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INDUSTRIAL HYGIENE

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STERILITY RESULTING FROM ARC WELDING IMPROBABLE

The Division of Industrial Hygiene of the National Institute of Health has received several requests for information on the effect of radiation from arc welding on female reproductive organs.

Sterility resulting from exposure to the radiations from arc welding is extremely improbable, and certainly would not be produced without causing other serious systemic disturbances. Impotence of a temporary nature has occasionally been associated with welding operations, but functional impotence is distinctly related to the individual, and the fundamental causative factors are emotional and psychologic. In the absence of demonstrable organic disease, impotence is best treated by psychiatrists.

The part of the ultraviolet spectrum which is emitted by welding arcs and which is known to have biological effects has the characteristic of very low penetrating power. A layer of skin only a fraction of a millimeter thick and a layer of clothing of the usual nature will absorb practically all of the ultraviolet radiation. Infrared radiation emitted by the welding arc may penetrate somewhat more deeply than the ultraviolet rays. However, before the infrared could produce any striking biological effect, a definite sensation of burning would be noted and the effect of the burning would become quite uncomfortable.

Impotence has never been known to arise as the sole and exclusive manifestation of any occupational disease, with the possible exception of damage from roentgen rays (x-rays). Experiments have been conducted in industrial plants to determine whether x-rays are emitted by the welding arc. The results of several weeks' exposure of dental films carried in the pockets of welders failed to indicate even the slightest amount of x-ray exposure.

There is the possibility, however, that persons exposed to arc welding radiation may also develop intoxication from metal fumes and other substances, which may result in diminution or even temporary disappearance of sexual capacity, but not one of the chief potential exposures--ultraviolet rays, ozone, oxides of nitrogen, metal fumes or heat--is known to be capable of producing sexual impotence as the sole manifestation.

The fact that nitrogen compounds may be produced in arc welding may be the basis for the rumor that sexual impotence is produced, since it is an old tradition that some inorganic nitrogen compounds constitute sexual sedatives. There exists scant evidence, if any, that the nitrogen compounds produced in welding will exert any direct or primary action other than on the respiratory tract.

While it is true that any debilitating occupational disease such as lead or manganese poisoning may cause sexual capacity to diminish or temporarily disappear, the same would be true in non-occupational diseases such as typhoid or pneumonia. While one action of lead, in human beings and in the lower animals, is to damage sexual tissue and to promote sterility, abortions, and miscarriages, it is believed that this will not arise in the absence of other and more characteristic features of lead poisoning.

In summary, it would appear extremely unlikely for arc welding radiations to have a deleterious effect on reproductive organs. It is possible, however, that if welding fumes are not properly controlled, intoxications incidental to the welding process infrequently may produce untoward effects.

PRECAUTIONARY MEASURES FOR WORKERS HANDLING  
CHLORINATED NAPHTHALENES AND DIPHENYL COMPOUNDS SUGGESTED

In connection with the recent outbreaks of dermatitis and systemic injuries resulting from the use of chlorinated naphthalenes and diphenyl compounds in the State of New York, Dr. Leonard Greenburg, Director of the Division of Industrial Hygiene, New York State Department of Labor, has suggested that precautionary measures covering the following points be formulated in cooperation with the manufacturers of these compounds for the protection of the workers handling these materials:

1. Recognition of an agreement on toxicity of compound.
2. Warning to users—agreement to provide all users with notice.
3. Warning to middle men who sell the material in small lots to users.
4. Provision by the companies of a statement covering measures for protection.
5. Agreement by employers to provide pertinent State authority with a list of users and also a list of applications or processes in which the material is used. This list of users should be kept up to date.

An evaluation of the potential dangers of these materials is desirable. Hence it has been requested that reports on the incidence of such injuries in different States be sent to Dr. J. J. G. Townsend, Chief of the Division of Industrial Hygiene, National Institute of Health. The following information is to be included in these reports:

1. The number of cases of dermatitis or systemic poisoning that have occurred in each State.
2. The duration of the disease (time lost from work).
3. The industry and specific occupation in which these cases occurred.
4. The name of the material which was the causative agent.

It is planned to call a meeting of representatives of the five manufacturers of these materials with the Chemical Products Agreements Committee appointed by the Surgeon General.

With this procedure it is hoped that the hazards resulting from the handling of these materials can be adequately controlled.

#### WAR CONFERENCE

The four-day "War Conference" of the American Association of Industrial Physicians and Surgeons, The American Industrial Hygiene Association, and the National Conference of Governmental Industrial Hygienists will be held at Rochester, New York, May 24-27. At this meeting the medical, surgical and industrial hygiene experts will pool their knowledge and exchange their experiences regarding the new and complex problems of today's wartime production. Among the problems to be discussed are:

The mass entry of women into industry.

Older-age employees, with their various associated problems; proper placement and employability considerations of the 4F rejectees.

Rehabilitation and proper employment of those already discharged from the military services because of disabling conditions.

Toxic and other hazards from new substances, new processes, and the use of substitute materials.

Absenteeism; fatigue; nutrition.

Effects of long hours; double shifts; two-job workers; overtime; increased industrial accident rates.

Advances in the treatment of illnesses and injuries.

#### TUBERCULOSIS FINDINGS IN INDUSTRY REPORTED

Seventy-seven war industries in 11 different States were surveyed by the eight 35 mm. photofluorographic units operating in industry prior to February 1, 1943, reports the Office of Tuberculosis Control, U. S. Public Health Service.

A total of 194,896 individuals were x-rayed. Tabulations on results of the x-ray are available for 125,190 people. Of these, 1,651 or 1.3% were found to have significant pulmonary tuberculosis. The distribution of the positive cases by stage of the disease was as follows: 874 or 53.6% minimal; 707 or 43.3% moderately advanced; and 50 or 3.1% far advanced.

In the District of Columbia 28,098 government workers have been x-rayed. Exactly 300 cases (1.1%) of pulmonary tuberculosis have been discovered. Of these 182, (60.7%) were minimal, 106 (35.3%) moderately advanced, and 12 (4.0%) were far advanced. In addition, 1,300 workers at the National Institute of Health have been x-rayed. Among these, 15 cases of tuberculosis were found-- 9 minimal and 6 moderately advanced.

#### COMMITTEE ON CARDIOVASCULAR DISEASES IN INDUSTRY FORMED

The New York Heart Association has recently formed a Committee on Cardiovascular Diseases in Industry whose purpose is to advise industry concerning the employment of persons with cardiovascular diseases. It is planned to use the facilities of the New York Heart Association which consists of 66 cardiac clinics, in furthering this work.

Dr. Clarence E. de la Chapelle is chairman of this committee. Other members are: Dr. Donald B. Armstrong of the Metropolitan Life Insurance Company, Dr. O. F. Fedley of the U. S. Public Health Service, Dr. Ada Chree Reid of the Metropolitan Life Insurance Company, and Dr. Cassius Watson of the American Telephone and Telegraph Company. It is planned to add to this committee as the need arises. Although this committee was originally formed for the purpose of dealing with cardiac problems in industry in New York City, it is not intended to limit the scope of its activities to that locality.

Under the auspices of the New York Heart Association and the New York Academy of Medicine, a radio talk, "You Can Work With Heart Disease," was given by Dr. Charles Shookhoff over station WMCA, Brooklyn, N. Y. on March 13.

**IMPORTANT: ENCLOSED WITH THIS INDUSTRIAL HYGIENE NEWS LETTER IS A MIMEOGRAPHED LIST OF SAMPLING AND ANALYTICAL METHODS FOR VARIOUS ATMOSPHERIC CONTAMINANTS WHICH HAS BEEN PREPARED BY SENIOR CHEMIST F. H. GOLDMAN, NATIONAL INSTITUTE OF HEALTH.**

#### DEGREASING COMPOUNDS IN NEW FORMS

Degreasing compounds appearing under non-descriptive trade names require careful analysis to insure proper protective measures in their use. Two different soap compounds recently submitted to the National Institute of Health for analysis were found to contain ethylene dichloride in appreciable amounts. One

compound contained 33 percent ethylene dichloride. Control of solvent degreasing compounds by enclosure, condensation, or local exhaust ventilation is accepted good practice but alkaline degreasing compounds are usually controlled only to prevent dermatoses. The practice of adding chlorinated hydrocarbons to alkaline degreasers will require increased vigilance on the part of the industrial hygienist.

#### INSTITUTE FOR NURSES HELD

A ten day industrial hygiene institute for nurses was held at the National Institute of Health, March 1-10. Those attending were: Public Health Nursing Consultants of the U. S. Public Health Service District Offices; the nursing consultants assigned to industrial hygiene divisions of the State departments of health; the supervisors of visiting nurse associations rendering part-time services in small industries; and the instructors in the university public health nursing programs of study which offer courses on industrial hygiene for nurses. Over 70 nurses attended the institute.

For the past two years the nursing consultants of the Public Health Service have been engaged in the promotion of industrial nursing services through the industrial hygiene and public health nursing divisions of the State departments of health. During that time the number of State health departments employing nursing consultants in the field of industrial hygiene has grown from 3 to 18.

The institute was officially opened by Surgeon General Thomas Parren. The first session was devoted to wartime problems in industrial health and a review of medical, dental, and nursing services in industry. Discussion of occupational diseases and control measures followed. Nonoccupational disease control through special health programs in industry, special nursing problems, occupational injuries, safety and welfare programs, were covered during the succeeding days.

#### NOTES ON INDUSTRIAL DENTISTRY

P. A. Dental Surgeon (R) Leland H. Evans has been assigned to the Division of Industrial Hygiene, Michigan State Department of Health, as consultant on industrial dentistry. His assignment will round out the industrial hygiene staff of the Michigan Health Department.

At the recent mid-winter meeting of the Chicago District Dental Society, plans were initiated for the organization of industrial dental surgeons. The following temporary officers were elected to

present plans of organization at the October meeting of the A.D.A. in Cincinnati: Chairman, E. S. Arnold, D.D.S.; Secretary, R. M. Walls, D.D.S.; Advisory Board: R. C. Delgleish, D.D.S., L. D. Heacock, D.D.S., Ernest Goldhorn, D.D.S., Hugo M. Kulstad, D.D.S., Robert S. Sprau, D.D.S., Frank Houghton, D.D.S.

### SPECIAL NOTICE

The U. S. Public Health Service has adopted the title of Sanitarian for commissioned reserve officers whose education and experience is in fields allied to public health work, but not in the specific field of medicine, dentistry, sanitary engineering or engineering. Comparable qualifications with regard to education and experience for each rank are demanded for all titles. This title will replace the titles of Chemist and Industrial Hygiene Engineer which have been given recently to some officers assigned to industrial hygiene work.

The Manual of Industrial Hygiene and Medical Service in War Industries will be ready in April. Under the editorship of Dr. William M. Gafafer, Chief of the Statistical Unit of the Division of Industrial Hygiene, it has been prepared to assist industrial physicians, the general medical profession, industrial engineers and hygienists, and others in industrial service to protect the health of workers in war industries. The manual will contain about 500 pages. It is being published by the W. B. Saunders Company. The price has not yet been determined.

### STATE ACTIVITIES

#### CALIFORNIA: Unusual Exposures Reported

Unusual exposures to several toxic materials have recently been reported by the Division of Industrial Hygiene of the Los Angeles County Health Department. The following items were considered of special interest:

Carbon Monoxide in Metalizing. In certain repair shops where brake-drums were being built up by metalizing with steel wire, employees complained that the fumes made them sick. These fumes consisted of iron particles about four microns in diameter which, when taken in through the mouth, produced a peculiar taste and some other vague symptoms. It was also noticed that metalizing being done with brass wire did not produce white zinc oxide smoke. It was then suspected that the metalizing was being done in a reducing atmos-

phere of excess acetylene and that there might be a possibility of high concentrations of carbon monoxide. Tests made on a large scale metalizing job using steel wire confirmed this premise since concentrations of carbon monoxide as high as 500 parts per million in the breathing zone of the operator were recorded when metal screens had been placed around the location to prevent the dispersion of large particles throughout the room.

Fluoride and Chromium from Electric Welding. The welding rods used in welding armor plate had produced numerous cases of throat irritation. Analysis of the composition of these rods showed high percentages of fluorine and chromium. Atmospheric samples at the welders breathing level showed concentrations of fluorine averaging 2.6 mg./cu.m. and ranging from 1.6 to 5.1 mg./cu.m. Chromium concentrations were approximately 10 times the maximum amount permitted for chromic acid. It was the consensus that the production of hexavalent chromium compounds or chromic acid in appreciable amounts in the welding operations was improbable and that other forms of chromium would not be toxic in the concentrations encountered. Consequently it was assumed that exposure to fluorine had caused the workers' throat irritation. While the maximum permissible concentration of fluorine for continuous exposure has not been established it was recommended that the concentration should be kept at as low a level as possible and preferably below 1 milligram per cubic meter.

MICHIGAN: Rapid Method Found for Estimation of Formaldehyde

The Bureau of Industrial Hygiene of the Michigan Department of Health has called out attention to a more rapid method for the estimation of formaldehyde than that afforded by the use of Schiff's reagent. This method which has been developed on a quantitative basis by J. B. Gisclard, Chief Chemist, and is based on one of Fritz Feigl's "spot" tests (Qualitative Analysis by Spot Tests, Fritz Feigl. Nordeman Publishing Co., New York, 1939) is described as follows:

Reagents: Standard solution of formaldehyde (1 ml. = 1 mg.)  
Sodium hydroxide solution, 1 N.  
Ferric chloride solution, 1% in 2 N HCl.  
Benzene-sulfohydroxamic acid, freshly prepared 1% alcoholic solution. (This chemical can be purchased from Eastman Kodak Company.)

Procedure. To 10 ml. of the unknown aqueous solution of formaldehyde in a 50 ml. Nessler tube are added 1 ml. of the sodium hydroxide solution, and .5 ml. of the benzenesulfohydroxamic solution. The tube is shaken and allowed to stand for about three minutes followed by the addition of 1 ml. of the ferric chloride solution.

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The color that forms immediately is compared with those of a series of standards similarly prepared and ranging from .1 mg. to 1 mg. In preparing the standards the volume in each tube is made up to 10 cc before admitting the reagents.

After color formation the contents can be brought up to 50 ml. and compared but the colors fade in less than one hour. If left at the initial volume visual comparisons are easily made, particularly in the range of from .1 to .5 mg. where there is a slight difference in color as well as in intensity.

Discussion. The reaction seems to depend to some extent on concentration and if the volume of unknown solution to be taken is only 5 ml. a series of standards can be made using smaller amounts of formaldehyde.

Some investigators prefer to collect formaldehyde in an alkaline solution. If such a solution is greater than 1 N, a correspondingly stronger acid solution should be added along with the ferric chloride solution to insure proper acidity for color formation.

#### OKLAHOMA: Two Institutes Held

Two one-day institutes on Wartime Industrial Health were held at Tulsa and Oklahoma City March 18 and 19. They were sponsored by the Committees on Postgraduate Medical Teaching and Industrial and Traumatic Surgery of the Oklahoma State Medical Association in cooperation with the Oklahoma State Health Department.

The programs in each city included talks on: The Purposes and Objectives of the Program on Industrial Health of the Oklahoma State Medical Association, Technical Assistance of the State Health Department Available to Industry, Industrial Hygiene in War Production, General Relation of Medicine to Industry, Pre-employment Examination and Placement, Remedial Legislation, Conservation of Industry's Manpower, Medical Legal Phase and Evaluation of Disability, Management Looks at Industrial Health, and Dermatitis in War Industries.

#### GEORGIA: Four Institutes Held

Four one-day institutes on industrial health were held in four Georgia cities--Augusta, Savannah, Atlanta, and Columbus--during March. Each institute included talks on community health problems, wartime health problems within industry, health services available to industry in Georgia, management's view of the physician's function in industry, labor's view of industrial health, recent developments in the handling of industrial injuries, nursing aspects of health program for industry, dental aspects of health program for industry and medical aspects of health program for industry.



MISSOURI: When Is a Respirator?

This is the title of an interesting little item in the February Industrial Health News Letter issued by the Industrial Hygiene Service, St. Louis County Health Department in cooperation with the Missouri State Board of Health, for distribution throughout Missouri. The item reads: "An employee wearing a good general duty respirator died as the result of fumes he breathed in through the respirator while cleaning pipe line screens on the bottom of a gasoline tank car. This case emphasizes the fact that respirators are designed for use in specific types of atmosphere. Care should be taken that workers are equipped with the proper breathing apparatus for the atmosphere in which they are to work."

PERSONNEL NOTES

During March two newly commissioned officers were assigned to the Division of Industrial Hygiene, National Institute of Health. They were P. A. Sanitarian (R) Duncan A. Holaday and P. A. Surgeon (R) Abner Veitch. They will serve as members of field crews surveying government owned, contract operated arsenals.

Junior Chemist James Mandis has been assigned to the Virginia State Department of Health for duty with the Industrial Hygiene Division.

Mr. William Stalker, Industrial Hygiene Engineer of the Division of Industrial Hygiene, Kentucky State Health Department, is spending three weeks in-service training with the Division of Industrial Hygiene, National Institute of Health.

With best wishes for her happiness, but with regret for the partial loss of her services to the Public Health Service, we announce the resignation of Mrs. Karl Klump (nee Olive Whitlock) who has served ably as Associate Public Health Nursing Consultant to the Division of Industrial Hygiene. Mrs. Klump will serve as Special Consultant to the U. S. Public Health Service on Industrial Hygiene Nursing. During the two years Mrs. Klump was associated with this Division the State industrial hygiene services showed their recognition of the importance of nursing in this field by increasing the number of Industrial Hygiene Nursing Consultants from three to eighteen. Special credit is also due Mrs. Klump for her leadership as Chairman of the American Public Health Association Committee which conducted the Nationwide Survey to Study the Duties of Nurses in Industry. This survey resulted in the formulation of desirable industrial

nursing practices as reported in the February 1943 issue of Industrial Hygiene.

The March 13 issue of the Journal of the American Medical Association is the Industrial Health Number. It contains several excellent articles on industrial health as well as the complete report of the Annual Congress of Industrial Health held in Chicago, January 11-13.

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News items for publication in INDUSTRIAL HYGIENE should be submitted to Sanitary Engineer J. J. Bloomfield, Division of Industrial Hygiene, National Institute of Health, Bethesda, Maryland.

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## NEW PUBLICATIONS

(Supplement to Publications List of Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, March 1943)

THE TOXICOLOGY OF BERYLLIUM. Frances Hyslop, E. D. Palmes, W. C. Alford, A. R. Monaco, and L. T. Fairhall. Natl. Inst. Health Bull. No. 181 (1943).

Assuming beryllium to be a toxic substance, investigation was made into its physiological effects following intraperitoneal injection, oral administration, inhalation of its dust, and exposure to fumes produced during electrolytic deposition of beryllium. No particular toxicity was established. Rather, it appeared that whatever toxicity has been found to occur with the beryllium salts is due to the toxicity of the acid radical, such as the fluoride or oxyfluoride, or to an objectionable condition brought about by the hydrolysis of certain of its salts, such as the chloride and sulfate. No safe permissible working standards should be based upon beryllium itself. Safe operating conditions in the preparation of the metal or its alloys must be based upon other considerations than an implied toxicity of beryllium.

TOXICOLOGY OF ACRYLONITRILE (VINYL CYANIDE). III. DETERMINATION OF THIOCYANATES IN BLOOD AND URINE. A. H. Lawton, T. R. Sweeney, and H. D. Dudley. J. Ind. Hyg. Toxicol., 25, 13-19 (Jan. 1943).

This paper describes a test which will enable physicians to discover cases of over-exposure to acrylonitrile before toxic symptoms develop. It has been found that dogs exposed for four hours to 24, 40, and 60 p.p.m. acrylonitrile in air show a significant increase in serum thiocyanate immediately following the exposure period, and a significant increase in urine thiocyanate content 24 to 48 hours following the exposure period. Therefore, a method has been devised for determining small amounts of thiocyanate in blood and urine.

THE TOXICITY AND POTENTIAL DANGERS OF ALIPHATIC AND AROMATIC HYDROCARBONS. W. F. von Oettingen. Yale J. Biol. Med., 15, 167-184 (Dec. 1942).

This article presents a general discussion of the toxicity of various saturated and unsaturated aliphatic hydrocarbons, benzene, benzene, and related aromatic hydrocarbons. Information is given with regard to the clinical picture of acute and chronic poisoning, as well as the effects produced by exposure to various atmospheric concentrations of these substances. Reference is made to the more detailed information given in the author's paper on "Toxicity and Potential Dangers of Aliphatic and Aromatic Hydrocarbons: A Critical Review of the Literature," which is Public Health Bulletin No. 255, published in 1940.

THE IDENTIFICATION AND LOCALIZATION OF LEAD IN BONE TISSUE. L. T. Fairhall. U. S. Public Health Reports, 58, 209-216 (Feb. 5, 1943).

A method of positively identifying lead in bone tissue, which permits detailed investigation of the lead deposit, is set forth. It is shown that

while the epiphyseal portion of bone is rich in lead, particularly in the early stage of lead absorption, deposition occurs throughout the compact tissue on all surfaces over which blood passes. X-ray studies of the bones of lead-poisoned animals indicate that the amount of lead is insufficient to be revealed by ordinary X-ray photography. Deposition of lead is shown to occur in the fat cells of the red marrow. Lead storage in bone tissue occurs first as colloiddally dispersed and finally as segregated crystalline masses.

SICK ABSENTEEISM AMONG A SAMPLE OF REPORTING COMPANIES IN THE INDUSTRIAL HYGIENE FOUNDATION, 1941, by W. M. Gaffner, in Proceedings of the Seventh Annual Meeting, Industrial Hygiene Foundation of America, Inc., Pittsburgh, Pa., Nov. 11-12, 1942. Pp. 116-132. Abstract, Ind. Med., 12, 23 (Jan. 1943).

Continuing his analyses of sickness absences of eight days or more among fourteen companies employing 50,000 males and 2,200 females, the author found, in 1941, a total of 4,230 absences covering 142,000 days. Analyses were made of causes, duration, frequency, etc., of the absences, and comparisons with similar reports from other groups. If illnesses of one day or longer had been recorded, rather than only the longer absences, it is estimated conservatively that there would be about 26,800 absences causing 284,000 lost man-days.

DISABLING MORBIDITY AMONG INDUSTRIAL WORKERS, THIRD QUARTER OF 1942, WITH A NOTE ON THE OCCURRENCE OF THE RESPIRATORY DISEASES, 1933-42. W. M. Gaffner. U. S. Public Health Reports, 58, 232-234 (Feb. 5, 1942).

The analyses of statistics show principally that the frequency rate for respiratory diseases causing absence of eight days or longer for the third quarter (July-September) of 1942, when compared with the corresponding quarters of the nine preceding years, is the highest. Thus, while the frequency of all sickness increased during the ten years from 54.8 to 78.7 cases per 1,000 workers, the respiratory diseases increased from 14.0 to 26.7, pneumonia increasing from 0.8 to 3.0.

OCCUPATIONAL DERMATOSES IN THE WAR INDUSTRIES, by Louis Schwartz, in Transactions of the 31st National Safety Congress, Chicago, Oct. 27-29, 1942. Vol. 1, pp. 173-178. Also in: Proceedings of Seventh Annual Meeting, Industrial Hygiene Foundation of America, Inc., Pittsburgh, Pa., Nov. 11-12, 1942. Pp. 36-47. Abstract, Ind. Med., 12, 18-19 (Jan. 1943).

Following a general discussion of preventive methods and treatment of dermatoses, especially those from that common source of infection, cutting oils, Dr. Schwartz discusses skin hazards encountered in the manufacture of materials of combat: firearms, explosives, armored vehicles, vesicant and incendiary agents, etc.

Dermatitis may occur among electroplaters, welders, shell and bomb loaders, and among those coming in contact with tetryl, DNT, TNT, lead azide,

fulminate of mercury, ammonium nitrate, asphalt paint, solvents, dopes, paints, thinners, and degreasers. Preventive and protective methods are presented.

PRACTICAL PLAN FOR THE TREATMENT OF SUPERFICIAL FUNGUS INFECTIONS. S. M. Peck and Louis Schwartz. U. S. Pub. Health Repts., 58, 337-345 (Feb. 26, 1943).

Methods of prophylaxis and treatment of superficial fungus infections affecting the glabrous skin, the hair or hairy regions, and the nails are described. Formulae are given for recommended dusting powders, ointments, etc., for use in the treatment of the various infections. Recommendations are also made for sterilizing infected shoes and socks in cases of dermatophytosis of the feet (athlete's foot).

AN OUTBREAK OF MICROSPORON LANOSUM INFECTION FROM A KITTEN. Isadore Botvinick, S. M. Peck, and Louis Schwartz. U. S. Pub. Health Repts., 58, 317-319 (Feb. 19, 1943).

Inquiry into four cases of ringworm in a family proved that the infection was transmitted from a kitten to the children and from one of the children to his mother. This indicates the importance of seeking animal sources of such infections and the need to cure or destroy the animal which causes an epidemic.