

Occupations of Men Dying From Accidents in the United States, 1950

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FATAL ACCIDENTS accounted for more than 10 percent of the deaths included in the National Vital Statistics Division study of mortality for 1950 by occupation and industry among men 20–64 years of age. Of the 327,271 deaths recorded, 34,949 were reported to be due to accidents, 8,297 at work and 26,652 away from work and unspecified. The death rates per 100,000 men for both types of accidents reached a peak at the older ages. The figures for each age group are shown in table 1.

When the difference in ages of the men in each occupation and industry is taken into account, the rate for work accidents among lumbermen was eight times the average for work accidents among all men, and among mine workers and structural metal workers, more than five times the average. By industry, the same high risks were reflected in the rate for logging, which was 10 times the average, and for coal mining, which was almost 5 times the average. The range of death rates by occupation or industry was much narrower for accidental deaths that were not described as taking place at work.

Nature of Data

A copy of each death certificate filed in State vital statistics offices is sent routinely to the National Vital Statistics Division, where data are compiled for the United States. Deaths in 1950 were classified in the National Vital Statistics Division by the "usual" occupation and industry—the kind of work done during most of life—reported on the death certificate, as well

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as by age and cause of death. These figures, along with the count of the current occupation of the population by age as enumerated in the census of population for April 1950, made it possible to compute age-specific and age-adjusted death rates for each occupation, for each industry, and for groups of occupations or industries.

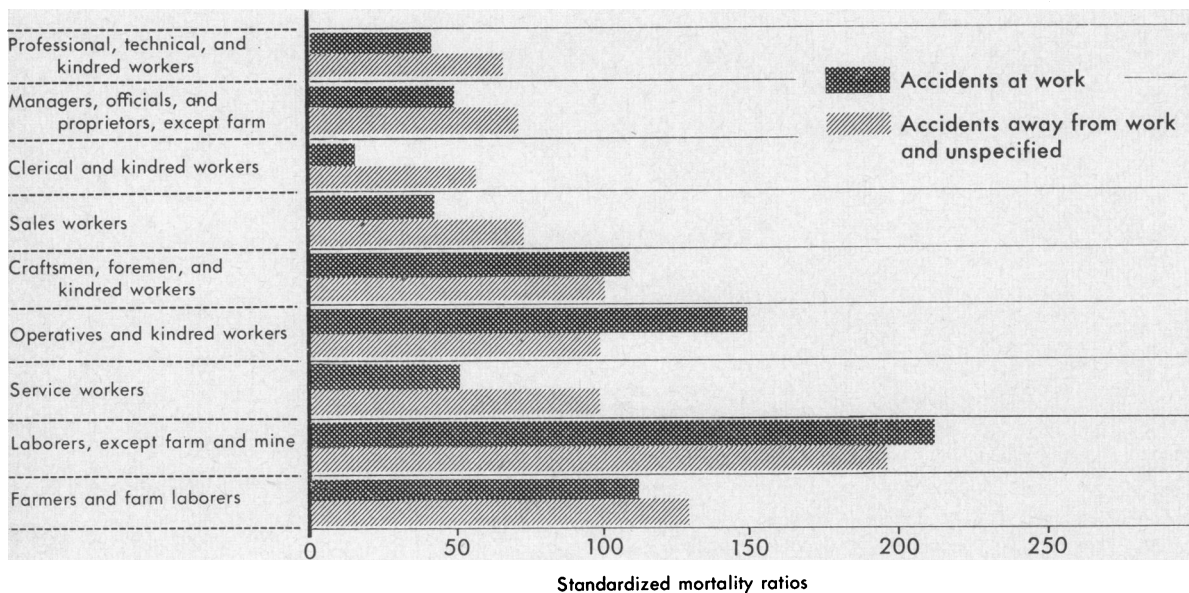
The numbers of deaths from accidents and the standardized mortality ratios assigned to the major occupation and major industry groups are shown in table 2. The standardized mortality ratios also appear in figures 1 and 2. The standardized mortality ratio is the number of deaths tabulated in each occupation or industry group divided by the number that would have been expected if the age-specific death rates in the occupation or industry were the same as those rates by age shown in table 1.

The major occupation and industry groups have been established by the Bureau of the Census (1) and are designed to bring together occupations with the same type of work and industries with related processes. In this paper, two of the census occupation groups, farmers and farm laborers, have been combined because the distinction between them is based on the question concerning class of work—whether working for private employer, in own business, and so on—which appears on the census schedule but not on the death certificate. Also, the small number of private household workers has been combined with other service workers.

Interpretation of Data

A standardized mortality ratio significantly above 100 for a particular occupation should indicate an unusual risk of death from accidents

Figure 1. Standardized mortality ratios for accidents in major occupation groups, men 20–64 years of age, United States, 1950



for men working in that occupation or industry. But a high ratio for any cause can occur as well from an overstatement of the number of persons in the occupation or industry reported on the death record in comparison with the reports of the number in the same occupation or industry in the census. Occupation and industry are difficult items to report precisely, both for deaths and for the enumerated population. A comparison of the occupation of an individual reported on the death certificate with the occu-

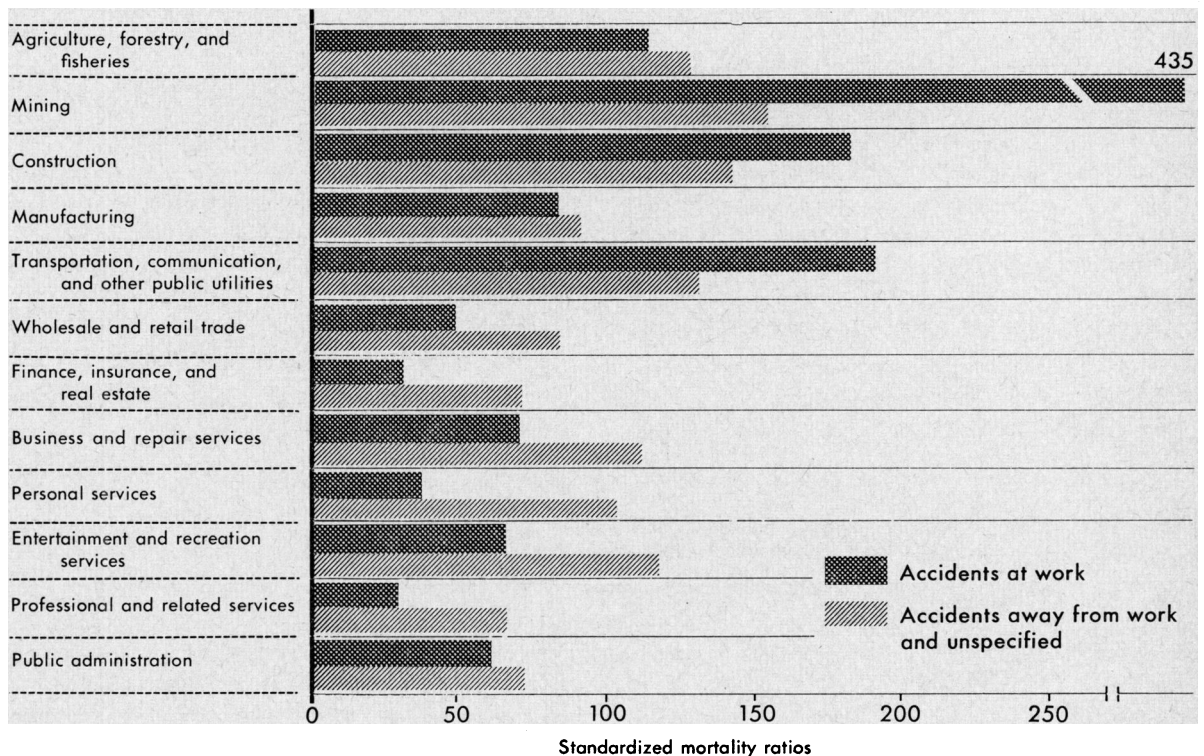
pation reported for the same individual on the census schedule was made by the Scripps Foundation for Research in Population Problems for white males 45–64 years of age who died after the date of the census of 1950 (2). The study showed that 70 percent of these persons were reported in the same major occupation group and 80 percent in the same major industry group on both death certificate and census schedule. The net distribution of major occupation groups from the two records differed significantly for three groups only—clerical, craftsmen, and operatives.

Table 1. Deaths and death rates from accidents, men aged 20–64 years, United States, 1950, by age group and work status

Age (years)	Number of deaths		Rate per 100,000 population	
	Not at work and unspecified	At work	Not at work and unspecified	At work
20–64	26, 652	8, 297	66. 3	20. 6
20–24	3, 830	907	84. 6	20. 0
25–29	3, 301	974	61. 0	18. 0
30–34	2, 854	969	54. 0	18. 3
35–44	5, 784	2, 007	56. 7	19. 7
45–54	5, 371	1, 834	64. 2	21. 9
55–59	2, 825	873	80. 7	24. 9
60–64	2, 687	733	91. 3	24. 9

These findings may not apply to an occupation or industry that is subject to systematic errors in reporting, either on the death certificate or on the census record, which may result in an understatement or overstatement of death rates. The effect of such errors can be eliminated by comparing the proportionate mortality ratio—the number of deaths from accidents per 1,000 deaths from all causes—for an occupation with the proportionate mortality ratio for all occupations, since this involves no use of the census data. This approach was suggested by Dr. Percy Stocks in his review of the occupational data for the United States as consultant to the Public Health Service, assigned by the World Health Organization.

Figure 2. Standardized mortality ratios for accidents in major industry groups, men 20–64 years of age, United States, 1950



If the proportionate mortality ratio for accidents is significantly higher for a particular occupation than this ratio for all occupations, it may be because the risk of accidental death for workers in that occupation exceeds the risk for all occupations. If the standardized mortality ratio is also high, then the risk of accidental death is in fact great for men reported as working in that occupation or industry compared with the risk for the male population as a whole. If the proportionate mortality ratio is not higher than expected, in spite of a high standardized mortality ratio, the latter may be the result of an overstatement of deaths for the occupation or industry in relation to the population enumerated in this occupation or industry or of high nonspecific mortality for the entire occupation or industry. A choice between these explanations cannot be made from the information at hand.

In any case, when a high risk of deaths from accidents is confirmed by a high proportionate mortality ratio it should be remembered that the figures presented are for the mortality ex-

perience of a group of persons in a particular occupation or industry. The risks described may arise from selection of persons drawn into an occupation and the social and economic conditions associated with the occupation, as well as from hazards in the occupation itself.

Before either the standardized mortality ratio or the proportionate mortality ratio was computed, estimates of the occupational distribution of deaths for which no occupation was reported were included in the base figures, as well as estimates of the distribution of the retired population by occupation and industry. The estimating procedures are described in a report now in preparation (3).

Accidents at Work

In this paper the division of accidents into those occurring at work and those not occurring at work has been made according to information given on the death certificate. If "Injury occurred while at work" (item 20d, Standard Certificate of Death) was not checked, the acci-

dent was included with the group occurring "away from work and not stated."

Occupation

From figure 1 it is evident that the standardized mortality ratio for accidents while at work is extremely low for professional, managerial, clerical, sales, and service workers. The standardized mortality ratio was above average for craftsmen, operatives, and laborers. The ratio for farmers and farm laborers was about the same as for craftsmen.

The total number of accidental deaths while at work is so small that a meaningful standardized mortality ratio cannot be computed for each occupation of the Intermediate List of Occupations (1). Computations were limited to classes

for which more than 20 deaths were reported for this cause. However, among these occupations there are many groups for which the frequency of accidental death is far beyond the expected value.

From the nature of their work, few accidental deaths would be expected among "professional, technical, and kindred workers." More than 20 deaths are reported for only two occupation classes in this group—civil engineers, with 22 deaths assigned and a standardized mortality ratio of 88, and the residual group, "other professional, technical, and kindred workers," with 119 deaths and a standardized mortality ratio of 118, not significantly above the average for all occupations.

More than 20 deaths were recorded for work

Table 2. Deaths from all causes and from accidents, and standardized mortality ratios for men 20-64 years of age, by major occupation and industry group, United States, 1950

Major occupation or industry group	Number of deaths			Standardized mortality ratios		
	All causes	Accidents		All causes	Accidents	
		While at work	Away from work and unspecified		While at work	Away from work and unspecified
Men in all occupations and industries, aged 20-64 years.....	327, 271	8, 297	26, 652	100	100	100
<i>Occupation</i>						
Professional, technical, and kindred workers.....	19, 087	249	1, 250	88	42	66
Managers, officials, and proprietors, except farm.....	37, 628	451	2, 069	89	49	73
Clerical and kindred workers.....	15, 188	79	918	84	15	55
Sales workers.....	16, 834	214	1, 169	96	44	74
Craftsmen, foremen, and kindred workers.....	65, 119	1, 756	5, 126	99	108	100
Operatives and kindred workers.....	55, 086	2, 535	5, 445	96	149	98
Service workers, including private household workers.....	26, 715	251	1, 542	116	52	98
Laborers, except farm and mine.....	43, 772	1, 508	4, 579	163	212	196
Farmers and farm laborers.....	47, 842	1, 254	4, 554	96	112	126
<i>Industry</i>						
Agriculture, forestry, and fisheries.....	50, 130	1, 357	4, 827	97	116	128
Mining.....	10, 424	905	1, 029	125	435	154
Construction.....	35, 837	1, 371	3, 397	118	181	140
Manufacturing.....	77, 200	1, 781	6, 361	93	79	88
Transportation, communication, and other public utilities.....	38, 695	1, 495	3, 241	123	190	128
Wholesale and retail trade.....	52, 199	656	3, 615	99	47	80
Finance, insurance, and real estate.....	9, 702	73	493	97	33	70
Business and repair services.....	9, 257	176	893	109	70	110
Personal services.....	12, 119	86	771	116	37	104
Entertainment and recreation services.....	3, 770	54	302	133	69	118
Professional and related services.....	13, 503	112	833	83	29	68
Public administration.....	14, 435	231	890	96	61	74

accidents in each of four classes within the major occupation group "managers, officials, and proprietors," but in each case the standardized mortality ratio was below average. Several occupation classes among "clerical and kin-

dred workers" and "sales workers" averaged more than 20 deaths from work accidents, but the standardized mortality ratio was extremely low for every class.

Table 3. Deaths from accidents occurring at work and standardized mortality ratios, for selected occupations and industries,¹ men 20-64 years of age, United States, 1950

Occupation or industry	Number of deaths	Standardized mortality ratio
<i>Occupation</i>		
Farmers and farm laborers.....	1, 254	112
Cranemen, hoistmen, and construction machinery operators.....	123	273
Electricians.....	155	231
Foremen (n.e.c.), nonmanufacturing industries.....	114	168
Linemen and servicemen—telegraph, telephone, and power.....	180	429
Locomotive firemen.....	26	236
Millwrights.....	27	225
Stationary engineers.....	80	178
Structural metal workers.....	61	555
Brakemen and switchmen, railroad.....	106	353
Mine operatives and laborers (n.e.c.).....	726	581
Truck drivers and deliverymen.....	938	293
Other specified operatives and kindred workers.....	97	243
Operatives and kindred workers (n.e.c.): sawmills, planing mills, and miscellaneous wood products.....	59	179
Fishermen and oystermen.....	38	271
Lumbermen, raftsmen, and wood choppers.....	304	844
Laborers (n.e.c.), construction.....	392	260
<i>Industry</i>		
Agriculture.....	1, 303	114
Forestry and fisheries.....	54	235
Coal mining.....	554	478
Crude petroleum and natural gas extraction.....	157	320
Mining and quarrying, except fuel.....	194	473
Construction.....	1, 371	181
Logging.....	361	1, 031
Sawmills, planing mills, and mill work.....	250	223
Railroads and railway express service.....	435	152
Trucking service and warehousing.....	520	382
Air transportation.....	53	331
Electric and gas utilities.....	223	217

¹ From Intermediate List (1).

NOTE: "n.e.c."—not elsewhere classified.

Among "service workers" the standardized mortality ratio for work accidents was above average, but not significantly so, for "policemen, sheriffs, and marshals" only. Since the standardized mortality ratio for accidents occurring at work is no higher for this group than this ratio for all causes for policemen, the proportion of deaths assigned to work accidents was not higher than expected. It would require other information to establish clearly that the risk of death from accidents was excessive for policemen.

The remaining major occupation groups each contain several occupations with high mortality from work accidents. The proportionate mortality ratio as well as the standardized mortality ratio was computed for each occupation in the Intermediate List (1). When both ratios are high there can be little doubt that an excess risk existed in 1950. These occupations, the numbers of deaths, and the standardized mortality ratios are shown in table 3.

Industry

Figure 2 isolates four major industry groups in which the standardized mortality ratios for work accidents are high. In descending order these are "mining"; "transportation, communication, and other public utilities"; "construction"; and "agriculture, forestry, and fisheries." The industries listed in the Intermediate List (1) for which both the standardized mortality ratio and proportionate mortality ratio are high are shown in table 3. Two of the industries, "logging" and "sawmills, planing mills, and mill work," are in the major group, "manufacturing," for which the standardized mortality ratio as a whole is not high, while the risk of death from accidents in the remaining industries listed is reflected in the high standardized mortality ratios for their major groups.

Accidents Away From Work

The same procedure as that described for evaluating death rates for work accidents reported on death certificates for 1950 was

followed for evaluating the remainder of the accidental deaths—those specified on the death certificate as occurring away from work combined with those for which no information was given. The standardized mortality ratio and the proportionate mortality ratio were computed for each occupation and industry in the Intermediate List (1). Those for which both ratios were high are listed in table 4.

For nonoccupational accidents, consisting

Table 4. Deaths from accidents away from work and unspecified, and standardized mortality ratios, men 20–64 years of age in selected occupations and industries,¹ United States, 1950

Occupation or industry	Number of deaths	Standardized mortality ratio
<i>Occupation</i>		
Farmers and farm laborers.....	4, 554	126
Carpenters.....	701	110
Masons, tile setters, and stone cutters.....	160	134
Mechanics and repairmen, automobile.....	524	121
Structural metal workers.....	69	197
Mine operatives and laborers (n.e.c.).....	839	209
Operatives and kindred workers (n.e.c.):		
Sawmills, planing mills, and miscellaneous wood products.....	174	157
Primary metal industries.....	199	120
Fishermen and oystermen.....	117	260
Lumbermen, raftsmen, and wood choppers.....	316	268
Other specified laborers.....	177	124
Laborers (n.e.c.):		
Furniture, saw and planing mills, miscellaneous wood products.....	343	301
Stone, clay, and glass products.....	114	224
Construction.....	961	193
Railroads and railway express service.....	471	248
<i>Industry</i>		
Agriculture.....	4, 646	126
Forestry and fisheries.....	181	238
Crude petroleum and natural gas extraction.....	305	192
Construction.....	3, 397	140
Logging.....	339	292
Sawmills, planing mills, and mill work.....	598	163
Railroads and railway express service.....	1, 222	133

¹ From Intermediate List (1).

NOTE: "n.e.c."—not elsewhere classified.

chiefly of motor vehicle and home accidents, considerably less variation in death rates would be expected among the major occupation or major industry groups, since these causes of death are not directly connected with work activity. The charts bear this out. However, there seems to be some correlation between the rates for deaths from accidents while as work and the rates for deaths from accidents away from work or "not stated." A possible explanation may be that the "not stated" group to some degree includes work accidents. Of the 15 occupations for which both the standardized mortality ratio and the proportionate mortality ratio for accidents away from work are high (table 4), 7 appear also in table 3. The seven industries shown in table 4 also appear in table 3. At a later date all accidents may be tabulated in further detail in order to produce a better understanding of the high standardized mortality ratios.

Summary

Data are presented for mortality from accidents in 1950 among men 20–64 years of age, according to the occupation or industry reported on death certificates. Considerable difficulty exists in interpreting death rates based on usual occupation, requested on the death certificate, and the current occupation, enumerated on the census schedule, because of the frequent lack of correspondence between the two reports.

A method is suggested that permits the interpretation of the mortality data with a reasonable degree of confidence. Its application to accident mortality figures for 1950 shows that in that year death rates from accidents occurring at work were significantly high for men in certain of the manual occupations. For accidents occurring at places other than at work rates were high also for some of the manual occupations. About half of these occupations had been listed as having high rates for work accidents. It is unlikely that the high rates for these occupations are the results of errors in reporting occupation or industry. On the other hand, the criteria established for the selection of these occupations may result in omitting other high mortality groups because

reporting errors cannot be eliminated as a possible explanation of unusual rates.

REFERENCES

- (1) U.S. Bureau of the Census: Census of population: 1950. Vol. II. Characteristics of the population. Pt. I. U.S. summary. U.S. Government Printing Office, Washington, D.C., 1953.
- (2) Kaplan, D. L., Parkhurst, E., and Whelpton, P. K.: Comparability of reports on occupation from vital records and the 1950 census. *Vital Statistics—Special Reports, Selected Studies*, vol. 53, No. 1. In preparation.
- (3) Guralnick, L.: Mortality by occupation and industry. *Vital Statistics—Special Reports, Selected Studies*, vol. 53, No. 2. In preparation.

PUBLICATION ANNOUNCEMENTS

Address inquiries to publisher or sponsoring agency.

Check-Ups: Safeguarding Your Health. Public Affairs Pamphlet No. 314. By Michael H. K. Irwin, M.D., M.P.H. June 1961; 18 pages; 25 cents. Public Affairs Pamphlets, 22 East 38th St., New York 16.

Psychiatric Pilot Project. Publication No. 31. 1961; 25 pages. Institute for the Crippled and Disabled, Community Education Department, 400 First Ave., New York 10.

Volunteer Services in Mental Hospitals. Report of the Institute for Directors of Volunteer Services in Mental Hospitals. 1961; 255 pages. National Association for Mental Health, 10 Columbus Circle, New York 19.

Report of the Committee on the Control of Infectious Diseases. 1961; 132 pages; \$1. American Academy of Pediatrics, 1801 Hinman Ave., Evanston, Ill.

Proceedings of the 15th Purdue Industrial Waste Conference. 1961; \$3.50. Dean G. A. Hawkins, Engineering Administration Building, Purdue University, Lafayette, Ind.

Occupational Disease in California Attributed to Pesticides and Agricultural Chemicals, 1959. February 1961; 30 pages. California State Department of Public Health, 2151 Berkeley Way, Berkeley 4, Calif.

Salaries and Working Conditions of Social Welfare Manpower in 1960. 1961; 130 pages; \$1.75. National Social Welfare Assembly, Inc., 345 East 46th St., New York 17.

Planning for Better Hospital Service in the Charleston Area. 1961; 28 pages. The Hospital Facilities Study Committee of Kanawha Welfare Council, Inc., Charleston, W.Va.

Simplified Diet Manual With Meal Patterns. Prepared by Nutrition Service of the Iowa State Department of Health. 1961; 119 pages; \$2.50. Iowa State University Press, Ames, Iowa.

Camp Health and Safety Guide. Edited by John Nelson. 1961; 54 pages. Boy Scouts of America, New Brunswick, N.J.

Weather Modification. Second Annual Report, 1960. National Science Foundation, NSF-61-30. 1961; 22 pages; 15 cents. Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

Radiographic Anatomy of the Human Skeleton. By (Mrs.) W. H. Johnson and J. A. Kennedy. 1961; 288 pages, 302 figs.; \$10. The Williams & Wilkins Co., 428 Preston St., Baltimore 2.

The Consistency of ACIR Accident-Injury Relationships in Four States. By B. J. Campbell. June 1961; 39 pages. Automotive Crash Injury Research of Cornell University, 316 East 61st St., New York 21.

Current Research and Development in Scientific Documentation, No. 8. NSF-61-29. National Science Foundation. May 1961; 193 pages; 65 cents. Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

Behavioral Approaches to Accident Research. 1961; 178 pages; \$1.50. Association for the Aid of Crippled Children, 345 East 46th St., New York 17.

Health Care for the Aged in the State of Washington. HIF Perspectives No. a3. By Odin W. Anderson, Ph.D., and William T. Reich, Ph.D. 1961; 19 pages. Health Information Foundation, 420 Lexington Ave., New York 17.

Proceedings. Eighth Annual Meeting of National Citizens Committee for the World Health Organization, November 2-3, 1960. 49 pages; \$1. National Citizens Committee for the World Health Organization, 1790 Broadway, New York 19.

SEC Technical Reports

A limited number of the following reports are available from the Sanitary Engineering Center, Public Health Service, Cincinnati, Ohio. Order by number.

Exhaust Contamination in Passenger Cars. A61-2. By Andrew H. Rose, Jr., Ralph C. Stahman, and Hever J. R. Stevenson. February 1961; 9 pages.

Publications. Section 2. Milk and food. F61-1. 1961; 13 pages.

Estuarine and Marine Pollution. Selected studies on biological, bacteriological, and physical aspects, with major emphasis on the United States literature. W61-4. By William Marcus Ingram and Thaddeus A. Wastler III. 1961; 30 pages.

Program Notes

New York City policemen have been ordered by the police commissioner to give out summonses to drivers of motor vehicles emitting unnecessary smoke. The department of air pollution has reported that the carbon monoxide content of the city air has risen from 1.4 to 3.5 parts per million during the past 5 years.

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Using funds accruing to the United States from the sale of agricultural surpluses (Public Law 480), translations of three Russian scientific publications on the nervous system have been issued: volume 1 of the pathophysiological series of the "Works of the Institute of Higher Nervous Activity of the Academy of Sciences of the U.S.S.R." (1955); A. N. Gordienko, "Control of Immunogenesis by the Nervous System" (1958); and R. E. Kayetskii, "The Neoplastic Process and the Nervous System" (1958). These translations have been distributed to medical libraries by the Office of Technical Services, Department of Commerce, for the National Science Foundation and the National Library of Medicine.

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Subscriptions to *Aging*, a monthly publication prepared by the Special Staff on Aging of the U.S. Department of Health, Education, and Welfare, have grown to more than 11,000. The Superintendent of Documents, Government Printing Office, Washington 25, D.C., sells subscriptions at \$1.00 a year.

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Kentucky and Tennessee will each open a residential school for emotionally disturbed children in 1962. Each school will enroll 40 children, aged 6 to 12. The National Institute of Mental Health, Public Health Service, is aiding the establishment of the schools with a \$1,962,000 grant. Part of this money will be allocated to the George Peabody College for Teachers in Nashville for training teachers, basic research in the problems of disturbed children,

and a study of the effectiveness of the new schools.

The schools are intended for children whose mental illness is not severe enough to require hospitalization, but who cannot be cared for effectively as outpatients. They are not designed for mentally retarded children. The average stay will probably range from 1 to 4 months.

If the project is successful, Kentucky and Tennessee will eventually assume full support of the schools.

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The license for an atomic reactor at the University of Wyoming was suspended by the Atomic Energy Commission when an AEC inspector found the reactor in operation without a licensed person at the controls.

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Educational film strips with sound recorded in the Navajo language are being made by the Division of Indian Health, Public Health Service, in cooperation with the Navajo Tribal Community. The films, on subjects of nutrition, school health, development of water supplies, and trachoma control, will be employed in the tribal education program.

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"Lifetime Health Record," a book by Dr. David D. Rutstein, professor of preventive medicine at Harvard Medical School, encourages everyone to keep a lifetime personal health history, and tells how to do it. Spaces are provided for putting down information on family history, immunization, illnesses, X-rays, tests, and hospital admissions.

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A guide to the literature on laboratory animals has been compiled by Jules Cass and his co-workers at the University of Cincinnati. Literature on the procurement, maintenance, use, and intrinsic characteristics of the various species is listed and annotated.

The guide is Supplement 6 of a recent issue of *Federation Proceedings* titled "A Guide to Production,

Care, and Use of Laboratory Animals." The *Proceedings* is published by the Federation of American Societies for Experimental Biology and Medicine.

The compilation of the bibliography was supported by a research grant from the National Institutes of Health.

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In a pilot project at the National Naval Medical Center, Bethesda, Md., nurses are learning about the medical application of nuclear energy and the nursing techniques and safety measures required in caring for patients receiving radioactive substances.

No graduate nursing program offers such training, although thousands of institutions in the country use radioisotopes for medical purposes. "Radioactive substances are drugs, and nurses are obligated by law to know the minimum and maximum dosages of drugs, their effects and the expected outcome," says Lt. Comdr. Lenore Simon, head of the Division of Nuclear Nursing at the Naval Medical Center.

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Of 400 male alcoholics in the New England area surveyed by Milton H. Maxwell of the Alcoholism Foundation, Alberta, Canada, 50 percent were able to keep their problem from showing while on the job for a year or more, 30 percent for 3 to 5 years, and the rest for 5 years or longer.

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A list of technical reports of the Robert A. Taft Sanitary Engineering Center, Public Health Service, has been issued. Requests for copies of the list may be addressed to the director of the center at Cincinnati 26, Ohio.

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A fountain-pen-shaped radiation monitor that "chirps" has been designed by Oak Ridge National Laboratory and is in production. The device is 6 inches long, weighs 3.5 ounces, and can be worn in the breastpocket by laboratory and industrial workers. At safe levels of radiation, the monitor chirps every 2 minutes. As radiation increases, the chirps blend to produce a tone of rising frequency.