

UNCLASSIFIED

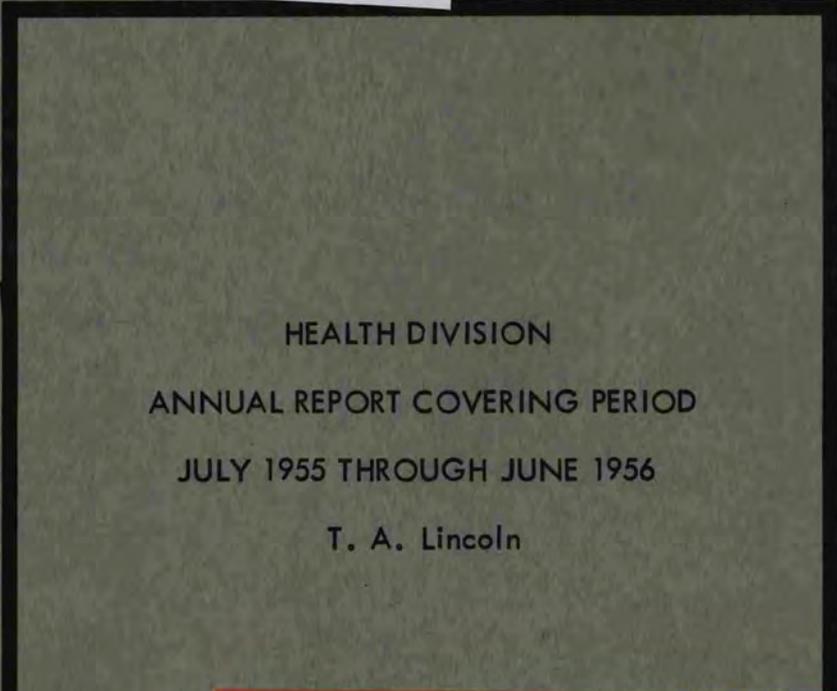
CENTRAL RESEARCH LIBRARY
DOCUMENT COLLECTION

MARTIN MARIETTA ENERGY SYSTEMS LIBRARIES

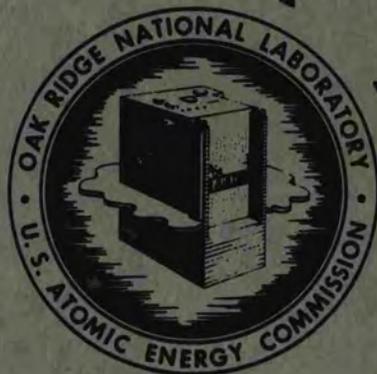


3 4456 0350336 8

ORNL-2190
Progress *cy. 1*



HEALTH DIVISION
ANNUAL REPORT COVERING PERIOD
JULY 1955 THROUGH JUNE 1956
T. A. Lincoln



CENTRAL RESEARCH LIBRARY
DOCUMENT COLLECTION

LIBRARY LOAN COPY

DO NOT TRANSFER TO ANOTHER PERSON

If you wish someone else to see this document,
send in name with document and the library will
arrange a loan.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation



POST OFFICE BOX X • OAK RIDGE, TENNESSEE

UNCLASSIFIED

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

- A. Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission to the extent that such employee or contractor prepares, handles or distributes, or provides access to, any information pursuant to his employment or contract with the Commission.

UNCLASSIFIED

Report Number ORNL-2190

Copy No. 1

Contract No. W-8405 eng 26

HEALTH DIVISION
ANNUAL REPORT COVERING PERIOD
JULY 1955 THROUGH JUNE 1956

Thomas A. Lincoln, M. D.

Date Issued

FEB 13 1957

OAK RIDGE NATIONAL LABORATORY

operated by

UNION CARBIDE NUCLEAR COMPANY
A Division of Union Carbide and Carbon Corporation
Post Office Box X
Oak Ridge, Tennessee

UNCLASSIFIED



3 4456 0350336 8

INTERNAL DISTRIBUTION

- 1 - 2 Training School Library
- 3 Health Physics Library
- 4 - 5 Biology Library
- 6 -15 Laboratory Records
- 16-40 Health Division
 - 41 A. M. Weinberg
 - 42 M. E. Ramsey
 - 43 J. A. Swartout
 - 44 K. Z. Morgan

EXTERNAL DISTRIBUTION

- 45 A. G. Kammer, M. D., Head, Dept. of Occupational Health, Graduate School of Public Health, University of Pittsburgh, Pittsburgh 13, Pa.
- 46 E. V. Henson, M. D., C & CCC, South Charleston, W. Va.
- 47 R. J. Sexton, M. D., C & CCC, Institute, W. Va.
- 48 R. E. Joyner, M. D., C & CCC, Texas City, Texas.
- 49 John Neilson, Jr., M. D., Union Carbide and Carbon Corp., New York City
- 50 C. U. Dernehl, M. D., Union Carbide and Carbon Corp., New York City
- 51 Neal Ward, M. D., Union Carbide Nuclear Co., Paducah, Ky.
- 52 J. Lyon, M. D., Union Carbide Nuclear Co., K-25, Oak Ridge, Tenn.
- 53 C. R. Sullivan, Jr., M. D., Union Carbide Nuclear Co., Y-12, Oak Ridge, Tenn.
- 54 Technical Information Service, Oak Ridge Operations Office, AEC, Oak Ridge, Tenn.
- 55 Div. of Biology and Medicine, U. S. AEC, Washington 25, D. C.

ILLUSTRATIONS

Figure 1	Medical-Accident Report
Figure 2	Discharge of Injury Form
Figure 3	Release to Work Form
Figure 4	Restriction From Work with Radioactive Materials Form
Figure 5	Monthly Pregnancy Report Form
Table 1	Resumé of Findings of Proctoscopic Examinations
Figure 6	Erythrocyte Sedimentation Rate mm/hr - Wintrobe Corrected Reading
Figure 7	White Blood Count -- Thousands of Cells/cu.m.m.
Figure 8	Percent Lymphocytes
Figure 9	Percent Segmented Neutrophils
Figure 10	Percent Basophils, Eosinophils and Monocytes
Figure 11	Lymphocytes Greater Than the Sum of Segmented Neutrophils and Non-Segmented Neutrophils
Figure 12	Hemoglobin, Grams/cc
Figure 13	Hematocrit Percentage
Figure 14	Hearing Loss, Craftsmen and Laborers
Figure 15	Hearing Loss, Technical and Administrative
Figure 16	Presbycusis Curves for Men
Figure 17	Octave Band Analyses, Audiometric Testing Room
Figure 18	Nutrition Exhibit
Figure 19	Noise Level, Central Machine Shop

HEALTH DIVISION ANNUAL REPORT

July 1, 1955 -- June 30, 1956

Thomas A. Lincoln, M. D., Medical Director

SCOPE OF PROGRAM

An active program in industrial health has been maintained at the Oak Ridge National Laboratory during the past year, with the objective of maintaining the best possible health status of the employed personnel. The specific component parts of this program are as follows: (Changes are indicated with an asterisk and are explained at the end of this section.)

I. INDUSTRIAL HEALTH PROGRAM AS IT RELATES TO THE INDIVIDUAL EMPLOYEE

The employee ordinarily is considered from three points of view: A. As a candidate for employment; B. As an employee requiring health maintenance, and C. As a sick or injured employee.

A. As A Candidate for Employment

1. Examination at Time of Interview

- a. Completion of Cornell Medical Index Health Questionnaire.
- b. Completion of medical and employment history.
- c. Laboratory examinations.
 - 1). Complete blood count (hemoglobin, white blood cell count-differential cell count, hematocrit and sedimentation rate).
 - 2). Urinalysis
 - 3). Chest film (14" by 17" at 6').
 - 4). Serodiagnostic test for syphilis (VDRL).
- d. Brief personality evaluation by clinical psychologist, routinely when possible and mandatory when examining physician so indicates.
- e. Complete physical examination by a staff physician.
- f. Review of all laboratory and clinical findings by examining physician and consulting psychologist.
 - 1*). Weekly consultation with Personnel Director.

INDUSTRIAL HEALTH

- 2). Health classification determined and forwarded to the Employment Section of the Personnel Department.
- 3). Reservations stated when indicated.

2. Examinations and Procedures When Employee Reports for Work.

- a. Complete blood count, urinalysis, chest x-ray, if interval between preliminary examination and employment date exceeds three weeks.
- b. Determination of blood type and Rh factor.
- c. Vision evaluation (~~Bausch and Lomb Ortho-Rater~~)
- d. Hearing evaluation (~~Mico audiometer~~)
- e. Brief interview with examining physician for interval history.
- f. Immunizations
 - 1). Smallpox
 - 2). Tetanus
 - 3). Typhoid and paratyphoid fever.
- g. Fitting and issuing of occupational eyewear, if indicated.
- h. Electrocardiogram.

B. As An Employee Requiring Health Maintenance

1. Annual multiphasic screening on all employees each year.
 - a. Complete blood count, urinalysis and serodiagnostic test.
 - b. Ortho-Rater examination.
 - c. Audiogram.
 - d. Electrocardiogram, including weight determination and blood pressure recording, at age 35 and then once a year after age 40, or yearly when abnormal, or when so requested by examining physician.
 - e. Stimulating immunization injections as needed.
 - f*. Chest x-ray.
2. Complete periodic physical examination by physician.
 - a. All employees 45 years of age and over.
 - b. Given every third year until age 45, with the exceptions listed below:
 - 1). Yearly on all diabetics.
 - 2). Yearly on all employees with restrictions.
 - 3). Yearly on certain key personnel.
 - 4). Yearly when so requested by a physician.

ORNL-2190
Annual Report

3. Review of classification and restrictions by examining physician.
 - a. Notification to supervisor of any changes in restrictions.
4. Notification of results of multiphasic screening examinations.
 - a. No significant abnormality.
 - b. Request for repeat examination.
5. Special examinations, when indicated, because of special health hazards.
 - a. Metallurgy
 - 1). Vital capacity.
 - 2). Blood and urine beryllium determination.
 - b*. Cafeteria employees.
 - 1). Blood, urine and x-ray examination every six months.
 - c. Chemical Technology (mercury workers)
 - 1). Blood and urine mercury level determinations when employed, then every three months.
 - 2). Oral pharyngeal and neurological examination by a physician.
 - 3). Quarterly routine urinalysis and hemoglobin determinations.
 - d*. Lead Burners.
 - 1). The concentration of lead in the blood and urine, a qualitative urine coproporphyrin and blood hemoglobin determinations are done at the time of employment and every three months thereafter. Urine lead determinations are done every month.
 - e*. X-ray examination of lumbar spine.
 - f. Cyclotron and Pile Operators.
 - 1). Slit lamp examination by consultant ophthalmologist semi-annually.
 - g. Other diagnostic procedures, as indicated.
 - h. Clinical photograph, in color and/or black and white, of unusual findings.
6. Health Education.
 - a. Creation (or procurement) and distribution of posters and pamphlets.
 - b. Procurement of waiting room issues of the American Medical Association health magazine, "Today's Health," for all dispensaries.
 - c*. Preparation of a weekly health column for the Oak Ridge National Laboratory News by Dr. Lincoln.
 - d. Meeting with supervision or management to clarify job adjustment of the worker.

- e. Health Division contribution to orientation for new employees and other groups.
 - f. Talks to employee groups relative to occupational and non-occupational health problems.
 - g. Health education seminars.
 - h. Nutrition counseling.
7. Industrial hygiene surveys for occupational hazards by Mr. N. H. Ketcham, consultant Industrial Hygienist from Carbide and Carbon Chemicals Company at South Charleston; co-operation with the Safety Department in industrial hygiene maintenance control.

C. As a Sick or Injured Employee

- 1. Medical and/or surgical care of occupational illness or injury, including over-exposure to radiation, under workmen's compensation laws.
- 2. Emergency care for non-occupational illness or injury including diagnosis, emergency therapy, and referral to family physician when indicated.
- 3. Assistance and direction in medical rehabilitation of the ill or injured employee.
- 4. Liaison between ill employee and private physician, hospital, Veterans' services, Welfare Services Department, American Red Cross, Office of Vocational Rehabilitation, etc.
- 5. Counseling services for workers presenting job maladjustments involving emotional disturbances (mental hygiene procedures).
- 6. Conference with management or supervision in order to effect a better work adjustment for the emotionally disturbed employee.
- 7*. Completion of necessary injury and illness forms.
- 8*. Reporting of pregnancy.

II. CONSULTATION SERVICES

- A. Consultant services in cardiology.
- B. Consultant services in radiology.
- C. Consultant services in clinical psychology.
- D. Consultant services in nutrition.
- E. Consultant services in industrial hygiene.
- F. Consultant services in proctology.
- G. Others as selected.

III. MISCELLANEOUS

A. Termination Physical Examination for All Employees.

1. The same as preliminary examination, exclusive of serology and psychological consultation.

B. Special Examination for Visitors

1. Visitors of three days or less. These individuals do not report to the Health Division.
2. Visitors of three weeks to three months. Complete blood count, urinalysis and chest x-ray.
3. Visitors remaining over three months. The same procedures as for reporting to work examination without the electrocardiogram unless over age 40.

C. Examinations for Individuals at the Laboratory under Contract, or in Oak Ridge by Special Arrangement.

The same procedures as for the reporting for work examination without the electrocardiogram unless over age 40. Among these are:

1. Atomic Energy Commission.
2. Oak Ridge Institute of Nuclear Studies.
3. Army Air Force
4. Oak Ridge School of Reactor Technology
5. Pratt-Whitney Company

COMMENTS

These will be confined to changes made in the examination program during the past fiscal year.

- A. 1.f. 1*). Beginning in March 1956, Dr. Lincoln initiated visits to the Personnel Department each Wednesday morning for discussion of the physical and mental health of the interviewees examined during the previous week. In cases where the Health Division believed a significant risk was involved, the demands of the particular job, the work situation, the need for and supply of applicants for such jobs,

and their relationship to the particular health problems of the individual were all considered. It is believed that these weekly discussions have increased the effectiveness of both the Personnel Department and the Health Division in their constant efforts to assist in selecting the best possible man or woman for each job available.

- B. 1. f*. Chest x-ray -- yearly on all employees. After age 40 each male employee is also offered a repeat chest x-ray at the six month interval. This is being done in an effort to detect early cases of pulmonary malignancy.
- B. 5. b*. The stool examination for parasites and pathological bacteria has been discontinued. It is no longer felt that this is a necessary or worthwhile procedure for our cafeteria employees.
- B. 5. d*. The urine coproporphyrin and hemoglobin determinations every three months are new additions to the lead control program.
- B. 5. e*. This has been discontinued since the value of the information obtained did not appear to warrant the radiation exposure.
- B. 6. c*. As of June 30, a total of 109 of these News articles have been prepared. All of the articles are original. Helpful ideas come from employees, news releases and pharmaceutical and medical literature.
- C.7*a. A new snapout interlaced carbon medical accident report was adopted about January 1st. Copies of this form are sent to the Safety Department, Insurance Section and the supervisor. See Figure No. 1.
 - b. A new Discharge of Injury form is now in use, see Figure No. 2. Copies are sent to the Insurance and Safety Departments.
 - c. A new snapout interlaced carbon type Release to Work form was adopted in January 1956. See Figure No. 3.
 - d. A revision of the form used to temporarily restrict employees from working in contact with radioactive materials was adopted

TIME	
In	Out

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee

MEDICAL-ACCIDENT REPORT

Name _____ (Last) (First) (Middle) Badge No. _____ Age _____ Sex _____

Department _____ Supervisor or Foreman _____ Occupation _____

Date and Time injury or exposure occurred _____ Date and Time injury or exposure reported _____

HISTORY: Where was patient at time? _____

Who witnessed the accident? _____

What was he doing? _____

What happened? _____

Was involved part ever previously affected by injury or disease? _____

What safety equipment was worn? _____

Findings: _____

X-ray: _____

Diagnosis: _____

Treatment: _____

Disposition: Reg. Work _____ Restricted Work _____ Home _____ Hospital _____

Return _____ Is this injury or illness likely to result in permanent defect? _____

Signed: _____

(Write revisit notes on back)

Signed: _____

Safety Department's Copy

Signed: _____

Insurance Section Copy

Signed: _____

Supervisor's Copy

Fig. 1.

Oak Ridge, Tennessee

DISCHARGE OF INJURY

Name _____ Badge No. _____ Date _____

Please discharge injury of _____

1. Condition on discharge _____

2. Final diagnosis _____

Remarks _____

Signed _____

INSURANCE

X-852

OAK RIDGE NATIONAL LABORATORY

Please discharge injury of _____

1. Condition on discharge _____

2. Final diagnosis _____

Remarks _____

Signed _____

SAFETY

X-852

OAK RIDGE NATIONAL LABORATORY

Fig. 2.

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee

RELEASE TO WORK

To:

_____ has been away from work for

_____ days. He may return to:

Regular work _____

Restricted work _____

Remarks: _____

Signed: _____

Insurance Copy – Blue
Safety Sec. Copy – Pink
Supervisor's Copy – Yellow

Remarks: _____

Signed: _____

Insurance Copy – Blue
Safety Sec. Copy – Pink
Supervisor's Copy – Yellow

Remarks: _____

Signed: _____

Insurance Copy – Blue
Safety Sec. Copy – Pink
Supervisor's Copy – Yellow

Fig. 3.

in May of 1956, see Figure No. 4. This revision was adopted to enable most injured employees to continue working with radioactive materials if necessary precautions were taken. For example, if a worker has a laceration of his finger, which has been dressed, he is advised that he can continue working with radioactive materials provided he wears a rubber glove at all times. In the past, either this restriction was ignored or the individual was greatly handicapped in his performance of his job until the minor injury healed. This restriction is now applied by a nurse who instructs the individual to return for discharge removal of the restriction. It is recognized that in many minor injuries, such as a scratch to the skin of the hand, the individual may fail to return for removal of the restriction. Therefore an attempt is made to have the restriction apply for a period of time regarded as reasonable for recovery of the minor injury. In general, it is felt that the hazard of absorption of radioactive materials through minor cuts on the hands is not great after 24 hours.

- C. 8*. A monthly pregnancy report, which was adopted in April of 1956, Figure No. 5, is sent to all Division Administrators each month. It lists pregnancies already known by us and he indicates on this form any new pregnancies among employees in his Division. After the report is returned to the Health Division, if there are new names on the list, the woman is contacted and advised to come to the Health Division where additional routine information is obtained. These women are allowed to continue their same work unless it involves a radiation hazard or any heavy lifting. They are required to leave the Laboratory, or terminate, six weeks before the expected date of confinement.

PERSONNEL SERVED

During this period the total number of employees at the Laboratory approximated an average of 3525± per month. Medical services were also provided for an average of 211 visitors per month from the Army Air Force, Pratt-Whitney Company, Oak Ridge School of Reactor Technology, Oak Ridge Institute of Nuclear Studies and the Atomic Energy Commission. Various sub-contractor construction employees were given emergency care prior to referral to their company physicians.

To: _____, Supervisor or Foreman
Re: _____
(Patient's Name) _____ (Badge No) (Date) _____
The above named employee is not to be permitted to handle or work in contact with any radioactive materials, <u>except with the provisions stated below</u> , until released from this restriction by an authorized member of the Health Division.
Provisions: _____
This temporary restriction is being made because this employee has a condition which makes it potentially dangerous for him to work or be in direct contact with radioactive materials unless the above precautions are taken.
This employee is to report to the Health Division on the following date, _____ for further evaluation of the condition.
If there is any question concerning this restriction please call Extension 6681 for added information.
Restriction applied by _____

Figure 4

To:

According to our records the following female employees in your Division are pregnant. If there any new pregnancies will you please indicate their name in the appropriate space below and we will call them in for consultation.

In most cases pregnant women can continue the type of work they are now doing without difficulty. If you feel there is an unusual hazard in the work area of your employee, I would appreciate knowing this so that suitable investigation and adjustments can be made.

T. A. Lincoln, M. D.
Medical Director

Name	Badge No.	Date Pregnancy Reported to Health Division	Required Termination Date

Figure 5

PERSONNEL OF THE HEALTH DIVISION

The maximum staff of the Health Division during the past year is as follows: Medical Director, two staff physicians and eight nurses. There is one x-ray technician, three clinical laboratory technicians, one optical technician, an administrative clerk, one record clerk, two secretaries, and two members rendering custodial services. A consultant clinical psychologist, at the present time, spends approximately three days weekly at the Health Division.

FACILITIES

A. Building 2013

A decontamination unit is being installed in the dispensary of Building 2013. This facility will consist of a room 10' by 16' which has a separate ambulance entrance, shower and scrub facilities, a porcelain autopsy-type table with a drain. A console of monitoring instruments will also be installed in this room. The air conditioning, which will be installed in the adjoining surgery, will be drawn into the decontamination facility and exhausted externally. The walls will be painted with stripable paint.

B. Building 4500

An attempt was made to reduce the annoying vibration and noise problem caused by air compressors located beneath the Dispensary. This included the installation of acoustical tile on the ceiling and rubberized padding beneath some of the furniture. This has been only partially successful.

C. Building 7009

There have been no significant changes in this sub-dispensary in the past year.

GENERAL

Physical Examinations

During the past fiscal year 2,838 complete physical examinations were performed by the physicians of the Health Division staff. Of these,

671 were preliminary examinations (an increase of 209 over the previous fiscal year) and 1,368 were periodic physical examinations, which included 158 complete examinations for the AEC, 62 for H. K. Ferguson Construction Company, and 77 for the Oak Ridge Institute of Nuclear Studies.

Periodic Physical Examinations

In the age group 45 and over a large number of employees have received their third annual examination. In general, interest continues at a high level. It is believed that over 95% of employees offered periodic examinations accept an appointment and approximately 90 to 95% eventually keep this appointment. The group which shows the least interest is the young, single, female group.

Proctoscopic Examinations

From January to April 1956 special proctoscopic and sigmoidoscopic examinations were performed on all Assistant and Division Directors by Drs. Stockman and Young in their office in Knoxville. A total of 37 such examinations were performed.

Groups, usually from three to six persons, went in to Knoxville on Friday afternoons approximately two hours after receiving a small cleansing enema in the Dispensary. The \$10 cost per examination was paid by the Laboratory. Removal of rectal polyps was done only after the patient had been offered the opportunity of seeing a surgeon of his own choice. The cost of polypectomy, when performed, was born by the individual, although company health insurance completely covered such cost in all cases. Table 1 gives a resumé of the findings.

The 18% of patients with rectal polyps is unusually high and no reason is apparent. It is well established that the removal of these polyps is an effective cancer prevention procedure. Although routine proctoscopy and sigmoidoscopy on all employees is desirable, at the present time it does not seem possible.

Table 1

RESUME OF FINDINGS OF PROCTOSCOPIC EXAMINATIONS

<u>Significant Rectal Findings</u>	<u>No. of Patients</u>
Symptomatic hemorrhoids	8
Rectal polyps	7
Anal fissure	6
Pruritis ani	2
Fistula	1
Diverticulum of sigmoid	1

<u>Insignificant Rectal Findings</u>	
Mild asymptomatic hemorrhoids	4
Hypertrophied papillae	3

Total number of examinations	37
Total number of individuals with no rectal findings	10 (37%)
Total number of individuals with no significant rectal findings	16 (43%)
Total number of individuals with significant rectal findings	21 (57%)
Total number of individuals with rectal polyps	7 (18%)

Survey of Hematology Examinations

Approximately 1250 complete blood counts were tabulated in an effort to determine the distribution of findings in Laboratory employees who are apparently clinically well. These findings are graphically illustrated on pages 19 to 24, Figures 6 thru 13.

In Figure 11 the number of white blood counts with the lymphocyte percentage greater than the sum of the segmented neutrophils and non-segmented neutrophils is listed. The total number of counts is 53, or approximately 4% of the white blood counts surveyed. This reversal does not appear to be related to the total number of white blood cells.

It is believed that these graphs will be helpful in evaluating the results of multiphasic screening laboratory examinations among normal people here at the Laboratory. They are printed in this report primarily for the convenience of the Health Division staff.

Audiogram Survey

Hearing data for 484 technical and administrative personnel and 294 craftsmen and laborers, which had been coded on mark sense cards, were tabulated by IBM during April 1956. It had been suggested by the clinical laboratory staff that there might be a greater average age adjusted hearing loss in the craft and labor groups than in the technical and administrative groups. To see if this could be demonstrated and, also, to get a better idea of the general distribution of hearing loss, this data has been plotted, as shown in Figures 14 and 15. The average hearing loss distribution $\left(\frac{\text{Db. Rt.} + \text{Lt.}}{2}\right)$ in the various frequencies from

250 to 8000 cps. in each of the five age groups have been plotted for these large occupational groups. By comparing these two Figures one can see that the curves rather closely approximate each other. Unfortunately the sample is rather small but it suggests that the average age adjusted hearing loss is not significantly different in the two large occupational groups.

Although extensive surveys of background noises have not been made at ORNL, it is believed that there are no areas where a significant noise problem exists. (See Industrial Hygiene Section, page 33 and Figure 19, page 34.) The dip at the 4000 cps level, seen in Figures

UNCLASSIFIED
ORNL - LR - DWG 17756

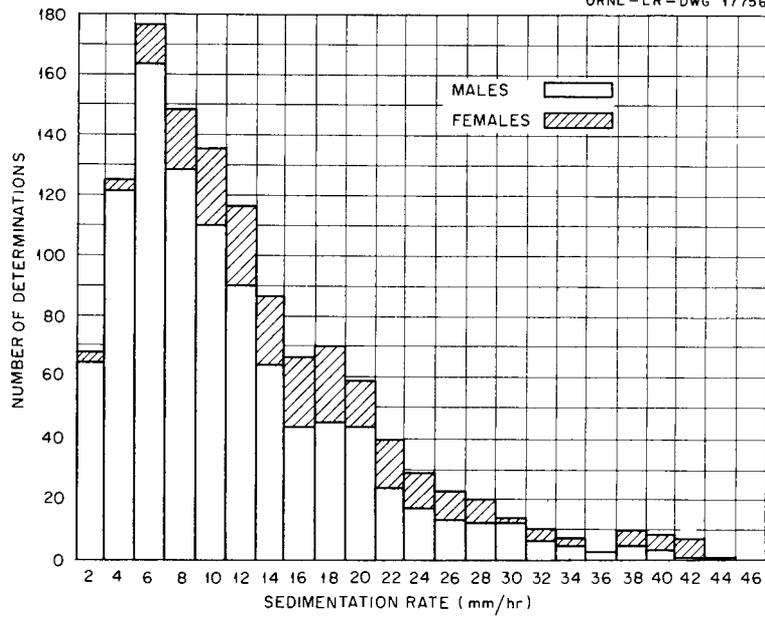


Fig. 6. Erythrocyte Sedimentation Rate (Males, $N=1020$, Females, $N=232$, Total $N=1252$).

UNCLASSIFIED
ORNL - LR - DWG 17651

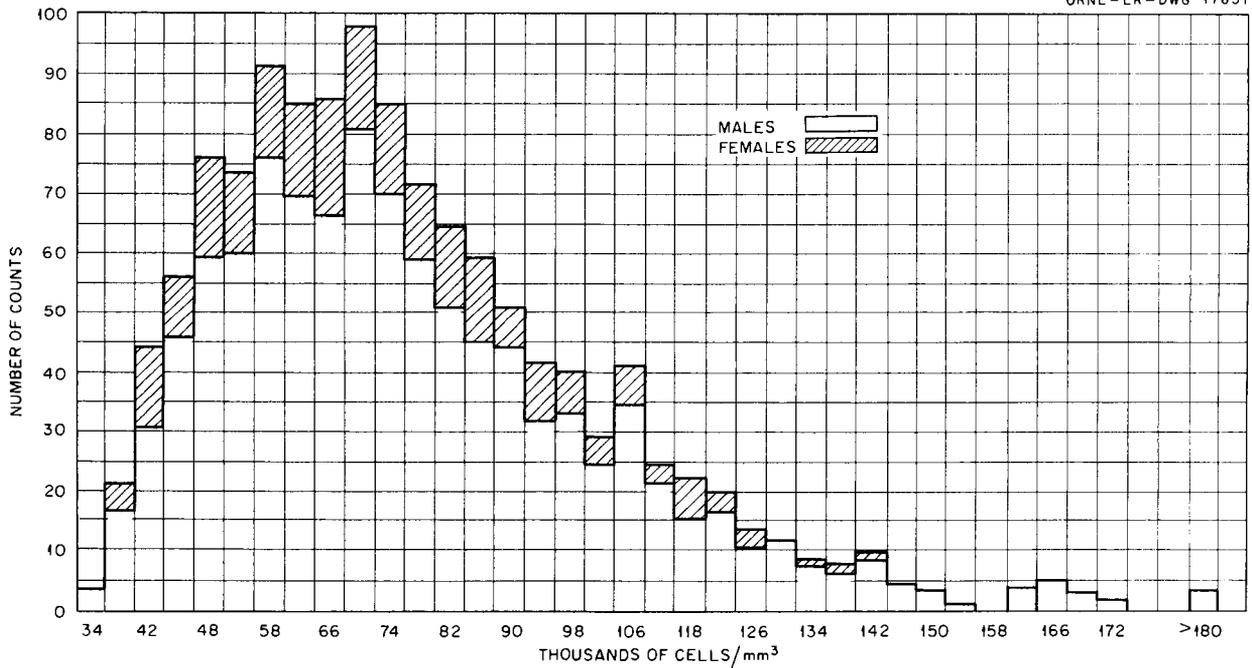


Fig. 7. White Blood Count (Males, $N=1022$; Females, $N=235$; Total $N=1257$).

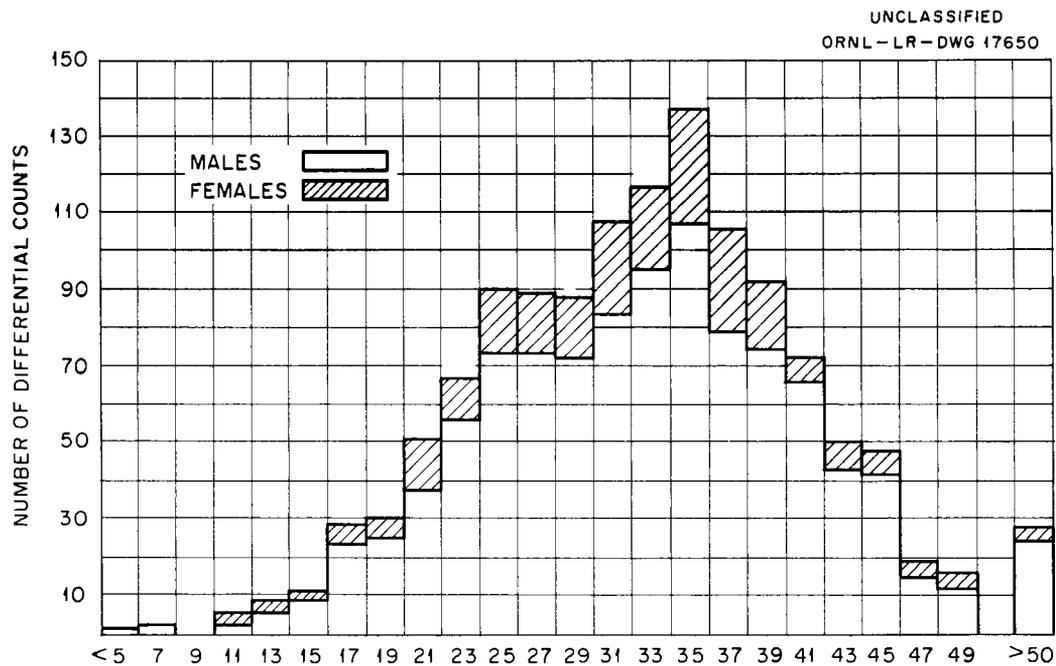


Fig. 8. % Lymphocytes (Males, $N=1021$; Females, $N=234$; Total $N=1255$).

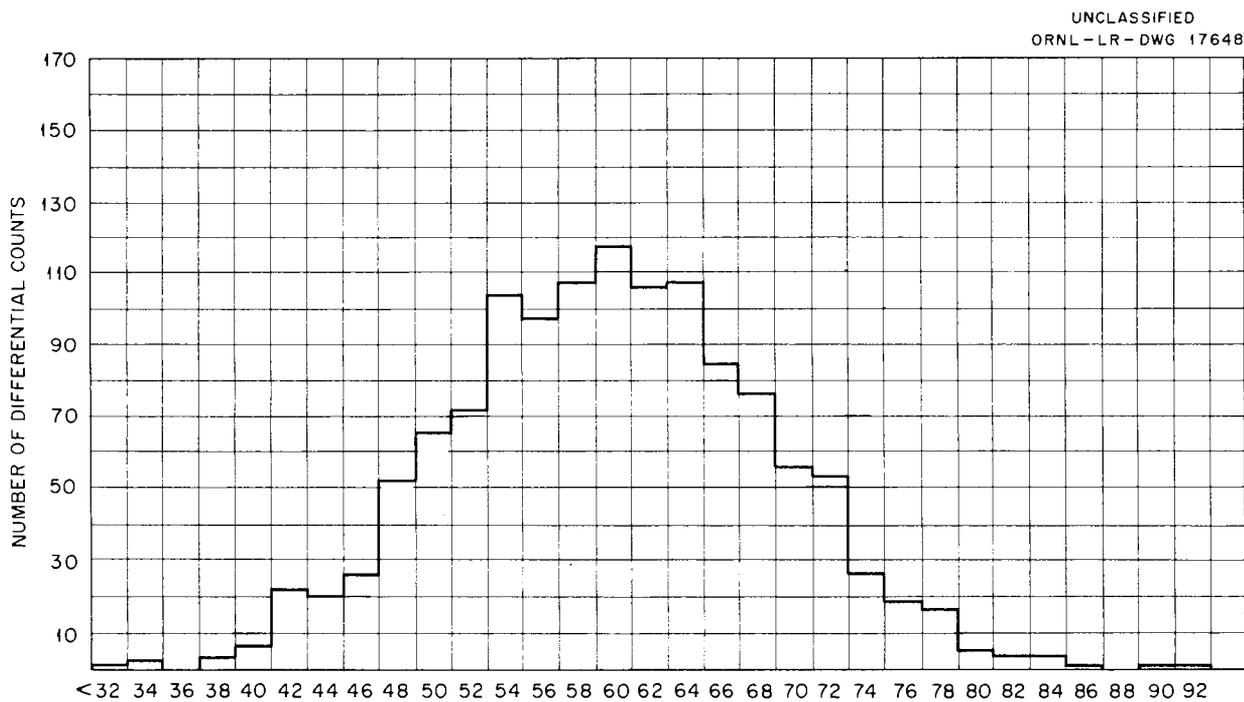


Fig. 9. % Segmented Neutrophils ($N=1255$).

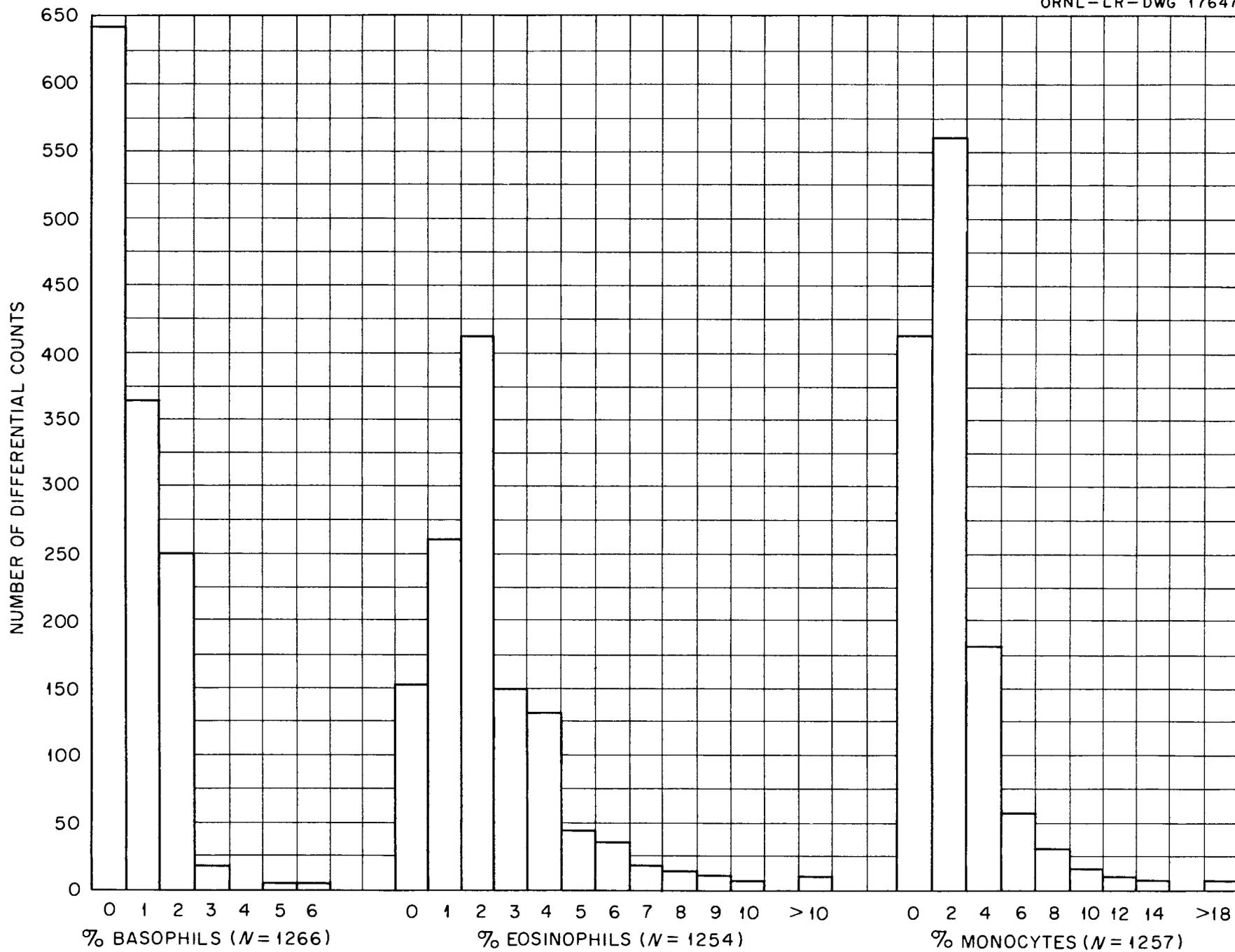


Fig. 10.

**LYMPHOCYTES GREATER THAN THE SUM OF SEGMENTED NEUTROPHILS
AND NON-SEGMENTED NEUTROPHILS**

White Blood Count	%	MALE		FEMALE	
		White Blood Count	% Lymphocytes	White Blood Count	% Lymphocytes
11,100	45	5,800	50	8,600	54
10,700	40	5,600	49		
		5,600	47	8,200	51
9,900	42	5,600	52		
9,100	48	5,500	55	7,300	48
		5,400	57		
8,700	62	5,300	46	5,500	51
8,700	56	5,100	46		
8,400	50	5,100	44	4,600	49
		5,000	55		
7,800	63	5,000	52	4,200	46
7,800	44	5,000	51		
7,600	51				
7,500	53	4,800	48		
7,500	52	4,800	44		
7,500	51	4,700	49		
7,500	50	4,700	42		
7,300	47	4,500	51		
7,200	49	4,400	49		
7,100	52	4,200	49		
		4,000	52		
6,500	55	4,000	46		
6,300	54				
6,100	52	3,800	49		
6,100	51	3,800	48		
6,000	52	3,500	56		
6,000	51				

Total number of white blood counts -- 1257

Total number lymphocytes greater than sum of segmented
neutrophils and non-segmented neutrophils -- 55
(male 49, female 6)

Total percentage of lymphocytes greater than sum of
segmented neutrophils and non-segmented neutrophils -- 4.2%

Figure 11

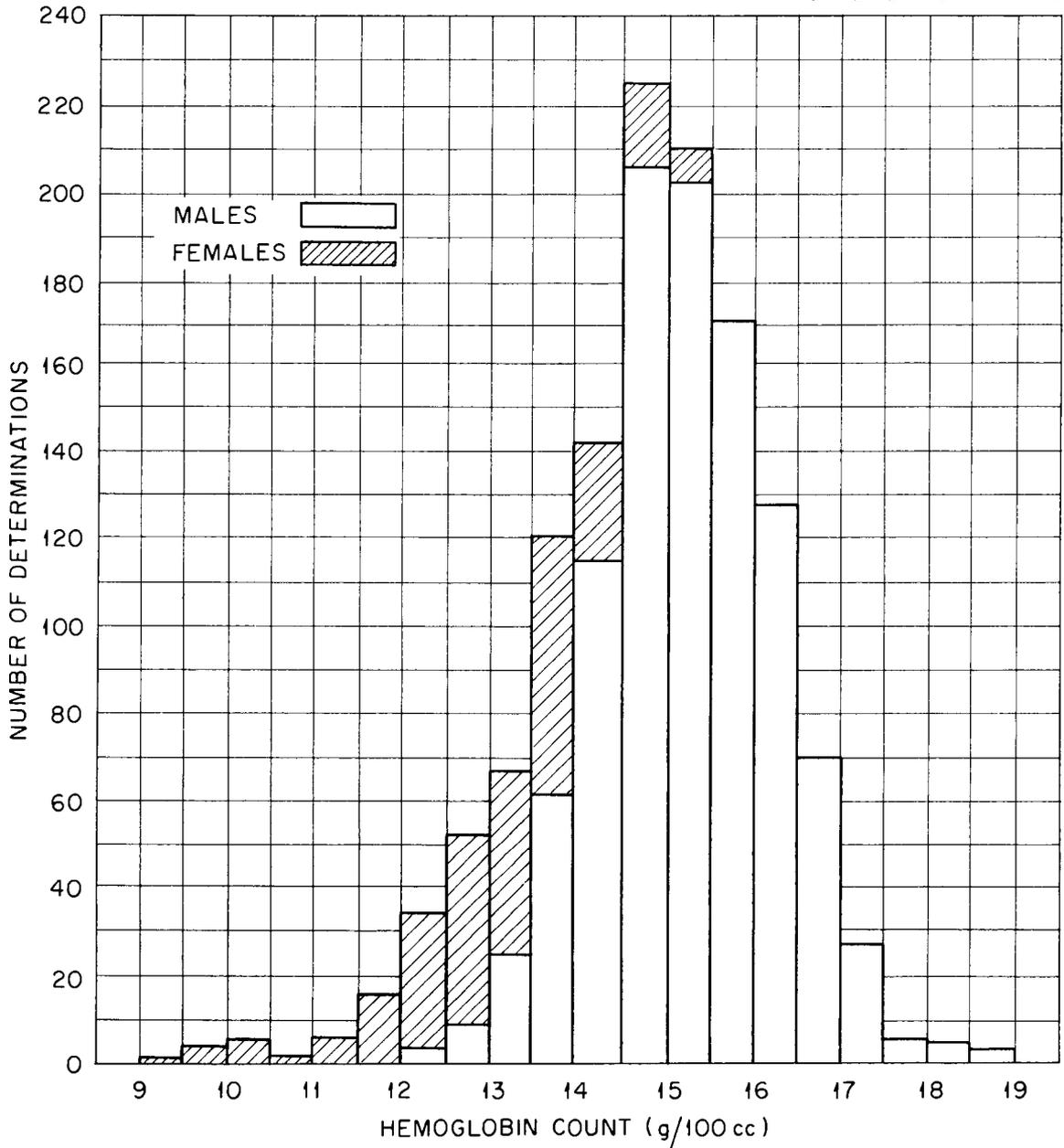


Fig. 12. Hemoglobin Counts (Males, $N = 1021$; Females, $N = 234$; Total $N = 1255$).

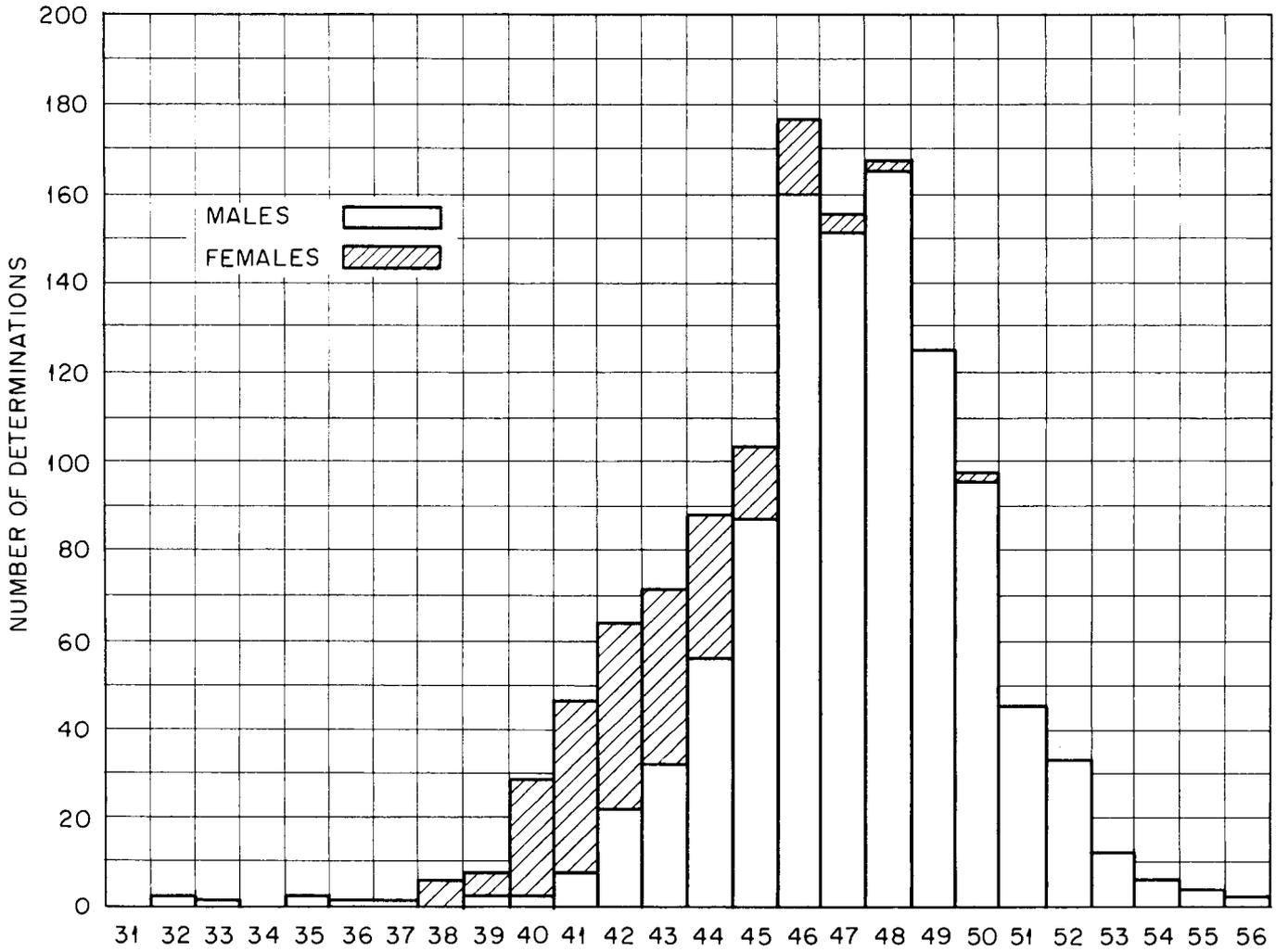


Fig. 13. Hematocrit % (Males, $N=1019$; Females, $N=234$; Total $N=1253$).

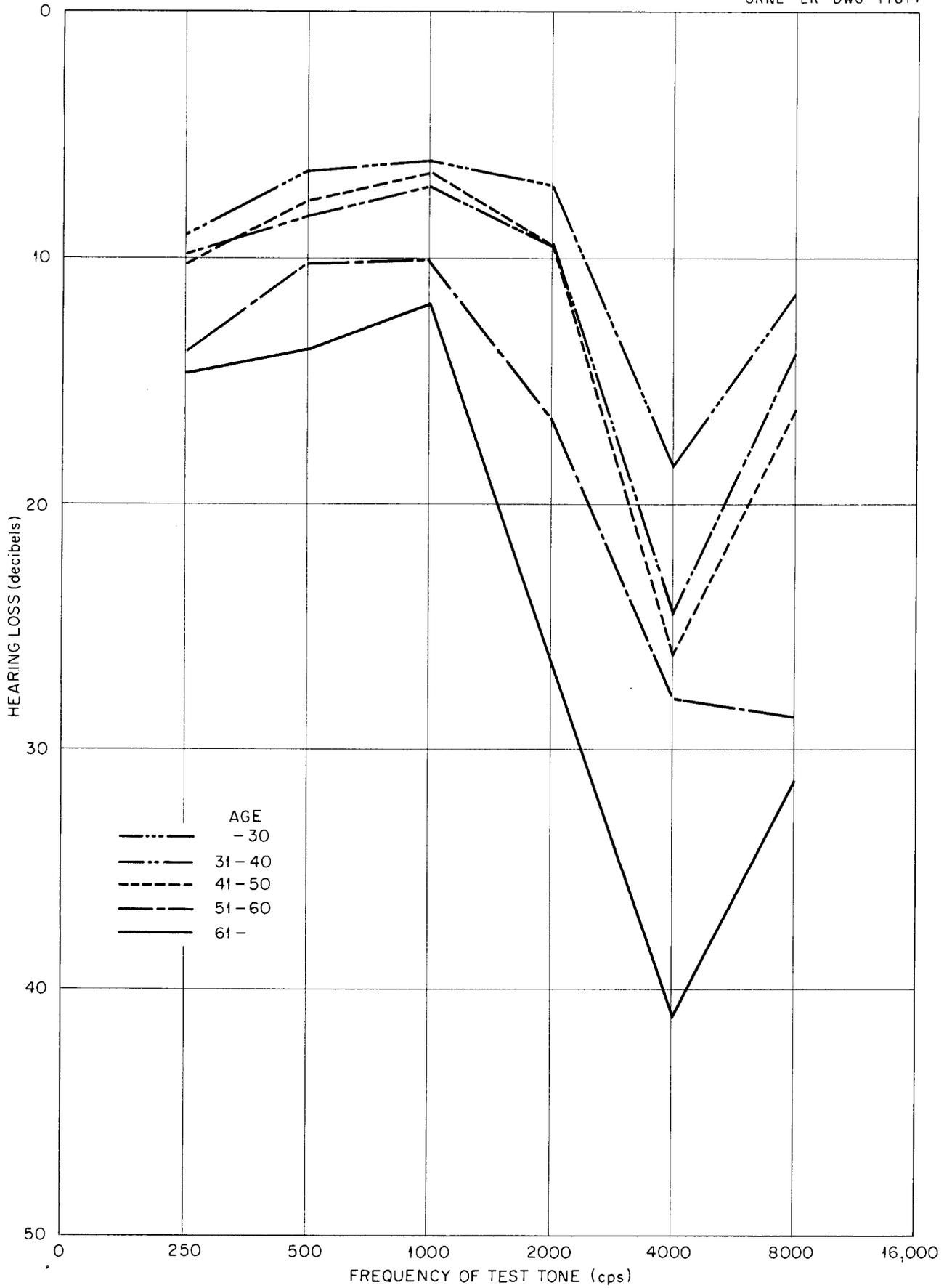


Fig. 14. Hearing Loss, 294 Craftsmen and Laborers.

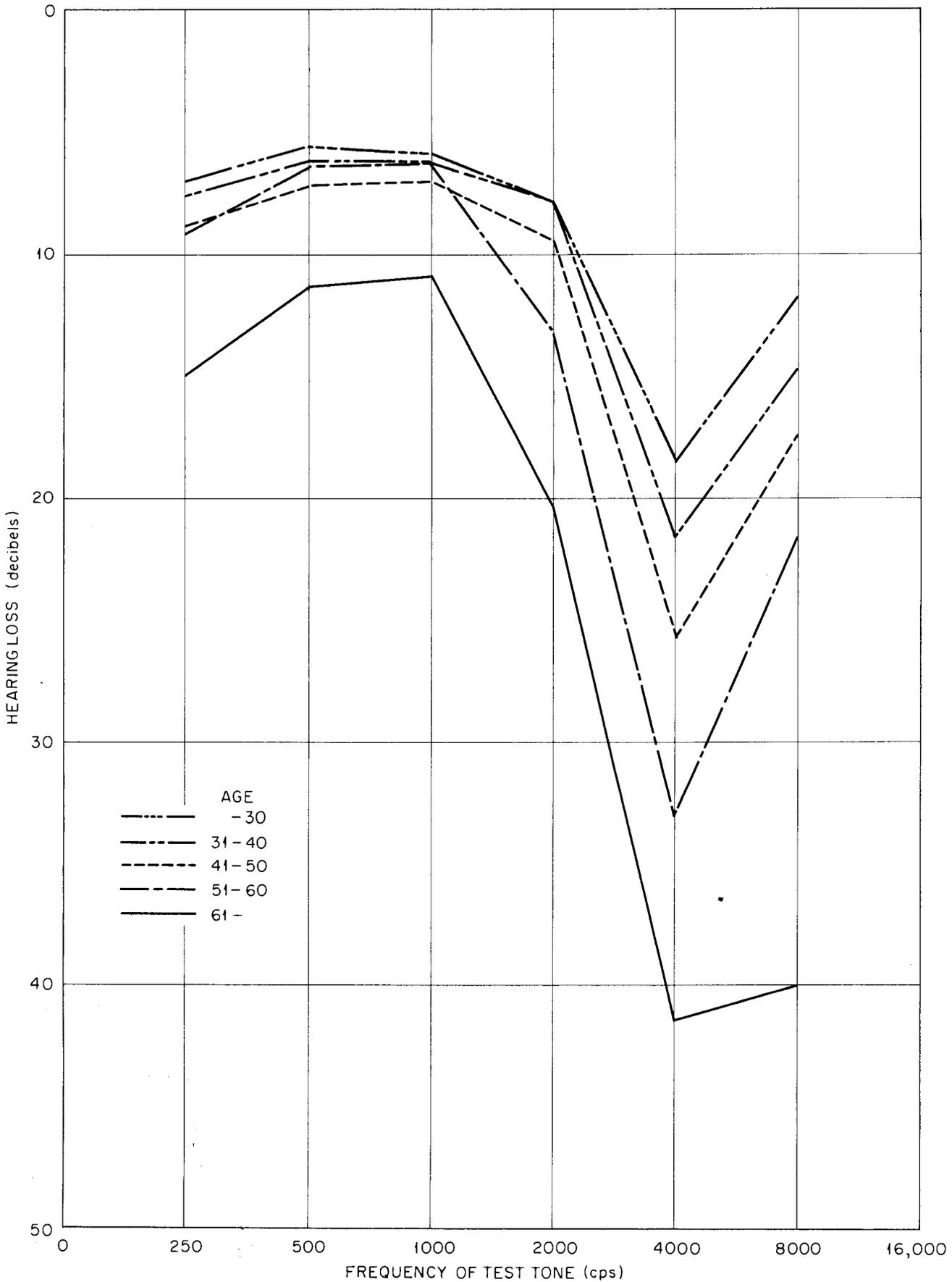


Fig. 15. Hearing Loss, 484 Technical and Administrative Personnel.

14 and 15 might suggest noise trauma. Joyner* reports a dip in 30% of his control group and approximately 50% in his suspect personnel who were being exposed to noise levels in excess of the damage risk curve. An attempt will be made to determine the frequency of the 4000 cycle dip in various age and occupational groups here at the Laboratory.

An adaptation from the presbycusis (so-called normal hearing loss with age) curves of Rudnose** which were adopted from the large population studies by Bunch, Steinberg, et al, and Webster, et al, may be seen in Figure 16.

Our audiogram was carefully calibrated one year ago and the majority of the studies in the survey were accomplished after this time. It may be seen in Figure 17 that the usual background noise level (curve 1) in our audiometry test room is not sufficiently high as to interfere with reliable testing.

There does not appear to be a significant ~~hearing loss~~ noise loss problem at the Laboratory at the present time. See Industrial Hygiene Section for special comment on noise levels in the Central Machine Shop.

Further observations on hearing loss at the Laboratory will be made and reported in the next Annual Report.

* Joyner, Roy E.: Evaluation of the Effects of Industrial Noise in Certain Areas of the Texas City Plant. Confidential Report.

** Rudnose, Wayne: The Relations of Noise Exposure to Hearing Loss. Proceedings of the 4th Annual National Noise Abatement Symposium, Oct. 23 and 24, 1953. Chicago, National Noise Abatement Council. 1955.

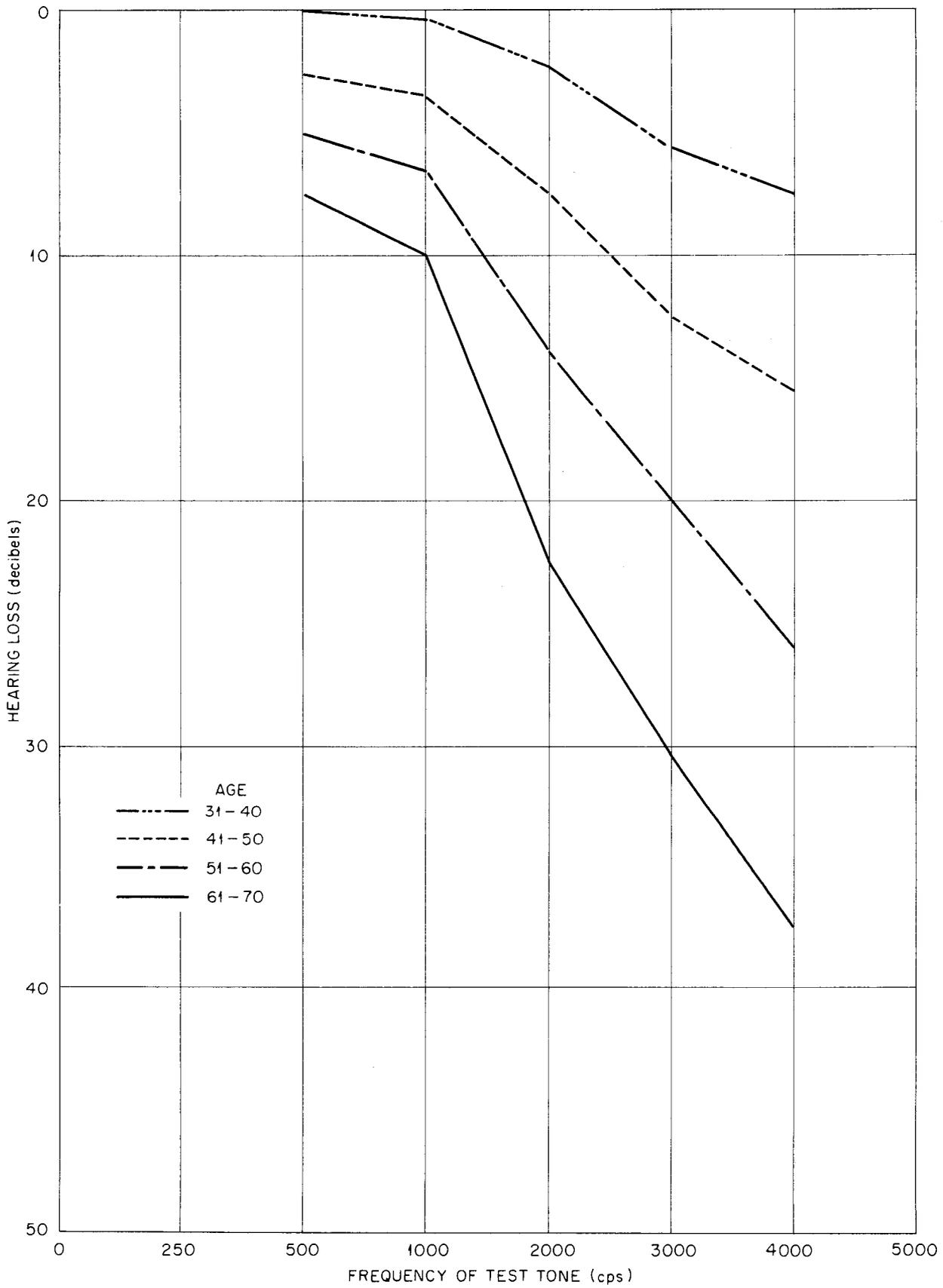


Fig. 16. Presbycusis Curves for Men: Average Hearing Loss to be Expected with Age. These Curves were Plotted from Data Obtained in Large Population Studies by Bunch, Steinberg et al, and Webster et al.

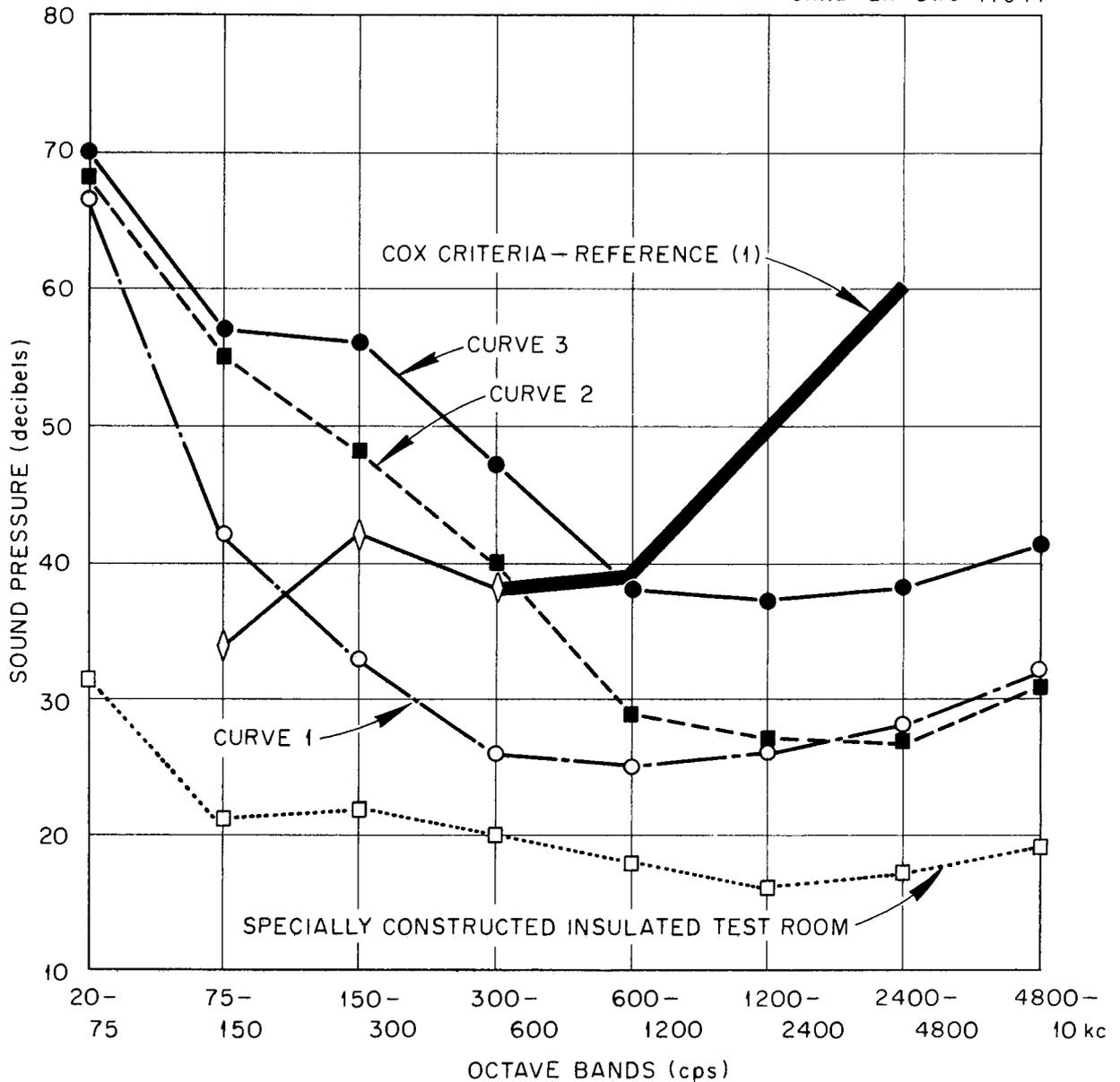


Fig. 17. Octave Band Analyses (Audiometric Testing Room, Medical Department, X-10 Plant).

Date: February 14, 1956

TIME: 3:00 P.M. to 4:00 P.M.

Curve 1. Head level of patient being tested, audiometric test room fan off, attic fan off, unit air conditioner in EKG room off.

Curve 2. Same as curve 1, except audiometric test room fan on low speed.

Curve 3. Same as curve 1, except audiometric test room fan on high speed.

Reference (1): Cox, Jerome R. Jr., "How Quiet Must it be to Measure Normal Hearing?", *Noise Control*, 1 No. 1, 25, January 1955.

SECTION REPORTS

X-ray Section

During the year 5,772 separate x-ray examinations were made. This represents an increase of 146 from the previous year. The response to the chest x-ray being offered to all employees 40 years of age or older at approximately the six month interval after the annual physical examination has been enthusiastic.

Dr. Arthur J. Muller, radiologist in Knoxville, is currently interpreting all roentgenograms taken by the Health Division.

Thomas L. Tuck, Jr., x-ray technician, visited Dr. Muller's office for a total of six half days to gain additional experience in new x-ray procedures and techniques.

Nursing Section

Beginning with the past year the need for immunizations is reviewed with the employee by a nurse at the time of his periodic physical examination. As a result of this personal contact the number of immunizations administered during the past year has increased tremendously.

The nursing staff has also carried on an informal nutrition counseling program. They have attempted to encourage employees to get an adequate breakfast each morning. They have also assisted in preparing material for the nutrition display in the cafeteria.

Clinical Laboratory

The laboratory has performed a large number of glucose tolerance tests during the past year. An attempt is now being made to get individuals who show glycosuria on routine urinalysis to have a glucose tolerance test as soon as possible. By doing so, several markedly abnormal glucose tolerance curves have been found and the individuals have been referred to their family physician for further care. A number of borderline glucose tolerance tests have been

obtained and these individuals will be followed closely. It is believed that most of these people have latent diabetics.

A number of prothrombin time determinations have been performed for individuals who are taking anti-coagulants on a long term basis following myocardial infarctions.

Occupational Vision

The office hours of Mr. Rule were extended to include the full day with the exception of Friday afternoon, which is set aside to enable clerical and adjustment work to be done. In the past, afternoons had been set aside for completion of adjustments and installation of lenses in the frames. It has been found, however, that this work can be "sandwiched" between employee visits.

Psychological Service

Dr. Hurt has continued essentially the same program as in the previous year. He has assisted in some of the compilations of data for several of the studies already reported. He has also given several health education talks and has consulted with supervisory groups on special problems.

Health Education

The American Cancer Society film, "Self-Examination of the Female Breast" was shown in the auditorium of the 4500 Building on June 19 and 22 and in the auditorium of Building 9204-1 at Y-12, June 20th. Approximately 700 women saw this film and asked a number of interesting questions.

A special nutrition exhibit was prepared for the cafeteria, see Figure 13. The printed material is changed at approximately one to two month intervals. The pictures themselves, which are in color, are changed about every three months.

The following health talks were given to various Laboratory groups by Dr. Lincoln:

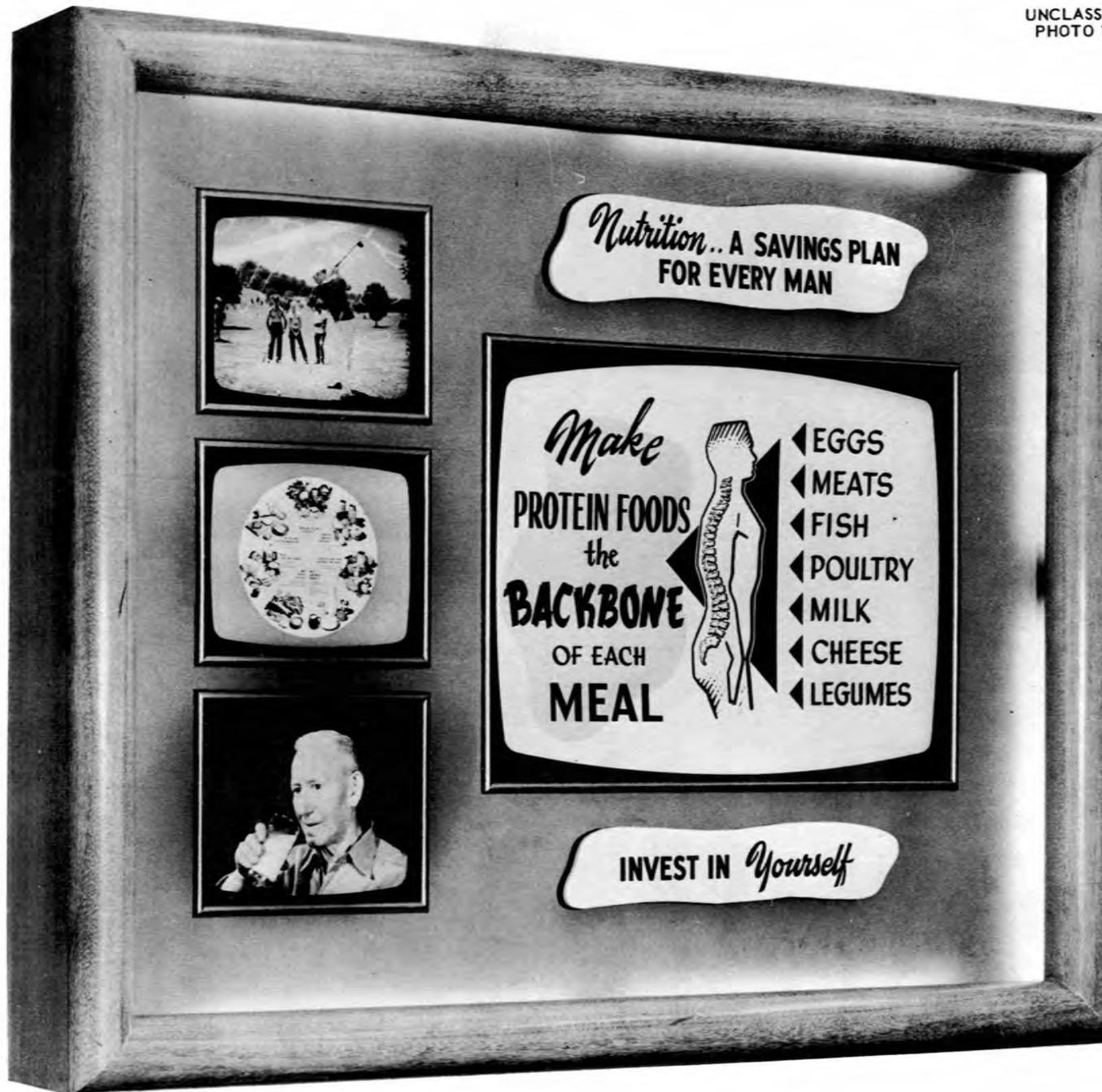


Fig. 18. Changeable Nutrition Education Display in Cafeteria.

The Dangers of Electric Shock -- High Voltage group
Special Precautions in the Handling of Lead -- leadburners
The Hazards of Fluorine, Hydrofluoric acid and Sodium
Fluoride -- Pilot plant section of Chemical Technology
Division
The Causes and Dangers of Horse Play -- electricians.

Dr. Lynn F. Lockett gave a talk on The Hazards of Beryllium, to the High Voltage group.

Industrial Hygiene

Mr. N. H. Ketcham of the South Charleston plant made two visits to the Laboratory during the past year. The control of the lead hazard was the principle concern for his first visit, while the second visit was devoted primarily to noise level measurements. These were made in our audiometry room and in the Central Machine Shop. Data resulting from these studies is included in Figure 19.

In Mr. Ketcham's opinion the noise level measurements in the Central Machine Shop did not indicate a need for intensive study at this time. Although there was specific intermittent noise sources which were significant, their use was sufficiently infrequent as to make more intensive study unnecessary.

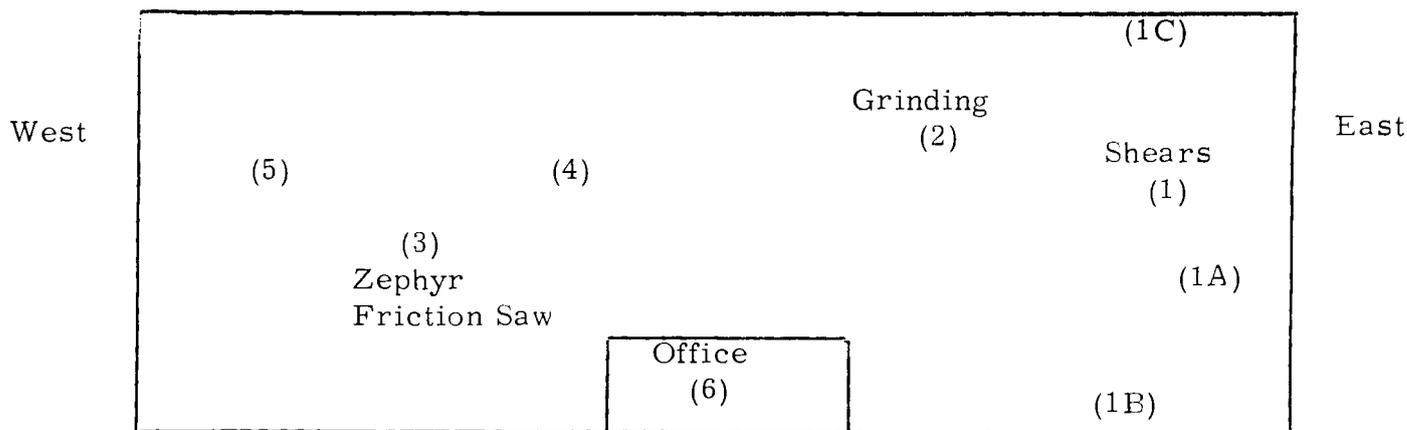
The Pilot plant section of the Chemical Technology Division was assisted in developing a program for control of any fluorine hazard.

Administrative Section

Dr. Gino F. Zanolli joined the staff of the Health Division on July 25, 1955. He holds an M.S. degree in chemical engineering from Columbia University, and an M. D. from State University of New York, Down State Medical Center. He received his internship at the U. S. Public Health Service Hospital at Staten Island, New York.

Miss Barbara Case, R. N. (West Tennessee Baptist Hospital, joined the nursing staff on November 15, 1955.

NOISE LEVEL, CENTRAL MACHINE SHOP



<u>Position (Figure 3, above)</u>	<u>Noise Level, Decibels (C Network)</u>
1). Face level of operator cutting 1/4 inch mild steel on 10 ft. shears.	
With "fast" meter needle action	113
With "slow" meter needle action	112
As above, background noise level when shears not cutting	83
1A). Face level, approximately 24 ft. from shears, while cutting	104
1B). Face level, approximately 70 ft. from shears, while cutting	100
1C). Face level, approximately 30 ft. from shears, while cutting	103
2). Face level to man grinding weld on stainless steel	93
As above, background noise level when grinding not in progress	84
3). Face level to man using Zephyr Friction Saw	104
As above, background noise level when saw not in use	84
4). Face level, with Zephyr Friction saw in use	93
As above, background noise level when saw not in use	84
5). Face level, with Zephyr Friction Saw in use	92
As above, background noise level when saw not in use	84
6). Face level in office, neither Zephyr Friction Saw nor 10 ft. shears in use in the shop area	70-75

Figure 19

Attendance at Professional Meetings

Thomas A. Lincoln, M. D.

"Experimental and Clinical Approaches to the Treatment of Poisoning by Radioactive Substances," Argonne National Laboratory, Division of Biological and Medical Research, October 1955.

Postgraduate course, "Modern Considerations and Methods in Handling the Lead Problem in Industry," Kettering Laboratory, College of Medicine, University of Cincinnati, Nov. 7 to 11, 1955.

American Medical Association Conference on Industrial Health, Detroit, January 1956.

Meeting of Carbide physicians at Paducah, February 1956.

Industrial Health Conference of the Industrial Medical Association, Philadelphia, April 1956.

Lynn F. Lockett, M. D.

American Medical Association Clinical Meeting, Boston, November 1955

Meeting of Carbide physicians at Paducah, February 1956.

Postgraduate course in Gastro-enterology, University of Tennessee, Memphis, March 1956.

Gino F. Zanolli, M. D.

American Medical Association Annual Meeting, Chicago, June 1956

MISCELLANEOUS

Dr. Lincoln was appointed chairman of the Industrial Health Committee of the Tennessee State Medical Association and conducted a survey of occupational medicine in Tennessee, which he hopes to publish in the Journal of the Tennessee State Medical Association in the near future. Dr. Lincoln also gave a paper, "Selling Health in an Industrial Setting" at the meeting of the Tennessee Dietetic Association in Gatlinburg, May 1956. This paper is being published in the Current Comments section of the Journal of the American Dietetic Association, in November 1956.

In June of 1956, Dr. Lincoln was appointed a member of the Cardiac-to-Work Committee of the Tennessee Heart Association, Inc.

STATISTICSStatistical Summary

Average monthly Severity Rate (days lost per illness-absence)		8.8
Average monthly Disability Rate (days lost per 1000 days scheduled)		12.8
Average monthly Frequency rate (absence per 1000 days scheduled)		1.4
Average number of visits per employee per year		11.8
Average number of ORNL employees on payroll per month		3528
Average number of patients visiting the Dispensary per month		2068
Average number of employee-patients per month		1857
Average percent of ORNL employees visiting the Dispensary per month		52.6%
Average number of illness-absences per employee per year		.4
Total number of visits for fiscal year 1955-56		44245
Total number of visits by ORNL employees	41764	
Total number of visits by AEC employees	162	
Total number of visits by H. K. Ferguson Co. employees	62	
Total number of visits by others	2257	
Total visits to X-10 Dispensary	29930	
Total visits to 4500 Dispensary	7204	
Total visits to 7009 Dispensary	2331	
Total visits to Y-12 Dispensary	4780	
Average number of preliminary examinations per month		56
Average monthly ratio of occupational to non-occupational services		1:4.13
Total number of procedures accomplished for fiscal year 1955-56		69363
Non-occupational illness, first visit	13548	
Non-occupational illness, repeat visit	5921	
Non-occupational injury, first visit	1454	
Non-occupational injury, repeat visit	697	

Occupational illness, not otherwise classified	61
Occupational illness, not otherwise classified, repeat visit	84
Occupational injury, not otherwise classified, alleged or questionable	2
Occupational injury or exposure, chemical	73
Occupational injury or exposure, chemical, repeat visit	118
Occupational injury or exposure, not otherwise classified	1843
Occupational injury or exposure, not otherwise classified, repeat visit	2716
Occupational injury or exposure, radiation	31
Occupational injury or exposure, radiation, repeat visit	1
Occupational injury or exposure, radiation, alleged or questionable	2
Health education counseling	12

COMPLETE EXAMINATION

Absence due to non-occupational illness	17
Absence due to non-occupational injury	1
Industrial hygiene examination	1
Job transfer examination	5
Periodic health examination, non-ORNL personnel	157
Periodic health examination, ORNL personnel	1211
	<u>1st Visit</u> <u>Repeat Visit</u>
Hourly employees	495 0
Weekly employees	272 2
Monthly employees	441 1
Non-occupational examination	101
Preplacement examination	354
Rehire examination	60
Termination examination	385
Preliminary examination	671

PARTIAL EXAMINATIONS

Absence due to non-occupational illness	1213
Absence due to non-occupational injury	40
Absence due to occupational illness	7
Absence due to occupational injury	21
Industrial hygiene examination	63
Job transfer examination	4
Periodic health examination, non-ORNL employees	48
Periodic health examination, ORNL employees	2681

	<u>1st Visits</u>	<u>Repeat Visits</u>	
Hourly employees	1007	10	
Weekly employees	673	7	
Monthly employees	972	12	
Non-occupational examination			594
Preplacement examination			514
Rehire examination			156
Termination examination			285
Blood donor examination			50
Special nutrition study interview			214
Psychodiagnostic services			66
Psychologic consultation			124
Psychodiagnostic testing			95
Consultation, occupational condition			18
Consultation, non-occupational condition			1287
Consultation without patient, occupational			1158
Consultation without patient, non-occupational			2711
Premarital serodiagnostic test			62
Medical termination			11
Procedure for outside physician			148
Emergency first aid for visitors			22
Auxiliary procedure:			
Audiogram			3582
Electrocardiogram			1773
Field clinical laboratory procedure			2
Clinical laboratory procedure			5759*

* This figure represents the number of clinical laboratory visits. More than one laboratory procedure may be performed in one visit, hence the breakdown for the procedures is shown on the following page.

Bacterial culture	4
Bacterial smear	12
Basal metabolic rate	10
Blood BSP	2
Blood cholesterol	8
Blood clotting and bleeding time	1
Blood creatine	2
Blood glucose	26
Blood mean corpuscular value	1
Blood NPN	5
Blood pressure	2868
Blood prothrombin time	43
Blood sugar	100
Blood serum bilirubin	1
Blood thymol turbidity	1
Blood typing	547
Blood uric acid	6
Feces for ova and parasites	2
Fishberg urine concentration	2
Fungus culture	1
Hematocrit	4818
Hemoglobin	5218
Hetrophile anti-body titre	4
Red blood cell count	1
Reticulocyte count	1
Rh factor	607
Sedimentation rate	3813
Sperm count	10
Throat culture	2
Urinalysis	4706
Urinalysis, mercury	1
Urinalysis, stipple cell count	1
Urine bilirubin	1
Urine coproporphyrin	407
Urine PSP	8
VDRL	3766
Vital capacity	1
White blood count and differential	5287

Total

32294

1954

Occupational Vision Section Procedures	
Spectacles issued, plano	188
Spectacles ordered, prescription	480
Spectacles issued, prescription	353
Emergency service for non-occupational eyewear	17
Partial replacement	159
Adjustment and repair	32
Advisory service regarding vision	38
Auxiliary procedure	
Ortho-Rater examination	3713
X-ray, occupational, auxiliary service	2465
X-ray, non occupational	3307
Psychologic testing preplacement	404
Immunizations	
First immunization	974
Second immunization	781
Third immunization	623
Booster and smallpox	2971
Other immunization	191
Special ophthalmological examination	189
Urinalysis, special, done at Y-12	244

DISPOSITION

Return to regular work	40244
Return to modified or part-time work	1258
Sent home	193
Remain off work	743
Rejected	3
Accepted with restrictions	23
Accepted without restrictions	1715
Sent to hospital or physician's office	66

ATTENDANT

Doctor	10001
Doctor and nurse	3792
Doctor, nurse and technician	104
Nurse	28082
Nurse referral	312

Neuro-psychiatrist	1
Psychologist	803
Technician	22130
No attendant*	4138

* This code is necessary to avoid a false duplication of items in the Attendant code.

END PAGE