii i mikrobiologii im. Gamalei AMN SSSR (Gamaleya Institute of Epidemiology and Microbiology of the USSR Academy of Medical Sciences) [JS]

LIQUIDATION OF INFECTIOUS DISEASES

Gromashevskiy, L. V. A contribution to the problem of liquidating infectious diseases. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 12, 1965, 3-10.

The following definition of "liquidation of infectious diseases," requested by the 20th Assembly of the Academy of Medical Sciences USSR, was given: "Liquidation of an infectious disease" signifies the complete annihilation of the infectious disease in question in one country, a number of countries, or the entire world, accompanied by the complete eradication or disappearance of the causative organism of this disease within the corresponding territory and excluding every possibility of a recrudescence of the liquidated infection in any form (unless the causative organism is reintroduced from the outside). [JS]

INSECT PESTS IN VIRGIN LANDS

Gullyyev, A. A. Insect pests of agricultural crops in the Ted-Zhen Oasis. IN: Akademiya nauk Turkmenskoy SSR. Izvestiya. Seriya biologicheskikh nauk, no. 5, 1965, 71-75.

A study was made from 1961 to 1963 of insect pests infesting sovkhozes newly created from 1959 to 1961 by irrigation of virgin lands. The 460 species collected belonged to 17 orders and 60 families. The most numerous were Orthoptera (34 species), Lepidoptera (22), Colecptera (80), various proboscis bearing insects (17), Hemiptera (14), thrips (2), and ticks (1). The species representing actual or potential pests numbered 170. Of these, 27 species were major pests, 66 were minor pests, and 77 were potential or occasional pests. All pest species are identified. Considerable crop damage was caused by Chloridea obsoleta and Agrotis segetum, Laphygma (Caradrina) exigua, Cicadatra ochreata, and Cicadetta musiva. Aphids and Tetranychus telarius did serious damage to cotton crops. Chrysochares asiatica, ordinarily considered a cotton pest, was found only on the weed Cynanchum. The number of pests had increased considerably by the third year of the study. Many species found in the new lands were there seen in Turkmeniya for the first time: Berberocoetus squalidus, formerly known only in Iran, and a new species of Orthotylus, resembling Orthotylus nigricollis. It is concluded that entomofauna in virgin lands and adjacent areas draws both on local pests adjusting to the new conditions and on outside pests actively or passively entering the area.

ASSOCIATION: Institut pustyn' Akademii nauk Turkmenskoy SSR (Desert Institute, Academy of Sciences Turkmen SSR) [DP]

CLOSTRIDIUM PERFRINGENS TOXIN ENZYME ACTIVITY

Ispolatovskaya, M. V., L. Ya. Mikhaylovskaya, L. V. Klimacheva, V. A. Blagoveshchenskiy, and I. A. Larina. Formation and interaction of enzymes of the toxic Clostridium perfringens complex. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 61-65.

This continuation of earlier studies on Clostridium perfringens toxicogenesis investigates the dynamics of enzyme synthesis in Clostridium perfringens cell cultures and their maximal release of lecithinase, collagenase, hyaluronidase, and proteinase at different stages of their development. Enzymatic activity was studied in cellular suspensions and proteolysis was investigated by the Zuverkalov and UV methods. Lecithinase activity was found to be low in the cells but high in the toxin after only 3—9 hrs. Collagenase and hyaluronidase were absent from the toxin. Proteolytic activity was low in both cells and toxin. Lecithinase activity was not decreased by incubation of the toxin or of lecithinase alone with proteinase, though incubation with trypsin quickly reduced lecithinase activity to zero. The antilecithinase activity of cysteine was again confirmed. It was concluded that the proteolytic activity of native exo- and endoproteinases of Clostridium perfringens is very low. The highly active proteinases, concentrated by the ammonium sulfate method, neither destroyed the toxin nor reduced its lecithinase activity. Trypsin strongly inhibits both Clostridium perfringens toxin and purified lecithinase.

ASSOCIATION: Institut epidemiologii i mikrobiologii im. Gamaleya Akademii meditsinskikh nauk SSSR (Institute of Epidemiology and Microbiology im. Gamaley, Academy of Medical Sciences SSSR) [DP]

THE HOUSE-FLY (*MUSCA DOMESTICA*) AS A CARRIER OF FUNGI

Kamyszek, F. Medycyna Weterynaryjna-Lublin, v. 21, no. 10, 1965, 622-624.

The author investigated the possibility of house flies becoming a vector of fungus infections by keeping them on artificial nutrient media inoculated with a pathogenic dermatophyte (*Trichophyton acuminatum* [Sabouraud]) for various periods of time. The results of the experiment support the conclusion that flies may indeed transport pathogenic fungi. A direct proportionality was observed between the length of time the insects are exposed to the infected environment, and the number of infections carried.

ASSOCIATION: Wojewodzki Zaklad Higieny Weterynaryjnej, Poznan (Regional Institute of Veterinary Hygiene); Zaklad Mikologii Likarskiej, AM, Poznan (Institute of Medical Mycology, AM) [DP]

PROTECTIVE EFFECT OF NONVIRULENT PLAGUE MICROBES

Korobkov, G. G., and L. V. Vasyukhina. Effect of nonvirulent plague microbes on resistance to infection of an organism simultaneously injected with virulent plague microbes. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 140-141.

In 5 series of tests on mice and guinea pigs, various amounts of different nonvirulent plague strains isolated from foodstuffs and the Daur gopher were injected subcutaneously together with a single lethal dose of a virulent plague strain. It was found in all cases that the nonvirulent plague microbes (live and killed) have a marked protective effect when injected simultaneously with the virulent strain, whether they are injected at the same site as the virulent microbes or in different parts of the body. This protective effect may be related to the ability of nonvirulent plague strains to increase the phagocytic activity of the reticuloendothelial system.

ASSOCIATION: Irkutskiy nauchno-issledovatel'skiy protivochumnyy institut (Irkutsk Scientific Research Anti-Plague Institute) [DP]

SANITATION OF BRUCELLOSIS FOCI RESULTING FROM MIGRATION OF BRUCELLA MELITENSIS TO CATTLE

Landik, G. T. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 1, 1966, 64-69.

The author reaches the following conclusions: 1) The fact that there were more alimentary brucellosis infections than infections caused by contact in the Luganskaya Oblast' in the 1956-1963 period was due to the existence of 6 foci in which cattle were affected by Brucella melitensis. 2) It is possible for Brucella melitensis to be passed from cow to cow, retaining its virulence for man for a considerable period (26 months according to these observations). 3) Sanitation of brucellosis foci of the sheep-goat type among cattle necessarily involves the immediate slaughter of all the infected animals, sheep,

goats, and cattle. The manual on combatting brucellosis in domestic animals now in use must be supplemented with this provision.

ASSOCIATION: Luganskaya oblastnaya sanitarno-epidemiologicheskaya stantsiya (Sanitary-Epidemiological Station of the Luganskaya Oblast') [JS]

EFFECT OF GROWTH STIMULANTS ON WHEAT RUST SPORE GERMINATION

Rassadina, E. G. Biology of germination of the uredospore causative agent of wheat stem rust. Botanicheskiy zhurnal, v. 50, no. 11, 1965, 1603-1604.

The effect of growth stimulants on the germination of Puccinia graminis uredospores in a sensitive wheat variety was studied. The following stimulants were effective: a 0.01% concentration of benzimidazole, a 0.01% solution of thionine, and a 0.03% concentration of multivitamins (B_1, B_2, and C). Germination was doubled, apparently due to faster spore maturation. Other factors favoring saturation and germination were cooling to 10—12C and temperatures fluctuating between 22C and 10—12C. A constant temperature of 22C gave poorer results. The effect of the stimulants decreased after spore maturation.

ASSOCIATION: Vsesoyuznyy institut zashchity rasteniy, Leningrad (All-Union Institute of Plant Protection) [DP]

PROPHYLAXIS OF HEMORRHAGIC FEVER WITH A RENAL SYNDROME IN A PIONEER CAMP

Roshchupkin, V. I., and V. I. Yermolinskiy. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 1, 1966, 134-138.

Extensive rat and insect extermination prevented the reappearance of hemorrhagic fever in a Pioneer camp where an outbreak of the disease had occurred previously (1960). Bait containing 4% zinc phosphide and 1% DDT was particularly effective in the extermination.

ASSOCIATION: Kuybyshevskiy meditsinskiy institut, Vrachebno-sanitarnaya sluzhba Kuybyshevskoy zheleznoy dorogi (Kuybyshev Medical Institute, Medical-Sanitary Service of the Kuybyshev Railway) [JS]

A METHOD OF ISOLATING ANTHRAX BACILLI FROM THE SOIL

Shapovalova, M. F. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 1, 1966, 144-146.

A method of isolating Bacillus anthracis from soil is described. One hundred to two hundred grams of the soil to be tested was thoroughly mixed with a double volume of normal saline. After the mixture had been left standing for 1—2 hr, 3—4 ml of the supernatant next to the sediment was removed and divided into two equal parts using a syringe or a Pasteur pipette. One part of the fluid was used to make cultures on meat-peptone agar and to infect white mice and guinea pigs. The other half of the test material was heated to 70C and treated in an identical manner. After 18—24 hr the cultures were examined and anthrax-suspicious colonies were subcultivated. Animals infected with a suspension of the subculture were observed for 10 days. Smears and cultures were prepared from the affected internal organs of these animals and extracts of the organs were used for Ascoli precipitation tests. From 87 soil specimens examined in this manner, 8 positive results were obtained with unheated samples (7 in animal experiments and 1 by culturing). Tests made with the same samples according to Dold's method gave negative results.

ASSOCIATION: Krasnodarskaya krayevaya sanitarno-epidemiologicheskaya stantsiya (Sanitary-Epidemiological Station of the Krasnodar Kray)

[JS]

CLOSTRIDIUM PERFRINGENS AS HUMAN MICROFLORA

Sidorenko, G. I. Isolation and identification of Clostridium perfringens from the intestinal contents of healthy individuals. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 29-33.

While Clostridium perfringens may sometimes be considered normal intestinal microflora, types A, C, F, and perhaps D may cause intestinal disturbances. A comparative study is made of the occurrence, identification, properties, variability, and relationship to diet of Clostridium perfringens accompanied and unaccompanied by adverse intestinal effect. A total of 680 fecal specimens from healthy adults and children in Moscow and southern Kazakhstan were cultured on heated medium to eliminate other bacterial matter, then subjected to bacteriological analysis. Incidence of Clostridium perfringens in

healthy individuals was 53.1% in the Moscow region and 94% in the Kazakhstan region. Two-thirds of the 920 strains found were non-toxic or had low toxicity, and one-third were of type A. Types B, C, and D were rare and were found only in association with reservoirs outside the human intestine such as animals, soil, or food products. The D type occurred in the feces of healthy persons, indicating that this type can cause "food poisoning" only if other adverse factors (illness, surgery) are present. Twelve percent of the A type strains had spores resistant to boiling for one hour or more; the other types were destroyed by boiling. Type A may thus be a potential pathogen under suitable conditions.

ASSOCIATION: II Moskovskiy meditsinskiy institut im. N. I. Pirogova (Second Moscow Medical Institute) [DP]

LIVE Q FEVER VACCINE

Sterkhova, A. N. Immunization of man with the M-44 live Q fever vaccine. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 12, 1965, 48-52.

The following conclusions were reached in the course of work with live Q fever vaccine prepared at the Gamaleya Institute under the direction of Zdrodovskiy: 1) Live M-44 vaccine administered to 495 people in a dose of 10^{-4} caused slight reactions and was immunologically effective: complement fixation tests (with the sera of those vaccinated) gave a positive result in 82.3±4% of the cases with a mean titer of 1:26.6. 2) Vaccination of people who had complement-fixing antibodies in their sera before immunization did not cause allergic reactions. Thus the live M-44 Q fever vaccine may be administered without preliminary serological investigations.

ASSOCIATION: Azerbaydzhanskiy institut virusologii, mikrobiologii i gigiyeny im. Musabekova (Azerbaydzhan Institute of Virology, Microbiology and Hygiene) [JS]

ORNITHOSIS IN ODESSA

Tkachuk, V. V., et al. Study of the spread of ornithosis infection in Odessa. Vrachebnoye delo, no. 1, 1966, 94-96.

The results of the study were summarized as follows: 1) The presence of ornithosis among the human population of Odessa was observed for the first time. 2) Of 214 patients presumed to be suffering from pneumonia, tuberculosis, influenza, or catarrh of the upper respiratory tract and suspected of paratyphoid, the presence of ornithosis was established in 27 (12.6%). 3) When there are febrile affections with an unclear etiology, especially if pneumonic foci are present, it is very important to examine the patients for ornithosis.

ASSOCIATION: Nauchno-issledovatel'skiy institut epidemiologii i mikrobiologii imeni I. I. Mechnikova, Otdeleniye infektsionnykh bolezney meditsinskogo instituta, Odessa (Scientific Research Institute of Epidemiology and Microbiology, Department of Infectious Diseases of the Medical Institute, Odessa) [JS]

AGGLUTINATION INHIBITION TEST FOR BRUCELLOSIS ANTIGEN

Uraleva, V. S. Agglutination inhibition reaction and the feasibility of using it for brucellosis antigen detection. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 48-52.

Various dilutions of brucellin, brucellysate, brucellohydrolysate, various fractions of Brucella abortus 19-BA, the supernatant liquid from a suspension of 22 strains of all 3 types killed by boiling, formaldehyde, acetone, or trichloracetic acid, and the supernatant liquid of live brucella suspensions, were tested with agglutinating brucellosis serum (1:2 or 1:4 titer) and the corpuscular antigen (500 million cells). The test mixtures were incubated for 18—24 hr at 37C and then examined for the agglutination inhibition reaction. Nonagglutinating brucella types and fractions gave negative results. Positive results were of low sensitivity and not consistently reproducible. The best means of obtaining soluble antibodies was to boil the cellular suspension in a water bath for 30 min. Specimens mixed with other microbes were also tested to determine the specificity of the reaction for brucella. Specificity was found to be impaired only by typhus, paratyphoid, and dysentery contaminants. While the test is not yet sufficiently sensitive for determination of brucella and brucella antigens in naturally infected objects, it may be useful for determining the agglutinability of brucella preparations and for study of the antigen structure of various strains and types.

ASSOCIATION: Rostovskiy-na-Donu nauchno-issledovatel'skiy protivochumnyy institut (Rostov-on-Don Scientific Research Anti-Plague Institute) [DP]

PASSIVE SENSITIZATION TO BRUCELLA ALLERGEN

Uvarov, A. A., and V. I. Sadovnikov. Passive sensitization of the body to brucella allergen. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 79-61.

Sensitivity to brucella allergen was investigated by the little used method of passive sensitization. The blood of guinea pigs sensitized a month earlier with a subcutaneously administered live vaccinal strain of brucella was used for passive sensitization. Administration of this blood (2 ml) to a group of test animals followed in 24 hr by brucellin (0.1 ml) produced a local reaction. The reaction proved specific for brucella in all test animals. Both whole blood and diluted blood were used; in both cases, sensitivity persisted from 12 days to 8 weeks. Sensitization lasting at least 3 days also occurred in 2 guinea pigs receiving citrated human blood from patients with acute and chronic brucellosis. The mechanism of passive allergy formation was studied by administering whole blood, plasma, or cellular blood elements to 3 test groups. All 3 groups of animals reacted positively. but the reaction was less pronounced in the group receiving the cellular blood constituents. Infectious allergy can thus be passively conferred on animals not previously sensitized with brucella allergen by injecting blood from actively sensitized animals, after which subcutaneous injection of plasma will produce local reactions.

ASSOCIATION: Orenburgskiy meditsinskiy institute (Orenburg Medical Institute) [DP]

BLOOD OPSONIN DETERMINATION IN BRUCELLOSIS

Vershilova, P. A., M. I. Charysheva, and E. B. Chelyadinova. Quantitative determination of blood opsonins in brucella infection. Zhurnal mikrobiologii, epidemiologii i immunobiologii, no. 11, 1965, 57-61.

Opsonin phagocytic activity was determined at various stages in the development of Brucella melitensis infections in guinea pigs as determined by bacteriological and histological examination. The animals were infected with a dose of 25—28 virulent microbes and killed in groups of 5 after 6 to 12 hr, 1 to 15 days, or 1 to 12 months. Blood opsonins were determined by Victor's method in undiluted serum and in serum diluted up to 1:100,000 with Kreb's solution. In healthy animals the opsonin titer was less than 1 for undiluted serum. In the early infective stages, when brucella can be found only in the regional lymph nodes and no pronounced morphological reaction is seen in the reticuloendothelial system, the opsonin titer was less than 1. During the period of generalized infection from the 15th day

to 3—4 months, 10 to 100 opsonin units were found in the serum. After 6 to 12 months, as the organism is eliminating the brucella though pathological changes persist, opsonin level remained high. It is concluded that quantitative opsonin determination can be used in combination with other investigation methods for studying brucellosis and the dynamics of the vaccination and immunization process in humans and animals.

ASSOCIATION: Institut epidemiologii i mikrobiologii im. Gamaleya Akademii meditsinskikh nauk SSSR (Institute of Epidemiology and Microbiology im. Gamaley, Academy of Medical Sciences SSSR) [DP]

MIGRATING FLEAS IN TURKMENIAN PLAGUE RESERVOIRS

Zagniborodova, Ye. N. Epizootological significance of migrating fleas of the great gerbil in Turkmeniya. IN: Akademiya nauk Turkmenskoy SSR. Izvestiya. Seriya biologicheskikh nauk, no. 5, 65-70.

Observation was maintained from 1953 to 1958 of the migrations of the fleas infecting the great gerbil (Rhombomys opimus) in Turkmeniya, with the purpose of determining the nature of flea migration and the number of plague carriers. Fleas were collected at burrow entrances regularly throughout the day. The fleas appear to migrate to the surface of the ground primarily when there is a shortage of hosts in the burrows. Under the conditions obtaining in Turkmeniya, fleas may migrate through highly diverse ecological regions, independently of the epizootic importance of the territory. The population composition of the migrating fleas was the same as that of fleas on rodent hosts: during the warm season, Xenopsylla predominates; in winter, Coptopsylla, Ceratophyllus, Rhadinopsylla, and Stenoponia somewhat outnumber Xenopsylla. More intensive migration was observed in spring and fall, and occasionally in summer. The fleas also migrate in winter if the number of gerbils is greatly reduced by severe plague epizootics. The time of day in which migration occurs varies with the season: in spring, it was the first part of the day; in summer, the evening; in fall, the first part of the day; and in winter, midday. The dangerous nature of flea migration during epizootics is stressed.

ASSOCIATION: Turkmenskaya protivochumnaya stantsiya (Turkmenian Anti-Plague Station) [DP]

ORNITHOSIS IN KIEV AND ZAPOROZH'YE

Zatulevskiy, B. G., et al. Clinical and laboratory observations of ornithosis in Kiev and Zaporozh'ye. Vrachebnoye delo, no. 1, 1966, 107-110.

For the first time the presence of ornithosis in the cities of Kiev and Zaporozh'ye was proved. Diagnosis was made with complement-fixation tests and clinical and epidemiological findings. Of the 20 cases thus detected, 17 had features of an atypical pneumonia. The time of appearance of complement-fixing antibodies in the patients' sera and the height of the titers varied considerably. In addition to maximal titers of 1:640 there were titers of only 1:40. Serological examinations of 640 patients showed 38 with low titers (1:10—1:20) in the complement-fixation tests. It is possible that these people had previously suffered from ornithosis. Epidemiological investigations usually pointed to pigeons as the source of infection.

ASSOCIATION: Kiyevskiy nauchno-issledovatel'skiy institut epidemiologii i mikrobiologii, Kiyevskiy meditsinskiy institut, Zaporozh'ye institut usovershenstvovaniya vrachey (Kiev Scientific Research Institute of Epidemiology and Microbiology, Kiev Medical Institute, Zaporozh'ye Institute for the Postgraduate Training of Physicians) [JS]

SCALES OF EDDY MOTIONS IN THE ATMOSPHERE DURING INTENSE TURBULENT HEAT EXCHANGE

Benchkovskaya, T. V., and V. G. Nikitin. Issledovaniye teplocobmena v atmosfere. Sbornik (Investigation of heat exchange in the atmosphere. Collection of articles), Moskva, Izd-vo "Nauka," 1964, 86-90. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 12, 1964, 12B349.)

Starting with a simplified representation of air-particle velocity as a sum of the velocity of horizontal transfer and the velocity of circular motion c, the authors derive the expression $u = -c \sin \alpha + u$ (where α and c are the phase and velocity of circular motion) for the components of velocity along the wind gradient u_g. The values of c and u_g can be determined by measuring the extremal values of the velocity u. If the distance d between the two maximum velocities is also known, the distance r of a particle from the center of revolution will equal $d\sigma/r\pi u_g$. The authors assume that the statistical mean value of r equals half the radius of the eddy R. This reasoning is used to estimate the dimensions of eddies in the atmosphere at a height of 300—400 m by observations of the motion of pilot balloons in a state of equilibrium. The positions of the pilot balloons were determined every 10 seconds by theodolites and phototheodolites. Observations were conducted over the Kuban Steppe in June and July 1960 on days when there was convection and the ground-level wind velocities did not exceed 5—6 m/sec. The mean value of R was found to be 10 m. The scales of disturbances in the atmosphere were also estimated by observations of the periods of oscillations and changes in the altitude of captive balloons with a known lifting force. In this case, a value of R of 10—15 m was obtained for short-period oscillations and 100—200 m for long-period oscillations. [EO]

STUDY OF THE DISPERSION RATE OF MODELED FOGS AND CHANGES IN THEIR MICROPHYSICAL CHARACTERISTICS

Gaydan, E. N., N. M. Kokhanovich, V. G. Korachevskiy, and V. S. Shapovalova. Problemy fiziki atmosfery. Sbornik vyp. 2 (Problems of the Physics of the Atmosphere. Collection of articles, no. 2). Leningrad, Leningradskiy Universitet, 1963, 172-186. (RAKH FRO": Referativnyy zhurnal. Geofizika, no. 12, 1964, 12B560.)

The dispersion of artificial fogs subjected to the action of atomized solutions of various chemical compounds is investigated. The experiments were conducted by Leningrad and Odessa State Universities in fog chambers of different sizes (1 and 3 m^3, respectively), using different methods for measuring and recording fog densities. The G. M. Zabrodskiy device for measuring cloud transparency was adapted to measure fog transparency in the Leningrad University fog chamber. The curve of transparency changes was recorded on an EPP-09 electronic potentiometer. Changes in the density of fogs were measured in the Odessa University chamber by the sedimentation method with scales having a sensitivity of 10^{-6} g. Fogs were created in both chambers by a pulverization method. In the Leningrad University chamber, the initial water content was about 5 g/m^3. Different parameters of the fog were measured directly and were also obtained by calculations. Values of visibility obtained by the following methods were compared: 1) by the transparency factor; 2) by the water-vapor content determined experimentally by the Zaytsev instrument and by the average radius of fog droplets (by microphotographic sampling of droplets); 3) by water content and average radius determined from the sedimentation curve. The action of 20 different surfactants and hygroscopic substances on fogs was tested in the chambers in about 400 experiments. Results are presented for tests of aqueous solutions of five of these substances (concentrations from 0.001 to 5% by volume). Changes in the water content and the visibility in the chambers when the substances were sprayed were compared with the values of these characteristics with natural fog dispersion. The curves of changes in transparency indicated that the maximum effect was obtained by spraying a 1% sodium chloride solution.

[BO]

INSTRUMENT FOR MEASURING THE MICROSTRUCTURE OF CLOUDS AND FOGS BY THE METHOD OF SMALL ANGLES

Golikov, V. I. Glavnaya geofizicheskaya observatoriya, Trudy, no. 152, 1964, 142-159. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 9, 1964, 9B87.)

The selection of parameters for the optical system of the instrument and its electrical photometer is discussed. A description is given of a model of the instrument built at the Main Geophysical Observatory. [EO]

VERTICAL PROFILE OF THE WIND IN THE ATMOSPHERIC BOUNDARY LAYER

Klyuchnikova, L. A., D. L. Laykhtman, and G. Kh. Tseytin. The problem of calculating the vertical profile of the wind in the atmospheric boundary layer. Glavnaya geofizicheskaya observatoriya. Fizika pogranichnogo sloya atmosfery (Physics of the atmospheric boundary layer). Leningrad, 1965, 3-37. (ITS: Trudy, no. 167, 1965.)

The theoretical model of the structure of the atmospheric boundary layer developed as a function of external parameters by Laykhtman, Orlenko, Utina, and Tseytin has been elaborated. A method is described by which the principal meteorological parameters (temperature of the air and soil, heat transfer in the soil, atmospheric humidity, height of boundary layer, etc.) and the vertical profile of meteorological elements in the boundary layer can be determined for use in the preparation of a precise model for the profile of the coefficient of vertical turbulent diffusion k(z). Here it is assumed that k(z), after attaining a maximum at a certain height, subsequently decreases with height. The procedure for calculating the vertical profile of the wind is described in detail.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory) [ER]

IMPROVEMENT IN THE PROCEDURE FOR CALCULATING THE AREA OF PRECIPITATION OF POLLUTANTS IN THE SURFACE BOUNDARY LAYER OF THE ATMOSPHERE

Kovacheva, N. Bolgarska akademiya na naukite. Geofizicheski institut. Izvestiya, v. 5, no.1, 1964, 27-31. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 2, 1964, 2B360.)

A procedure is considered for calculating the coordinates of the site of deposition of pollutants ejected by some source at a certain height above the ground surface when there are wind currents. A formula giving the wind profile in the surface boundary layer of the atmosphere and a formula for determining the dispersion of particles suspended in the air, obtained from solving the diffusion equation, are presented. The results of calculations with these formulas are compared with those of a simplified formula for Stokes particles. When the stratification of the surface boundary layer is unstable, the simplified formula can lead to obviously excessively high results. The results from the calculations are given in tables which show that the difference in the coordinates x_m and x determined with the aid of the simplified and the more exact formula, respectively, increases with increases in the mean wind velocity $\bar{U}$ with a fixed precipitation velocity v_s, and decreases with increased v_s for a given value of U. The table of $x - x_m$ as a function of $\bar{U}$ and v_s precisely defines the area of applicability of both computational formulas.

[EO]

THE ENERGY BALANCE OF THE SURFACE BOUNDARY LAYERS OF THE ATMOSPHERE AT NIGHT

Kozma, Ferenc. Idojaras, v. 68, no. 1, 1964, 33-41. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 2, 1965, 2B198.)

The previously published explanation of the nighttime distribution of temperatures determined by radiation is confirmed in this article by heat-balance computations. These computations reflect the role of two of the main factors of heat balance—exchange and radiation—in the ground-level surface cooling of the air at night. Starting with the heat-balance equations, the author constructs a model of the temperature distribution which provides

evidence of the possibility of a rise in the minimum temperature from the ground surface. The influence of the third factor, heat flux in the soil, is detected indirectly, with the aid of the soil temperature gradient. The regressive connection between the temperature gradients in the soil and the air shows that the heat flux in the soil also plays an important role in forming temperature minima above the ground surface. [EO]

MICROELEMENTS IN THE SOILS AND VEGETATION OF THE GYPSUM DESERT AND SUBMONTANE SEMIDESERT AREAS OF WESTERN UZBEKISTAN

Kozyreva, G. F., and M. A. Rish. Concentration of microelements in the soils and vegetation of the gypsum desert and submontane semidesert of western Uzbekistan. Mikroelementy v sel'skom khozyaystve. Sbornik (Microelements in agriculture; collection of articles). Tashkent, "Nauka," 1965, 227-231. (TAKEN FROM: Referativnyy zhurnal. Pochvovedeniye i agrokhimiya, 1966, no. 1, 21, 1.57.152.)

Measurements were made of the concentration of Mn, Cu, Zn, Co, Mo, I, and B in gypsum desert and submontane semidesert soils of western Kazakhstan. Rather substantial amounts of Cu, Zn, and Co were found in the upper horizons of the sierozems. However, the distribution of the microelements along the profile is uneven: Co, Cu, and Zn are partially carried out of the sod horizon and accumulated in the A_2 horizon, and Mn and B are found in greater quantities in the upper A_1 horizon. The soils of the Dzhamskaya Steppe are B enriched. The amount of Mo and I increases with depth. The average amounts of microelements (in mg/kg) in the vegetation of the submontane semidesert are Mn- 94, Zn- 16.5, Cu- 5.7, Mo- 2.2, Co- 0.38, and I- 0.53. In comparison with typical sierozems, the light sierozems and gray-brown soils of the wormwood-ephemer deserts of Uzbekistan are $1\frac{1}{2}$—2 times poorer in Mn, Zn, Cu, Co, and B; however, the amount of Mo and I is approximately the same. The desert soils are characterized by a leaching of Cu, Co, Zn, and B. A relationship was found between the accumulation of microelements and an increase in the amount of Fe. [SP]

WASHOUT OF RADIOACTIVE DUST FROM THE ATMOSPHERE

Makhon'ko, K. P. Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 4, 1964, 596-603. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 11, 1964, 11B107.)

The specific artificial radioactivity of precipitation is made up of two parts—that acquired in a cloud (C_1) and that acquired when drops fall from a cloud to earth (C_2). Because of radioactive dust washout from the subcloud layer, C_2 decreases with time. The decrease in C_1 with time during showers is caused by two factors: 1) decrease in the radioactivity concentration in the air of the cloud, although this decrease in cumulus clouds is reproduced by rapidly rising air; and 2) the short time that newly formed drops remain in the cloud. The second mechanism of attenuation turns out to be unimportant in stratus clouds, since drops remain in these clouds an average of only two hours. Formulas for the relative decrease in the specific concentration of radioactivity in precipitation during rains are derived assuming that processes are stationary and a condition of particle and drop monodispersivity. Because the formulas include parameters which are difficult to determine, in studying time-wise changes in the concentration of radioactivity in rains and radioactive dust in the air, an estimate can be made of the value of a combination of some of these parameters because the equations become semi-empirical:

$$\frac{C}{q_0} = \left(\frac{C_0}{q_0}\right)_i e^{-b_i t} + \frac{H}{I}\sigma e^{-\sigma t} \quad (i = 1, 2).$$

Here C is the specific activity of the precipitation, C_0 its initial value, q_0 the concentration of radioactive dust in the air, b_i an empirical parameter, t time, H the height of the clouds, I the intensity of the rain, and σ the washout parameter. A computation of changes in the ratio C_2/C_1 with time shows that the rule of washout from the layer below the cloud increases as the rain continues, and the heavier the rain, the greater this increase is. For rains of average duration, the mean value of C_2/C_1 is 10%, i.e., an average of only 10% of radioactivity is removed by falling precipitation; the remaining 90% is captured by the drops in the cloud. It was found at the same time that only 50% of fallout on the ground was removed by precipitation; the remainder fell in the form of dry precipitates. This is explained by the fact that only radioactive particles of a completely defined spectrum

of sizes are actively removed from the atmosphere by precipitation. These particles become ever scarcer as the atmosphere clears during the moratorium period; thus, the role of washout by precipitation decreases in the process of self-cleansing of the atmosphere. [EO]

MICROCLIMATIC STATION FOR MEASUREMENTS IN GRASSLANDS

Mushkin, I. G. Vsesoyuznoye nauchnoye meteorologicheskoye soveshchaniye. Trudy, v. 3, 1963, 58-66. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 12, 1964, 12B64.)

Sensors used to measure wind velocity, air temperature, and humidity in microclimatic investigations of grasslands, and methods used to calculate data obtained with them, are described. Wind velocities are determined with a thermo-anemometer. A short description is given of the construction and design of the instrument. Thermistors are included in the differential bridge circuit. The sensors are heated by the measuring current, one of the sensors receiving more heat than the other because of a smaller heat-transfer surface and higher electrical resistance. The difference in temperatures of the sensors indicates the measured wind velocity. The circuit parameters are calculated on the basis of the bridge input signal being independent of the ambient temperature. A functional amplifier is connected to the measuring diagonal of the bridge, which makes it possible to linearize the scale of the instrument. Air temperatures and humidity are measured by means of a psychrometer with low speed of air past the bulb, and MT54-type transistorized temperature sensors installed inside porous ceramic tubes. One of the tubes is inserted in a tank filled with water. Temperatures are measured with a transistorized amplifier designed for a temperature interval of 0—40C. A procedure is proposed for designing psychrometer sensors which takes into account their geometrical dimensions and transfer of heat and moisture with environment. The expressions obtained for the psychrometer factor take into account heating of the sensors by external radiation. The psychrometer with low speed of air described here ensures absolute humidity measurements with an accuracy of 5% when the aspiration velocity varies from 5 to 3 m/sec.

ASSOCIATION: Agrofizicheskiy institut (Agrophysical Institute) [EO]

ADVECTION FOG FORMATION AND TRANSFORMATION

Nadezhina, Ye. D., and V. V. Simonov. The formation and transformation of advection fogs. Glavnaya geofizicheskaya observatoriya. Fizika pogranichnogo sloya atmosfery (Physics of the atmospheric boundary layer). Leningrad, 1965, 59-66. (ITC: Trudy, no. 167, 1965.)

The authors utilize the theory of advection fog formation published in 1956 by L. A. Klyuchnikova and M. P. Timofeyev (Trudy Glav. geofiz. observ., no. 60 and Izv. Akad. nauk SSSR, ser. geofiz., no. 6) to investigate its application for general forecasting purposes. Formulas are derived to express the following conditions: 1) turbulent mixing in the presence of moisture-phase transformations in heat-flux and moisture-transfer equations, 2) radiant-heat fluxes, 3) use of the heat-balance equation as the boundary condition at the underlying surface, 4) moisture-transfer equation taking into account not only fog formation but also its transformation when the underlying surface is nonhomogeneous, and 5) investigation of the soil heat-conductivity equation, taking nonstationary processes into account. Examples are given to illustrate the calculation of some of these conditions. These formulas and calculation methods are described as making it possible to forecast the formation and dissipation of advection fogs regardless of their nature.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory) [ER]

HYDROLOGICAL STUDIES OF NORTH VIETNAM

Nadyaev, V. S. Sbornik rabot po gidrologii, no. 5, 1965, 98-110.

An approximate method of determining the intensity of rainfall and coefficient of runoff applicable to town and village conditions in North Vietnam is described. An attempt is made to estimate the areal distribution of rainfall on the basis of data obtained in Vietnam.

ASSOCIATION: Giprokommunvodokanal [DM]

CALCULATION OF TURBULENT ENERGY-BALANCE COMPONENTS

Orlenko, L. R. Calculation of turbulent energy-balance components from experimental data. Glavnaya geofizicheskaya observatoriya. Fizika pogranichnogo sloya atmosfery (Physics of the atmospheric boundary layer). Leningrad, 1965, 73-79. (ITS: Trudy, no. 167, 1965.)

The author presents formulas which can be used to determine the components of turbulent energy balance and the dissipation parameter δ which characterize the ratio of turbulent energy dissipated by heat to that caused by the energy of mean motion. Determinations of δ are made by two methods, one using data on the distribution in the atmospheric boundary layer of meteorological elements which is based on the turbulent energy-balance equation, and the other which is based on experimental data used to obtain a general solution of the problem of boundary layer structure.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory) [ER]

A METHOD FOR MEASURING THE TIME-WISE AND SPATIAL STRUCTURE OF AIRFLOW

Panin, B. D. Glavnaya geofizicheskaya observatoriya. Trudy, no. 150, 1964, 102-106. (TAKEN FROM: Referativnyy zhurnal geofizika, no. 12, 1964, 12B347.)

An instrument for measuring differences in characteristic pulsations in the wind direction (with frequencies of 2×10^{-1} to 2×10^{-3} sec^{-1}) at two points in space is described. The basic elements of the instrument are specially designed synchronized wind vanes and a recording system which permit registration of changes in the wind direction simultaneously at several points in space. When the instrument was tested, the wind vanes were set up 5 to 320 m apart. The recorded results were used to calculate the spatial structural and correlational functions, and the improved data were used to obtain calculations of the time-wise structural functions. Because of defects in the extension mechanism, the data for spatial and time-wise structural functions include large errors, but, nevertheless,

they yield logical results. The time required for recording the readings from pairs of sensors increases with distance between the sensors so that measuring one spatial structural function takes about 4 hr. [EO]

CARTOGRAPHIC REPRESENTATION OF SALINE AREAS IN CENTRAL ASIA AND KAZAKHSTAN

Polyakov, V. G. Representation of land areas of Central Asia and Kazakhstan on agricultural maps. Geodeziya i kartografiya, 1965, no. 3, 46-51. (TAKEN FROM: Referativnyy Zhurnal. Geodeziya, 1965, no. 10, 17, abstract 10.52.151.)

A study is made of the cartographic representation of saline soils and soils with different textures. Legends are given for the symbols to be used in identifying different areas on 1:25,000 maps. The following classification of saline lands is proposed: 1) impassable solonchaks (wet and swollen); 2) passable solonchaks; 3) solonchaks in farming and cultivated areas; 4) highly alkaline soils; 5) subsaline soils. [SP]

THE DISTRIBUTION OF CONDENSATION NUCLEI OVER THE UKRAINIAN METEOROLOGICAL TEST AREA

Seleznova, Ye. S. Glavnaya geofizicheskaya observatoriya. Trudy, no. 154, 1964, 3-10. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 9, 1964, 9B156.)

Results are presented of observations of the distribution of condensation nuclei over the experimental meteorological test area of the Ukrainian Scientific Research Hydrometeorological Institute, and changes in the concentration of

nuclei with height in the warm and cold seasons of the year under various weather conditions are discussed. The results from several horizontal airplane flights are presented. The effects of industrial sources on the concentration of condensation nuclei at various heights are cited. [EO]

MICROCLIMATIC EVALUATION OF AN AREA DURING CERTAIN TYPES OF WEATHER

Shakhnovich, A. V. Ukrainskiy nauchno-issledovatel'skiy gidrometeorologicheskiy institut. Trudy, no. 45, 1964, 83-96. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 12, 1964, 12B510.)

Until recently, the processing of microclimatic observations and the reduction to stable, multiyear characteristics was carried out in the same way as climatic data processing. In this case, large microclimatic differences appearing only under certain weather conditions were artificially smoothed. However, it is precisely those days, not observed often, but with a pronounced area of microclimatic distribution of air and soil temperatures, humidity, and wind velocities, which are of decisive importance in determining crop-growth periods. The author believes that it is necessary to reject the old method of processing microclimatic observations and to turn to differentiated processing of microclimatic observations taking types of weather into account, i.e., essentially taking into consideration definite combinations of cloudiness and winds. Using as a basic data from microclimatic investigations of the Ukrainian Scientific Research Hydrometeorological Institute over a 10-year period, the author selected microclimatic differences which were characteristic of certain weather conditions and pertinent to an open plain. Tables of microclimatic corrections (differences) are given for relief, bodies of water, and vegetation under the following weather conditions: 1) early morning hours when the air temperature reaches a minimum under clear skies or a cloud cover of less than 4, with calm prevailing in low-lying areas; 2) daytime (1300—1400 hr) with clear weather or a cloud cover of less than 5 and light winds (1—3 m/sec). In order to determine the absolute values of the temperature and wind for specific farming areas, it is necessary to introduce a correction, taken from the table proposed by the author, to the climato-

logical data of the nearest meteorological station. The difference between the ordinary climatic indices and the complex climatic data computed by types of weather is shown. Complex characteristics are calculated for minimum and for daytime temperatures for several stations in the Ukraine and composite climatic maps of the Ukraine are compiled from these data. The ordinary mean climatic data taken from Ye. S. Rosova's maps are also plotted on these maps. Graphs were constructed showing the relationship between complex climatic characteristics and mean monthly temperatures taken from a climatic handbook. [EO]

VERTICAL DISTRIBUTION OF RADON IN THE ATMOSPHERIC BOUNDARY LAYER (0—300 m) IN CONNECTION WITH CHANGES IN METEOROLOGICAL CONDITIONS

Sisigina, T. I. Akademiya nauk SSSR. Izvestiya, Seriya geofizicheskaya, no. 3, 1964, 414-421. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 10, 1964, 10B62.)

The results are presented of measurements of radon concentrations made from a meteorological tower under different weather conditions and various conditions to analyze atmospheric mixing. The radon concentration over a given underlying surface depends to a large extent on exhalation conditions since, in a period of persistent dry weather, the radon concentration is two or three times higher than on rainy days, even with the same mixing conditions. The maximum vertical gradient of radon concentration appears during the development of temperature inversions. Values of the coefficient of turbulent mixing calculated from data on the vertical distribution of radon agree adequately with the values of the coefficient obtained by other methods. [EO]

COMPARATIVE WIND VELOCITY AND DIRECTION CHARACTERISTICS AS DETERMINED BY INSTRUMENTS WITH DIFFERENT AVERAGING INTERVALS

Smirnov, S. A. Leningrad. Glavnaya geofizicheskaya observatoriya. Metodika meteorologicheskikh nablyudeniy i obrabotki (Methods of meteorological observation and processing observation data), 135-148. (ITS: Trudy, no. 174, 1965.)

Confronted with the recommendation of the World Meteorological Organization that a 10-min interval be used for averaging wind velocity, the author made a study of the methods and instruments used in the USSR to measure wind velocity and direction. Wind vanes designed for 2-min averaging intervals were compared with M-12, M-63, M-64 anemovane-type instruments having 10-min averaging intervals at stations located in various types of regions with various degrees of shelter. Comparisons were made of the following data observed with the two types of instruments: the mean monthly values of wind velocity and direction, the diurnal changes in wind velocity, the number of calm periods, the number of cases with different gradations of wind velocity (0—1, 2—5, 6—10, 11—15, 16—28, and 29 m/sec), and the correlation coefficient. Meteorological stations supplying data for the study were divided into 3 groups by degrees of shelter: exposed stations—Poti (Georgia), Chiganak (Kazakhstan), and Vilsandi (Estonia); partly exposed stations—Dzharkent (Kazakhstan), Boz-Su (Uzbekistan), Ristna (Estonia), Gor'kiy, Myza (Upper Volga), and Vysokaya Dubrova (Urals); sheltered stations—Alma-Ata (Kazakhstan) and Arkhangelsk (Arctic).

For individual cases the structural function was investigated as a wind-gustiness characteristic. The well-defined relationship found to exist between instrument readings and different averaging intervals became less distinct with lighter winds and lessening variability. However, poor-quality observations and local instrumental installations worsened the relationships and were not adequate for combining stations by any criteria to derive unified transfer coefficients for station groups. The wind vanes were found to give results of wind-velocity and direction measurement, adequate for solving a number of practical meteorological problems. No seasonal differences in wind characteristics were found to exist, and the effects of glaze and similar phenomena were negligible. Graphic presentations of some of the results of the study follow.

Table 1. Mean wind velocity (m/sec), according to anemovane and wind vane

Stations	Instrument	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Yr.	No. of calms
Poti	A	3,0	3,8	4,1	3,3	2,7	3,0	2,6	2,4	2,9	3,0	3,0	3,8	3,1	57
	Φ	3,2	4,8	5,3	3,7	3,1	3,4	3,0	2,8	3,7	3,6	3,6	4,9	3,8	39
Chiganak	A	—	3,0	3,3	4,9	4,1	5,0	4,4	4,0	3,7	3,6	2,9	-	3,9	56
	Φ	—	2,9	2,9	4,5	3,8	4,3	3,8	3,5	3,4	3,4	2,8	—	3,5	100
Vilsandi	A	8,2	9,8	5,8	7,0	6,0	6,0	5,7	7,4	7,0	7,9	6,6	7,3	7,0	5
	Φ	8,4	10,2	6,4	7,6	6,7	6,7	6,1	7,9	7,2	8,2	7,0	7,9	7,5	3
Boz-Su	A	2,0	2,3	2,2	1,9	2,1	2,1	1,9	1,8	1,7	1,6	1,5	2,2	1,9	103
	Φ	1,8	2,0	2,0	1,7	1,9	1,8	1,5	1,4	1,2	1,2	1,2	1,7	1,6	344
Ristna	A	5,6	5,8	3,3	4,2	3,7	4,0	3,4	5,8	4,3	5,5	4,5	5,3	4,6	46
	Φ	6,5	6,9	4,1	4,9	4,5	4,6	3,8	6,5	4,7	6,2	5,1	5,9	5,3	41
Dzharkent	A	2,6	3,0	2,9	3,7	3,4	3,4	2,7	—	2,4	2,0	1,6	1,8	2,6	61
	Φ	2,0	2,4	2,8	3,9	3,4	3,2	2,5	—	3,1	2,4	1,8	2,2	2,7	88
Alma-Ata	A	0,7	0,8	0,8	0,8	1,0	1,3	1,6	1,3	1,4	1,2	1,0	1,2	1,1	420
	Φ	1,1	1,3	1,5	1,4	1,7	1,9	2,2	2,0	2,0	1,5	1,1	1,4	1,6	210
Arkhangelsk	A	3,3	3,5	2,2	3,6	3,3	2,5	3,0	1,9	—	—	—	—	2,9	61
	Φ	3,4	3,4	2,2	3,6	3,4	2,2	2,9	2,0	—	—	—	—	2,9	89

Note: A - anemovane, Φ - wind vane.

Table 2. Recurrence (no. of cases) of wind velocities, by various gradations

Stations	Instrument	Wind veloc. (m/sec)					
		0—1	2—5	6—10	11—15	16—20	21—26
Poti	A	214	613	123	5		
	Φ	195	577	164	16		
Chiganak	A	56	210	30	1		
	Φ	68	207	81	1		
Vilsandi	A	25	550	642	213	30	
	Φ	29	452	749	184	46	
Boz-Su	A	179	261	5			
	Φ	249	190	6			
Ristna	A	163	803	426	88	0	
	Φ	126	696	530	65	14	
Dzharkent	A	89	374	28	4	1	
	Φ	121	327	28	4	2	
Alma-Ata	A	294	187	2			
	Φ	265	216	3			
Arkhangelsk	A	149	588	82			
	Φ	146	615	88			

Table. 3. Assurance A (%) for deviations within limits of 1 m/sec between wind vane and anemovane readings, correlation coefficients k, and the mean square divergence σ from the mean velocity in individual months

Month	Exposed stations									Partly exposed stations									Sheltered stations					
	Poti			Chiganak			Vilsandi			Box-Su			Ristna			Dzharkent			Alma-Ata			Arkhangelsk		
	A	K	σ	A	K	σ	A	K	σ	A	K	σ	A	K	σ	A	K	σ	A	K	σ	A	K	σ
I	90			—	0,96	0,98	86	0,98	2,61	90	0,84	1,04	73	0,98	2,91	83	0,79	0,56	93	0,62	0,58	87	0,95	1,80
II	89			96	0,96	1,16	88	0,99	3,93	88	0,93	1,21	67	0,98	3,42	86	0,99	0,82	86	0,67	0,68	90	0,98	3,37
III	64	0,94	2,71	91	0,94	1,28	95	0,99	2,72	80	0,94	1,04	76	0,95	1,72	92	0,90	1,05	84	0,72	0,80	96	0,94	0,88
IV	88			85	0,96	2,10	83	0,99	2,91	88	0,74	0,82	81	0,96	1,71	84	0,95	1,90	84	0,60	0,54	93	0,96	2,17
V	88			89	0,94	1,52	85	0,98	3,06	91	0,94	0,96	81	0,97	1,93	90	0,84	0,98	83	0,77	0,66	92	0,93	1,07
VI	86			81	0,96	1,91	81	0,96	2,01	90	0,83	0,96	87	0,95	1,68	87	1,00	1,50	87	0,66	0,67	72	0,94	1,43
VII	90			81	0,95	1,49	90	0,97	2,12	85	0,84	0,64	88	0,95	1,61	89	0,76	0,87	80	0,51	0,59	79	0,04	1,87
VIII	90			82	1,00	1,50	76	0,98	3,21	86	0,66	0,63	85	0,99	3,72	—	—	—	75	0,52	0,63	79	0,92	1,48
IX	75			84	0,93	1,34	92	0,99	3,83	83	0,57	0,43	89	0,99	2,91	79	0,93	1,27	81	0,62	0,65			
X	82			85	0,95	1,64	85	0,99	3,14	86	0,85	0,69	83	0,96	2,15	92	0,92	1,09	93	0,93	0,64			
XI	84			93	0,97	2,16	89	0,98	1,73	97	0,87	0,78	86	0,96	2,21	92	0,92	0,90	97	0,78	0,58			
XII	76						90	0,99	2,41	89	—	—	87	0,99	2,67	89	0,95	1,28	88	0,56	0,42			

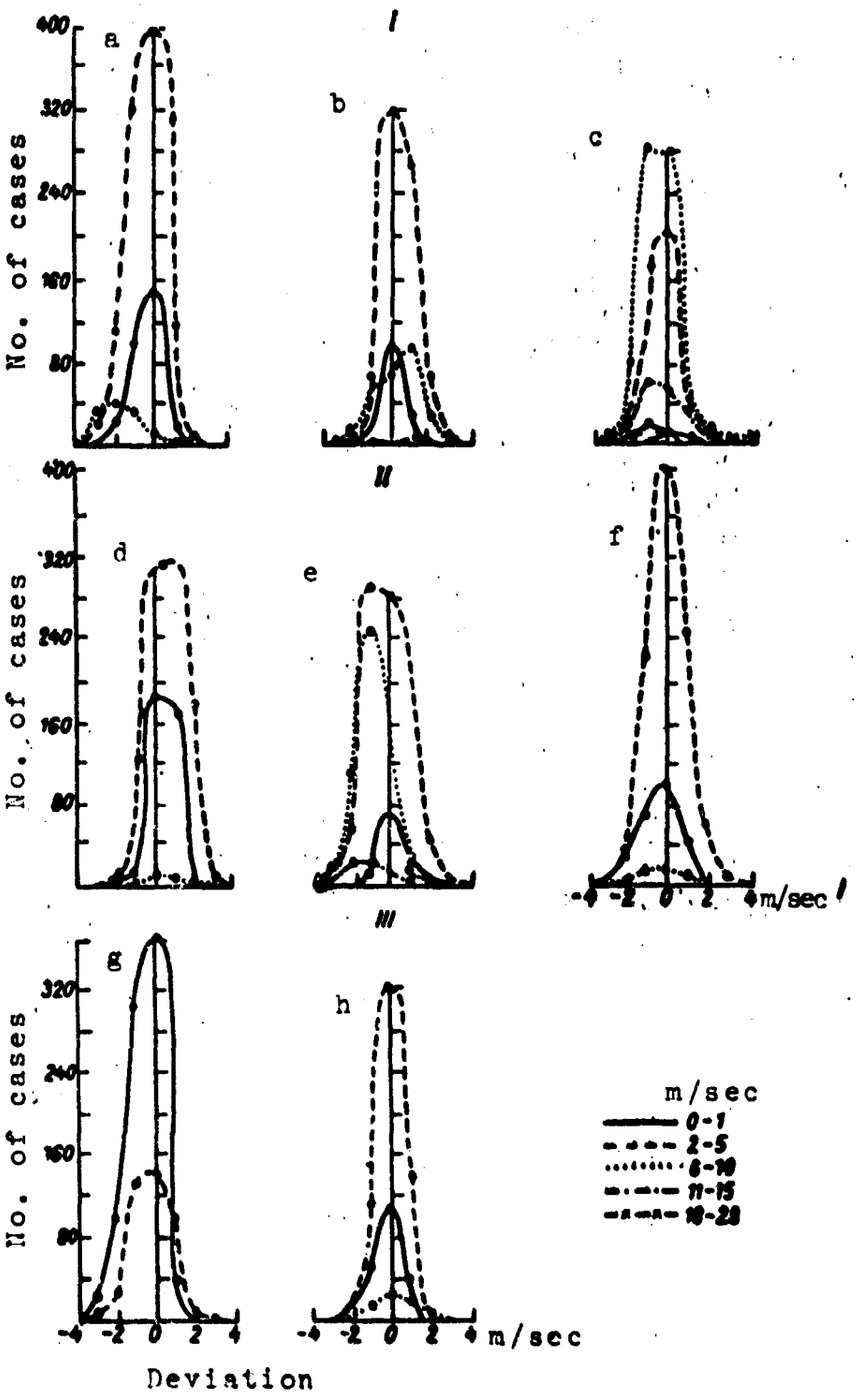


Fig. 1. Distribution of recurrence of wind-velocity deviations measured with a wind vane and the M-12 anemovane, 1962

I - Exposed stations, a - Pati, b - Chiganak, c - Vilsandi; II - partly exposed stations, d - Boz-Su, e - Bistna, f - Dzharkent; III - sheltered stations, g - Alma-Ata, h - Arkhangelsk.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory) [ER]

NEW SCIENTIFIC COUNCIL ON ECOLOGY CREATED

Sukachev, V. N. Problems and work program of the new scientific council. Akademiya nauk SSSR. Vestnik, no. 10, 1965, 55-57.

In the spring of 1965 the Presidium of the Academy of Sciences USSR resolved to form a Scientific Council within the Department of General Biology. This council will concern itself with problems of a complex biogeocenotic (ecological) study of living nature and natural resources and scientific principles for their use and conservation. The council's immediate program will be to coordinate research by other agencies on the statistics and dynamics of biogeocenoses. These studies will use the latest methods and information in biology, geophysics, pedology, chemistry, physics, mathematics, and cybernetics, with special emphasis on biochemistry, physiology, organic ecology, biophysics, and geochemistry. The council will also develop uniform investigation methods to facilitate comparison of findings and devise information channels for reporting practical results to industry. [DP]

INFLUENCE ON THE TEMPERATURE GRADIENT IN THE LOWER 300-M LAYER OF THE ATMOSPHERE ON THE DISPERSION OF POLLUTANTS OF INDUSTRIAL ORIGIN

Szepesi, D. Idojaras, v. 68, no. 1, 1964, 10-17. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 2, 1965, 2B197.)

Aside from wind conditions, the most important meteorological factor in the dispersion of pollutants of industrial origin is the temperature stratification of the lower 300-m

layer of the atmosphere. Using data from soundings conducted for 4—5 yr at Budapest, the author presents diurnal and annual values in an isopleth representation of the relative frequency of stable, isothermal, normal, and unstable equilibrium, and the mean lapse rate for the lower 300-m layer of the atmosphere. In addition, the diurnal and annual change and distribution of frequencies and thicknesses of ground-level inversions are considered. [EO]

AN INVESTIGATION OF THE AIR CURRENTS OVER MOUNTAINOUS REGIONS, TAKING INTO ACCOUNT THE THERMAL INHOMOGENEITY OF THE UNDERLYING SURFACE

Trubnikov, B. N. Akademiya nauk SSSR. Izvestiya. Seriya geofizika, no. 2, 1964, 293-301. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 8, 1964, 8B257.)

An analysis is made of a system of nonlinear partial differential equations describing the air-flow function which is derived from hydrothermodynamic equations, taking a simplified theory of free convection into account. When the nonlinear terms in the obtained system of equations are discarded, its solution is found in the form of a superposition of harmonics of the form:

$$e^{\delta t} \exp [im(x - ct) - in z],$$

where m and n are the wave numbers in the horizontal and vertical directions, and δ and c are the damping factor and the phase velocity which are determined from the form of the equations and are expressed by $\rho^2 = n^2 + m^2$ and the coefficients of the equations. The quantity

$$k = \frac{(d^2u/dz^2)^2}{g(\gamma - \gamma_a)/\theta} - 4\rho^2$$

characterizes the stability of the disturbance. (Here d^2u/dz^2 is the average value of the curvature of the wind profile for a certain layer, θ is the temperature, and γ is the lapse rate.) When $k < 0$, the motion is unstable, and conversely, when $k > 0$, it is stable. Thus, motion which is unstable for small "bubbles" (large ρ) may be stable for large bubbles. The lifetime of a bubble Δt is proportional to the square of its size, that is, $\Delta t = \nu/\rho^2$, where ν is the kinematic viscosity of air.

A study was made of a stationary case in which the terrain was thermally inhomogeneous and served as a flat underlying surface for stable and unstable atmospheres, and for simultaneous disturbances produced by thermal inhomogeneity and curvature of the underlying surface. Possible forms of convection are considered.

It was established from a theoretical analysis of the obtained equations and their special solutions that:

1. An increase in the curvature of the wind profile increases the stabilization of atmospheric layers (k increases). Large convection elements should accumulate at the line of inflection of the wind profile.

2. In an unstably stratified atmosphere, in the stationary case, disturbance caused by a thermal inhomogeneity decreases exponentially on both sides of the inhomogeneity. Rising currents are localized on the windward side of the inhomogeneity and the descending currents on the leeward side. The degree of instability and the wind velocity determine the width of the region of vertical currents.

3. In a stable atmosphere, wave motions, which may occur both behind mountains and thermal inhomogeneities and behind cumulus clouds occur along with the exponential disturbances.

4. When the atmosphere is unstable, disturbances from a heated mountain are greater than from a cold mountain; when it is stable, the reverse is true.

5. Excessive heating of the underlying surface leads to the appearance of a stream in an unsteady flow. The appearance of bubbles or lee "rotors" is possible with greater heating or if the mountain is high enough.

6. The rate of displacement of a bubble exceeds the wind velocity in an unstable layer and lags behind the current in a stable layer. The shape of the bubble is close to ellipsoidal.

From the theoretical conclusion drawn here, the author finds qualitative confirmation of the experimental works of many authors.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University) [IO]

SOME CHARACTERISTICS OF THE WIND IN THE BOUNDARY LAYER OF THE ATMOSPHERE

Tsverava, V. G. Glavnaya geofizicheskaya observatoriya. Trudy, no. 161, 1964, 28-35. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 12, 1964, 12B273.)

Observations of the Voyeykovo Aerological Station for September 1961 and 1962 are used to analyze the daily change in wind vector, using the Buajitti and Blackadar method (Buajitti, K., and A. S. Blackadar, RZhfiz, no. 2, 1959, 1720). The structural function of the wind velocity in the boundary layer is determined by the O. A. Drozdov method. The analytic expression of this formula which was derived makes it possible, in this instance, to describe certain patterns in the distribution of fluctuations in the wind vector with height. [EO]

THE WIND PROFILE IN THE LOWER 500-METER LAYER OF THE ATMOSPHERE

Tsverava, V. G. Meteorologiya i gidrologiya, no. 2, 1965, 24-27.

The conditions are discussed under which the largest deviations in the vertical distribution of wind velocities from the mean climatic profile are observed over a given point. Basic pilot-balloon observations conducted at the Pavlovskaya Aerological Observatory (near Leningrad) during 1933—1940 were used to analyze the space-time variability of the winds. A base about 1640 m long was used for the 3240 observations. An anemometer installed on the observatory tower 45 m above the ground level was used to measure the wind speed at that height. All data were processed (tabulated) in the computing room of the Scientific Research Institute of Aeroclimatology (NIIAK), sorted by months and times (0700, 1300, and 1900 hr) in each month. Observations associated with these hours were divided by wind-velocity gradations at specified heights (0—2, 3—5, 6—8, 9—11, and above 11 m/sec) and by the cloudiness of the lower cloud deck (0—3, 4—7, and 8—10 cloud cover). Computations were facilitated by combining wind velocities into gradations of 0—5 and 6—11 m/sec. The relationship between the cloudiness of the lower cloud deck and the vertical distribution of wind velocities was considered only for clear (0—3) and overcast (8—10) skies.

The results are shown in three graphs (Figs. 1, 2, and 3) and a table which indicates the effect of cloudiness on the vertical wind profile based on observations taken at 1300 hr during June, July, August, and September. At

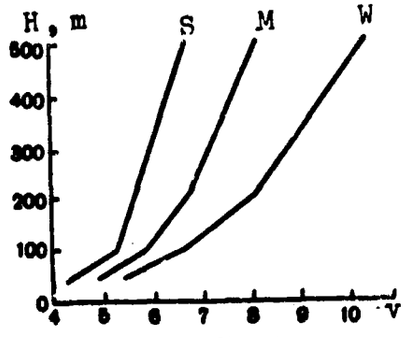


Fig. 1. Vertical distribution of the wind velocity (m/sec) in the summer (S), winter (W), and the annual mean (M).

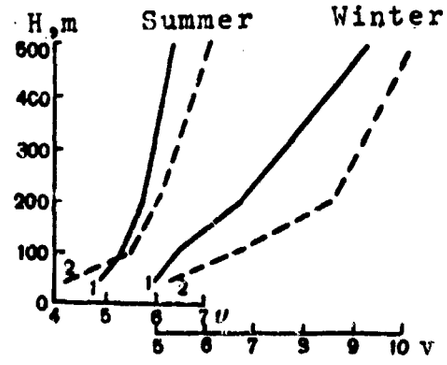


Fig. 2. Vertical distribution of the wind velocity (m/sec) at 1300 hr (1) and at 1900 hr (2) in the summer and winter.

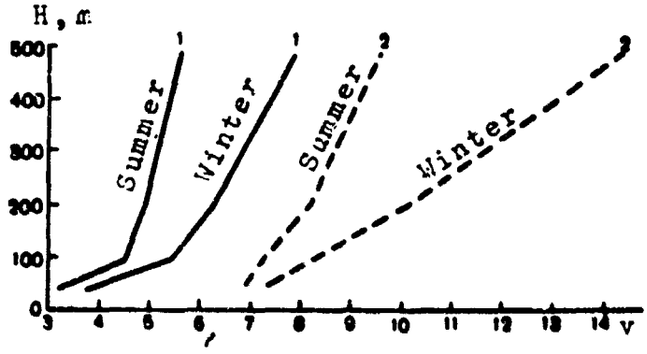


Fig. 3. Vertical distribution of wind velocities (m/sec) with velocities at vane level from 0—5 m/sec (1) and 6—11 m/sec (2) in the summer and winter.

500 m this effect decreases with increasing wind velocity because the distribution is determined chiefly by the intensity of turbulent exchange when the baric gradient is low.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya (Main Geophysical Observatory) [KO]

BOUNDARY-LAYER STRUCTURE IN A HORIZONTALLY NONHOMOGENEOUS ATMOSPHERE

Utina, Z. M. Structure of the boundary layer in a horizontally nonhomogeneous atmosphere. Glavnaya geofizicheskaya observatoriya. Fizika pogranichnogo sloya atmosfery (Physics of the boundary layer of the atmosphere). Leningrad, 1965, 38-43. (ITS: Trudy, no. 167, 1965).

Equations are derived to define the distribution of the meteorological characteristics of the atmospheric boundary layer as functions of external parameters for the case when a horizontal temperature gradient is present. The system of equations includes equations of: 1) atmospheric motion when a thermal wind is present, 2) heat conductivity in the atmosphere and in the soil, with advective terms being taken into account in the case of the atmosphere, 3) water vapor diffusion, 4) energy balance of turbulence, and 5) conditions prevailing at the upper limit of the boundary layer, with that limit defined as the level above which the wind changes with height only at the expense of the horizontal temperature gradient. Examples are calculated which demonstrate the possibility of making a quantitative estimate of the extent to which a change in the turbulent coefficient profile affects the remaining characteristics of the boundary layer when a horizontal temperature gradient is present.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory) [ER]

A METHOD FOR INVESTIGATING THE BOUNDARY LAYER TURBULENCE FROM RECORDING ACCELEROGRAPH DATA TAKEN AT PAKHTA-ARAL

Vorontsov, P. A., and M. A. German. Glavnaya geofizicheskaya observatoriya. Trudy, no. 154, 1964, 65-77. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 9, 1964, 9B256.)

A procedure is discussed for calculating a number of characteristics of the structure of an air current by means of data from records of an airplane accelerograph. [EO]

FORECASTING YEVGEY STORM WINDS

Yeserkepova, T. A. Kazakhskiy nauchno-issledovatel'skiy gidrometeorologicheskiy institut. Trudy, no. 21, 1964, 77-82. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 11, 1964, 11B211.)

The dependence is given of the occurrence of yevgey winds on certain aerological parameters whose critical values seem to be points of reference which are detected in the developing process of the beginning, continuation, or cessation of a yevgey wind. This procedure was selected because of the difficulty of precomputing the total gradient during a yevgey wind, which is the geometric sum of the baric gradient and the gradient caused by orography which sets up a head of air pressure along the Dzhungarskiy Pass (Kazakh SSR). The basic process involved in producing the conditions for the storm wind is the intrusion of an anticyclone into the eastern regions of the Kazakh SSR with subsequent displacement and stabilization of its principal center south, southeast, or east of the Dzhungarskiye Gates (the direction of the ground-level baric gradient is 210—310°). A second variation may be displacement of the cyclone from south of the Caspian Sea through Central Asia and southern Kazakhstan to Alma-Atinskaya Oblast'. The second variation is more frequent than the first, but the more persistent winds are associated with the first. It was discovered that yevgey winds occur when diurnal differences in the relative geopotential in regions north of the Dzhungar Pass and the western part of Alma-Atinskaya Oblast' exceed certain critical values determined by the graphic relationship. A procedure for computations and an empirical graph for predicting 12 hours in advance the beginning, continuation, or cessation of strong winds are presented with an example. The graph predicts yevgey winds with an accuracy of 70% and the absence of yevgey winds with an accuracy of 85%. Verification of the phenomenon was 76% (without taking into account pilot balloon data). This method of forecasting is suitable for the cold half of the year when yevgey winds are most frequent. When the proposed procedure was tested in November and December 1962 against operative data of the Weather Bureau in Alma-Ata, the verification of the forecasts was 83.4%. [KO]

MAXIMUM WIND VELOCITIES AND GUSTINESS IN SEVERAL REGIONS OF KAZAKHSTAN

Zav'yalova, Yu. P. Studies of maximum wind velocities. Kazakhskiy nauchno-issledovatel'skiy gidrometeorologicheskiy institut. Voprosy meteorologii i klimatologii (Problems in meteorology and climatology). Leningrad, 1965, 5-36. ITS: Trudy, no. 22, 1965.

The author was assigned the task of studying wind gusts in relation to the time of day, the year, and the local terrain, and to make recommendations for calculating these characteristics. The results of these investigations are presented in a three-part paper. Part I describes the instrument devised to measure gustiness and discusses the observation procedures used with the device during the investigation. Part II contains the collated observation results, the gustiness factor derived, and recommendations for future utilization of the instruments. Part III describes and analyzes experience gained in using the data to determine maximum gustiness at several hydrometeorological stations in southeastern Kazakhstan.

The principal observation stations (1960—1962) were Chokpar (approximate location 42°47' N, 70°34' E) and Shchuchinsk (approximately 52°56' N, 70°12' E) hydrometeorological stations. Auxiliary stations used as data-collecting points were at Chilik (approximately 43°33' N, 78°17' E) and Iliysk (or Ili, as it is often called) (approximately 43°53' N, 77°10' E) at which observations were made in 1963.

The instruments ranged from the standard wind vanes generally installed at network stations to anemovane-type instruments, and included a special "pulse meter" designed in accordance with proposals made by I. I. Prokhorov, the project head. All of the instruments were installed on towers or masts at heights ranging from 2 to 10 m above the ground.

Of the data obtained at the several stations, those of the Iliysk station apparently were subjected to the most careful analysis. However, considerable information is reported in the form of tables and graphs for data obtained at the other stations, particularly those from Chilik and Chokpar. Gustiness and turbulence data obtained at other network stations at Tselinograd, Dzhalanash-Kul', Tyul'kubas, Dzhambul, Lugovaya, and Alma-Ata were compared with those from stations directly involved in the study. Particular attention is given to analyzing the occurrence of maximum wind gusts between the standard observation schedules established for network station operations.

Comment: Detailed coverage of the contents of this paper will be incorporated in a comprehensive report to be issued at a later date. A complete translation of the paper is available at ATD. [ER]

VERTICAL CURRENTS IN THE ATMOSPHERIC BOUNDARY LAYER

Zaytsev, V. A., and A. A. Ledokhovich. Glavnaya geofizicheskaya observatoriya. Trudy, no. 154, 1964, 58-64. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 9, 1964, 9B269.)

The results of measuring the vertical components of the wind velocity from an airplane are discussed, and data are presented on changes in the velocity and horizontal extent of vertical currents with height. [EO]

A HYDRODYNAMIC INVESTIGATION OF THE INITIAL STAGE IN THE DEVELOPMENT OF LOCAL WINDS

Zaytunyan, Kh. R. Mirovoy meteorologicheskiy tsentr. Trudy, no. 3, 1964, 19-74. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 8, 1964, 8B330.)

The problem of the initial stage in the development of local winds is investigated along with the slope effect and the thermal inhomogeneity of the underlying surface. Solution of this problem is sought in the form of a time power series (the A. A. Dorodnitsyn method). The following conclusions are drawn: 1) the daytime slope wind includes ever higher layers over the slope with time; its development proceeds in jumps. 2) The velocity of the daytime slope wind is on slope and reaches its maximum about the middle of the slope. 3) At the surface of the slope there is no line of discontinuity with the boundary layer. 4) The process tends to quasi-stationary with time. The bibliography has 27 references.

ASSOCIATION: Mirovoy meteorologicheskiy tsentr (World Meteorological Center) [EO]

DUST STORMS IN THE STEPPES OF WESTERN SIBERIA AND KAZAKHSTAN

Zhirkov, K. F. Akademiya nauk SSSR. Izvestiya. Seriya geograficheskaya, no. 6, 1963, 50-55. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 9, 1964, 9B404.)

Dust storms cover large areas of the steppes of Western Siberia and Kazakhstan. The following factors contribute to their formation: the presence of large areas of limey dark chestnut and chernozem soils, which have been ploughed without taking any measures against deflation; light sandy loams and light loams, which are rapidly susceptible to wind erosion; the fact that the area is sparsely forested in the north and treeless in the south; and certain synoptic processes which cause dry weather and strong winds during the warm season. The region under investigation extends from the Urals to the Altay (between 47°30'—54°30'N and 54°30'—85°30' E). Observations from 12 weather stations between 1936 and 1960 served as the basic data for an analysis which showed that the number of days with dust storms in the steppes of Western Siberia and Kazakhstan increases from north to south, that dust storms are most frequent in drought years, that the maximum number of days with dust storms is in May and early June, and that dust storms occur most frequently on the southern and southeastern periphery of high cyclones and anticyclones when the ground-level isobars and isohypses on the 500—700-mb surfaces are parallel.

ASSOCIATION: Pedagogicheskiy institut, Petropavlovsk, Tselinnyy Kray (Pedagogical Institute) [EO]

THE PROBLEM OF WIND REGIME IN THE VICINITY OF THE TYUZ-ASHU PASS

Zhukov, N. N., and L. N. Deykina. Srednaaziatskiy nauchno-issledovatel'skiy gidrometeorologicheskiy institut. Trudy, no. 19, 34, 116-122. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 8, 1964, 8B324.)

The wind regime in the vicinity of the Tyuz-Ashu Pass is analyzed on the basis of data from two meteorological stations located on the southern and northern slopes of the Kirgiz Range. Mountain-valley circulation, which is most pronounced in the summer, exists on the southern slopes. The annual mean velocity is higher on the northern slopes than on the southern slopes, reaching 4.4 m/sec.

A relationship is established between the peculiarities of circulation on the southern and northern slopes on one hand and the wind in the free troposphere and the orographic region of higher pressures over the mountain range on the other hand.

ASSOCIATION: Sredneaziatskiy nauchno-issledovatel'skiy gidrometeorologicheskiy institut (Central Asian Scientific Research Hydrometeorological Institute) [EO]

INTEGRAL CHARACTERISTICS OF LOW-LEVEL ATMOSPHERIC TURBULENCE

Zilitinkevich, S. S. Integral characteristics of turbulence in the atmospheric boundary layer. Glavnaya geofizicheskaya observatoriya. Fizika pogranichnogo sloya atmosfery (Physics of the atmospheric boundary layer). Leningrad, 1965, 49-52. (ITS: Trudy, no. 167, 1965).

An analysis is made of the system of integral equations derived to calculate the energy balance of the atmospheric boundary-layer turbulence as proposed by D. L. Laykhtman (Fizika pogranichnogo sloya atmosfery, Gidrometeoizdat, 1961). Conclusions are drawn concerning the advantage of making an empirical study of a number of universal relations (z_o-roughness coefficient, δ-dimensionless parameter, Ri number, etc.) which contain specific information on the turbulent exchange in the atmospheric boundary layer.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya, Leningrad (Main Geophysical Observatory) [ER]

VERTICAL TURBULENT EXCHANGE IN THE SURFACE BOUNDARY LAYER OF THE ATMOSPHERE

Zilitinkevich, S. S. Glavnaya geofizicheskaya observatoriya. Trudy, no. 150, 1964, 21-35. (TAKEN FROM: Referativnyy zhurnal. Geofizika, no. 12, 1964, 12B342.)

This article is a survey of research in the theory of turbulent mixing in the surface boundary layer of the atmosphere and the distribution of wind velocities with height during stratifications in states of both equilibrium and non-equilibrium. The fundamental works of Reynolds are examined, in which the conditions for conversion of laminar flow into turbulent flow are elucidated and the concept of turbulent friction is introduced. The works of Prandtl, Karman, and Rossby are discussed, in which the logarithmic law of distribution of wind velocities in the surface boundary layer is derived. Numerous investigations are described which have been undertaken to determine the effect of thermal inhomogeneities in the wind-velocity profile and the nature of turbulent exchange in the surface boundary layer, and methods for calculating turbulent heat fluxes, humidity, and motion (Richardson, Schmidt, Taylor, Obukhov, Monin, Laykhtman, Budyko, Yudin, and others).

[EO]

VARIATIONS IN THE AMOUNT OF IODINE IN SOIL AND METHODS OF DETERMINING THESE VARIATIONS

Zyrin, N. G., and T. Kh. Imadi. Evaluation of an analytical method and variations in the iodine content in soil. Agrokhimiya, 1965, no. 4, 106-112. (TAKEN FROM: Referativnyy zhurnal. Pochvovedeniye i agrokhimiya, 1966, no. 1, 23, 1.57.161.)

Data are cited on results obtained in comparative measurements of iodine in soils and vegetation, using a method developed by Dragomirova in 1950. The method used makes it possible to determine the amount of iodine with an accuracy of ~7—8% in the presence of small quantities and 2—3% with average and high concentrations of iodine. The absolute sensitivity of the method is $3.2 \cdot 10^{-7}$% in a solution.

The coefficient of variation in the data obtained is 1.5—1.6% in 10 analyses. Variations in the iodine concentration is higher in plowed fields than in uncultivated soils. The coefficient of variation of iodine in thick chernozems is 1.1 in virgin steppe areas and 2.2 in plowed fields; in gray forest and steppe soils it is 4.46 in a forest area and 6.6 in a plowed field. [SP]

APPENDIX I

AVAILABLE TRANSLATIONS: CHEMICAL FACTORS

PROTECTIVE ACTION OF ACETYLCHOLINE IN THE REACTION BETWEEN SERUM CHOLINE ESTERASE AND PHOSPHORUS-ORGANIC INHIBITORS. Brestkin, A. P., R. I. Volkova, and E. V. Rozengart. Doklady Akademii Nauk SSSR, v. 157, no. 6, 1964, 1459. Consultants Bureau

ORGANOPHOSPHORUS INHIBITORS OF CHOLINESTERASE. Grigor'yeva, G. M. Biokhimiya, v. 30, no. 2, 415-422. JPRS 32874

CHEMICAL STRUCTURE OF DIPHTHERIA TOXIN AND TOXOID. I. COMPARATIVE ANALYSIS OF THE AMINO ACIDS OF THE TOXIN AND TOXOID. Iskierko, J. Medycyna Doswiadczalna i Mikrobiologia, v. 16, no. 3, 4, 1964, 127. OTS TT-64-11411/3-4

INFLUENCE OF N-CARBOETHOXY-N-PHTHALAZINEHYDRAZINE HYDROCHLORIDE (BINAZINE) ON THE FORMATION OF CONDITIONED FEAR PHOBIC REFLEXES IN WHITE RATS. Kleinrok, Z. Acta Physiologica Polonica, v. 15, no. 4, 1964, 474. OTS TT-64-11407/4

INTERACTION OF CHOLINESTERASE WITH O-ETHYL-S-ALKYLMETHYLTHIOPHOSPHINATES. Rozengart, Ye. V. Biokhimiya, v. 30, no. 2, 1965, 344-349. JPRS 32874

PHARMACOLOGICALLY ACTIVE DERIVATIVES OF PIPERAZINE. I. N,N'-DISUBSTITUTED DERIVATIVES OF THE CHLOROBENZOXAMINE TYPE. Sacha, A. Acta Poloniae Pharmaceutica, v. 21, no. 4, 1964, 369. OTS TT-64-11412/4

A TOXICOLOGICAL STUDY OF THE COMBINED EFFECTS OF PESTICIDES. Shtenberg, A. I., and Kh. I. Lutsoya. Voprosy Pitaniya, v. 24, no. 4, 1965, 3-8. JPRS 32742

GAS MASKS FOR CHEMICAL PLANT WORKERS. Solov'yev, P. M. Bezopasnost' Truda v Promyshlennosti, no. 5, 1965, 46-49. JPRS 32627

PHARMACOLOGY AND CLINICAL ASPECTS OF SYNTHETIC POISONS. Stade, K. Deutscher Militarverlag, 1964. IR 4-317-0139-64 Dept of Navy Tr 4326/ONI 2001

APPENDIX II

AVAILABLE TRANSLATIONS: BIOLOGICAL FACTORS

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