H-DIVISION PROGRESS REPORT

May 20 - June 20, 1954

REF: H-120

I. ADMINISTRATION (Thomas L. Shipman, M. D., Leader)

A. General Remarks:

None.

B. Personnel (6/1/54 - 7/1/54):

1. New Hires:

6/7	HODGES, Arthur J.	H-4	Biophysics	(SUMMER)
6/7	FOREMAN, W. Wayne	H-5	Laboratory	"
6/10	GROSSER, Jo Ann	H-4	Radiobiology	"
6/11	ELLINWOOD, L. Edward	H-4	Radiobiology	"
6/14	STEINMAN, Wilfred D.	H-4	Radiobiology	"
6/14	DAVISON, Helen I.	H-4	Biochemistry	"
6/15	JOHNSON, Helen M.	H-1	TA Monitoring	
6/16	SUAZO, Jose E.	H-5	Field	(SUMMER)
6/17	MOORE, Thomas E., Jr.	H-4	Biochemistry	"
6/24	HOWARD, Emma B.	H-DO	Property	
6/25	WOODRUFF, Philip H.	H-DO	Property	(SUMMER)
6/28	VAN RIPER, Jean	H-4	Biochemistry	"
6/28	FINNEGAN, Camille	H-4	Biochemistry	
6/30	POST, James T.	H-4	Biochemistry	(SUMMER)

2. Terminations:

6/3	SMITH, M. Jane	H-5	Administration
6/7	KELLEY, Donald W.	H-1	TA Monitoring

3. Total Personnel:

SM	49
Military	3
RA	14
SCP	78
Military	1
ASC	33
TOTAL	178*

*Includes 11 summer employees and 2 casual employees.

II. GROUP H-1, MONITORING (Dean D. Meyer, Leo G. Chelius)

A. General Remarks:

1. The Alternate Group Leader returned from PPG on May 24.

2. Demolition of D-Building is nearing completion. All of the superstructure with the exception of one firewall has been removed. Thus far there have been no overtolerance health tests on any personnel involved.

3. Group GMK-1 commenced the radiography of the pipe welds for the new reactor for Omega West. The work is being done with a 3 curie Cs^{137} source. There have been no unusual incidents or overexposures.

4. A number of shipping containers, primarily wooden boxes, returned from overseas have been found to have low level beta-gamma activity on the outer surfaces up to 1 mr/hr. The Supply and Property Department has prohibited the sale of these boxes as scrap lumber since these findings. Gas cylinders have also been found in the same condition. Coral has been found on the beds of commercial shipping trailers and this has necessitated decontamination at Los Alamos.

5. H-Division exhibit for the Old Ice House Museum: The request for an H-Division exhibit comprising the H-1 activities was received with a deadline given as July 13. A more refined duplicate of the exhibit prepared for the Public Health Meeting in Albuquerque is now being prepared.

6. The preparation for the X-ray calibration involving the measurement of depth dosage is continuing with the construction of various types of masonite phantoms.

7. The emergency vehicle has been partially revamped. The amount of equipment has been reduced and plans are in process for easing the storage problem with additional cabinet space.

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(Signature of person making the change, and date)

III. GROUP H-3, SAFETY (Roy Raider)

A. Accident Record:	Jan. 1 to June 1, 1954	1953
Man-hours worked	2,315,153	5,319,125
Number of disabling injuries	8	17
Number of days lost time	6,118	182
Frequency (Accidents per 1,000,000 man-hours)	3.5	3.2
Severity (Days lost per 1,000 man-hours)	2.65	0.03

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B. Industrial Accident [redacted]

1. On June 7, [redacted] GMK-1, received a fracture of the distal phalanx of the first toe of the right foot when several lead bricks fell off a hand truck on his foot. Lost time was one day.

2. On June 8, [redacted] SD-O, dropped a casting on his right middle finger. On June 10, he reported to Q-Building and was sent to the hospital where an X ray showed his finger was fractured. [redacted] was sent home and is still off work.

C. Fires

1. On May 20, a minor fire occurred at M-Building when fumes from hot tar, which was being used to reroof the building, were ignited by an electric motor. Damage was negligible.

2. A serious forest fire broke out on June 5 which threatened Laboratory facilities. The fire was fought by Los Alamos volunteers, Los Alamos firemen, the Forest Service, and several Indian crews before being brought under control on June 7. The Laboratory furnished fire fighting equipment, kept the S Site Cafeteria open to feed the fire fighters, and assisted in many other ways.

D. Motor Vehicle Accidents:	Jan. 1 to June 1, 1954	1953
Miles Driven	677,554	1,732,599
Number of Accidents	5	36
Rate (Accidents per 100,000 miles)	0.7	2.08
Total Cost	$1055.00	$1596.00
Accident Cost per 100,000 miles	$ 156.00	$ 92.00

There were no vehicle accidents involving Laboratory employees during May.

E. General Remarks:

1. Roy Reider served as chairman of a committee which investigated the recent forest fire.

2. Roy Reider worked with the Field Control Group during the recent successful evacuation trial involving the community of Los Alamos.

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3. Four more safety talks were made to the Protective Force personnel during this report period.

4. At the request of Supply and Property, the Safety Office prepared a set of rules for shipment of tuballoy turnings.

IV. GROUP H-4, BIOMEDICAL RESEARCH (W. H. Langham)

A. General Remarks:

A job offer was sent to Joseph Sayeg to work on the TE ion chamber dosimetry. Arthur Hodges is working in the Biophysics Section during the summer.

Gordon Gould gave a paper entitled "Cholesterol in Atherosclerosis" at the Medicinal Chemistry Symposium of the American Chemical Society at Syracuse, N. Y., on June 17, and also participated in a panel discussion on "Mechanism of Drug Action" on June 18.

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[redacted]

Dr. Wallace D. Armstrong, a summer consultant, arrived on June 15. (Date)

Mrs. Helen Davison, a summer technician, arrived on June 14.

(Signature of person making the change, and date)

The following summer employees joined the Radiobiology Section: Jo Ann Grometer, Wilfred Stedman and L. E. Ellinwood.

John E. Furchner rejoined the Group on a permanent basis.

B. Work in Progress

1. Biochemistry Section (Gordon Gould)

a. Absorption of Sterols as Determined with the Help of Isotopes.

(G. Gould , V. Lotz)

To confirm previous results on the absorption of T-sitosterol, pure beta-sitosterol has been labeled with tritium and fed to rats and to three humans. The significance of this problem is 1) although it is generally accepted that sitosterols are not absorbed at all, our results show this to be incurrect, and 2) since sitosterol is being fed to patients in large amounts in the prevention and treatment of coronary atherosclerosis it is important to know how much is being absorbed. The use of T-sitosterol is the only method of doing

this at present and this laboratory the only one in a position to study this problem.

Results to date show that when a single 10 mg dose of T-beta-sitosterol was fed to a rat, absorption occurred to an extent of about one-fifth as much as a corresponding amount of T-cholesterol. When 400 mg doses (100 uc) were fed to three humans the specific activity of blood sterols indicated the amount present in liver and blood was about 0.2 to 1.0% of the amount fed.

b. Simplification of Assay Methods for Fission Products in Urine.

(H. Miller, G. Gould)

It has been found that dry ashing of 100 ml samples of urine gives a small residue which can be counted in a gas flow counter after addition of a little collodion to prevent fluffing. This residue gives about four times as many c/m as the isolated strontium fraction and thus constitutes a simple, rapid method for estimating total body burdens of fission products. Some results to date are given below.

Urine	Date Collected	Dry Ash		Sr.	
		Date Counted	c/m 100 ml urine	Date Counted	c/m 100 ml urine
316	Mar. 16	June 17	204	June 21	50
317	" 17	" 18	186	"	50
319	" 19				
AM	" 19?				
Jap. Fishermen	" 28	June 16	34	June 15	2
	Apr. 14	" "	7	"	0.5
	" 19	" "	49	"	0.2

c. Isolation of Alkaline Earth Metals from Urine. (J. Sabine, M. Mayne)

Most of the month has been devoted to perfecting the method for isolating Ba and Sr with and without Ca from urine. The various chemical steps are clean-cut and each seems satisfactory. We are now working on the problem of improving the gravimetric recovery of Sr. Ba and Ca recoveries are in the 90 - 100% range.

d. Japanese Urine Samples (J. Sabine, M. Mayes, H. Miller)

Three of these were received and have been processed. They are now being counted for Sr^{89}. The counts are all less than 10 c/min/500 ml (1 sample) or per liter (2 samples).

e. Trioctyl Phosphate and Cholinesterase (J. Sabine, H. Miller)

At the request of Mr. Raymond N. Rogers of GMX-2, conveyed through Mr. Ed Hyatt, a brief investigation was carried out to find out whether this substance was an inhibitor of cholinesterase and could be expected to produce cholinergic symptoms in persons handling it. It was found to be free of any detectable anticholinesterase activity, and a memo to this effect was written to Mr. Rogers with carbon copies to W. H. Langham, R. W. Schulte, and T. C. Hyatt.

2. Biophysics Section (E. C. Anderson)

a. Human Counter (E. Anderson, F. Hawkins, J. Perrings)

Construction and design continues. Some progress is finally being made in the matter of a toluene resistant reflecting coat. We now have two promising materials for the binder (which may actually be the same): depigmented Armstrong adhesive and Epon resins. While P-8 feels that MgO is the best pigment because of its higher reflectivity at short wavelengths, it is our opinion that TiO_2 is a better choice because of its much greater index of refraction. By using a suitable wavelength shifter (e.g. POPOP), it is possible to move the emission spectrum to wavelengths at which the TiO_2 reflectance is nearly as good as that of MgO. The main difficulty is that all the suitable binders are more or less colored; therefore, penetration of the light into the coating must be kept to a minimum. If the binder has a refractive index of 1.5, then Fresnel's formula says that for vertical incidence of the light on a pigment particle MgO ($n = 1.73$) will reflect about 0.6% of the light, whereas TiO_2 ($n = 2.7$) will reflect 8.6% of the light. The much greater efficiency of TiO_2 in preventing penetration into the coating should reduce significantly the

transparency requirements of the binder.

b. Boron Analyses (J. Larkins, E. Anderson, with W. Langham)

The four foot graphite cube has been stacked and enclosed in a PVC bag. The graphite proportional counter built by J. Larkins has a very good characteristic when tested with Pu alphas. The PoBe source ($\lambda \times 10^7$ neutrons per second) emits enough gamma rays to cause serious interference when the alpha counter is operated at the middle of its plateau. By moving down to an alpha efficiency of about 80%, the gamma interference seems to be reduced to a low value. (Bi shielding between the source and the counter may or may not be advantageous.) The apparatus has not yet been tested with a boron sample.

c. High Level T Exposures (A. Hodges, W. Langham, E. Anderson)

The apparatus was nearly completed some time ago. It is being assembled and prepared for testing. Mice will be exposed to the inhalation of high specific activity HT for periods of time (of the order of a few hours) necessary to deliver doses of thousands of rep to the lung surface.

d. Tissue Equivalent Ion Chambers (J. Larkins, E. Anderson)

Some results have been obtained checking the relative ionization currents (gamma source) as a function of gas and wall composition. The results agree well the ratios calculated from stopping power and energy per ion pair. A qualitative check of the graphite chamber showed it to be properly insensitive to fast neutrons.

e. X-Ray Exposures (F. Worman, J. Larkins)

Depth dose curves and half-value layers have been prepared for all eight filters used with the beryllium window tube on the Maxitron 250.

During the past month 660 mice, 204 rats and a number of plants were exposed for different investigators. Fifty-five separate exposures were made and actual radiating time amounted to 8.8 hours.

f. The Relative Biological Effectiveness of Na^{24} Beta and Co^{60} Gamma Radiation of Spleen-Thymus Weight Loss in Mice (F. Worman, L. Larkins)

Chemical procedures have been worked out for preparing the Na^{24} for injection in a solution which is not toxic to the mice. A Co^{60} apparatus has been built which will deliver a decreasing dose of Co^{60} gamma over a period of twelve hours in an attempt to parallel the disintegration picture of the Na^{24}. This work is in progress.

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3. Radiobiology Section (P. S. Harris)

a. Determination of an RBE with the Use of AKm Mouse Leukemia in Swiss CFW Strain of Mice (J. Boone, V. Strang, W. Schweitzer)

Twenty mice per point were exposed to 100, 200, 300, and 400 r of X irradiation. Twenty-four hours after radiation the exposed mice plus 20 controls were injected with AKm leukemia, IP.

Although control takes were essentially negative, and the 400 r animals were clinically very sick one week after injection, the animals did not die as anticipated but continued to live with the chronic leukemia.

It is doubtful if this strain of mice will be of much value in the leukemia RBE study.

b. Metabolic Studies of C^{14} Isoniazid in Pyridoxine-deficient Rats (J. Boone, P. Sanders, J. Cromater)

Metabolic studies for renal clearance and turnover times of C^{14} isoniazid have been completed in 3 control and 3 B_6-deficient rats with intravenous injection of the drug and 1 control and 1 deficient with intraperitoneal injection. The plasma levels in the B_6-deficient rats again appeared slightly higher than the controls as was seen in the animals with the kidneys tied off. Serial chromatograms of the urine showed that the metabolites were the same in both groups, but the rates of excretion of the metabolites varied between the two groups.

This completed the metabolic study as planned and the data is being compiled for publication.

c. Bacteremia Study (P. Harris, K. Woodward, I. Boone, P. Sanders, W. Schweitzer, S. Rothermel)

Sixty mice per point were exposed to 400, 500, 600, 700, 800, and 900 r of X irradiation. Nine days post-radiation, half of the remaining mice in each group were sacrificed and bled asceptically from the heart for bacteremia studies. The remaining animals were followed for a 20 day LD_{50}. Bacterial cultures were read grossly at the end of 48 hours for growth and recorded as positive or negative at this time.

Results were as follows:

Dose	% + for bacteremia 9 days post-radiation	% dead 20 days post-radiation
Controls	4	0
400 r	10	10
500 r	75	13
600 r	93	53
700 r	87	87
800 r	91	100
900 r	100	100

A rough probit analysis of the data showed the LD_{50} to be approximately 500 r for the bacteremia and approximately 600 r for the per cent deaths at 20 days. This indicates that approximately 15 per cent of the animals survived the initial bacteremia and perhaps died from other latent radiation effects.

d. Iron Uptake in Rats Using Godiva (Entire Section)

A firing of Godiva was done during the past month using rats and studying iron uptake. The firing level was essentially the same as previously. Provisionally the data indicates that the RBE for this effect is about 4 and is similar to those previously found for organ weight loss and lethality.

e. Iron Uptake in Rats Using the Cockcroft-Walton (Entire Section)

At the same time as the Godiva runs, rats were exposed to 14 Mev

neutrons from the Cockcroft-Walton. A similar provisional look at the data indicates that 1 to 2 x 10^8 14 Mev neutrons/cm^2 is equivalent in effect to 1 roentgen of X ray.

f. Studies of a Beryllium Ionization Chamber in the [redacted] Boiler (P. Harris, C. Sheppard)

During a recent visit from Dr. Sheppard of Oak Ridge National Laboratory a series of measurements were made on a beryllium ionization chamber studying the sensitivity of the chamber to slow neutrons and pile gamma rays. The data have not been analyzed as yet. The chamber was left here and studies will be continued as time is available.

g. Median Survival Time as a Function of Thermal Neutron Dose on CF-1 Female Mice (K. Woodward, S. Rothermel)

CF-1 mice have been run at total doses of less than 1000 rem in order to determine the lower portion of the MST curve on this strain of animal. The results are similar to those found on Swiss mice. Again the plateau portion of the curve is extended into a lower total dose region than in the case of X rays or fission neutrons. This work completes the MST data necessary for publication.

h. Boron Effect on Median Survival Time (K. Woodward, S. Rothermel)

The tissue analyses by CMR-1 are complete. The results indicate that there is a higher boron uptake by the animal as the boron content of food is increased. Therefore, the shortening of median survival time depends on both a higher gut dose and a higher total body dose.

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4. Organic Chemistry Section (W. H. Langham)

Work on the book "Organic Syntheses with Isotopes" still constitutes the major effort in the Organic Chemistry Section.

5. Radiopathology Section (C. C. Lushbaugh)

a. Pathological Effects of Rapidly Administered Large Amounts of

Radiation.

1) Pathologic Studies of Morphologic Effects (C. Lushbaugh, J. Wellnitz)

The microscopic material has been completed and the results are being written up in preparation for the joint conference with the Radiation Section of the School of Aviation Medicine.

2) Cytological Studies on the Effect of Rapid, Massive Doses of Radiation on Mitosis (C. Lushbaugh, D. Hale, and J. Wellnitz)

Work continues on the effect of temperature on the rate of mitoses after death. New work has been started using the bean root tip as a source of numerous large mitoses for cytologic study in this regard. First attempts in staining these preparations were very successful.

b. Additional Biological Tests Systems for Determining the Relative Biological Effectiveness of Various Kinds of Radiation Available at Los Alamos (C. Lushbaugh, J. Spalding, P. Harris, D. Hale and L. Hughes)

1) The Broad Bean as a Test System for Studying Biological Effectiveness

a) As the result of fabricating a new tank the bean growing facilities were increased to accomodate 176 beans at one time. Using these facilities beans were exposed in groups of 35 to 200, 250, 300, 350, and 400 r and their growth followed daily. This data subjected to probit analysis indicates that the LD_{50} for 250 KV X rays filtered through 2 mm of copper at approximately 50 r per minute is 340-345 r.

b) A screening experiment with beta rays from a Sr-Y source yielding 11 rep/sec appears to indicate that the LD_{50} for the bean is slightly greater than 400 rep.

c) A third experiment studied the cytologic effect in the hour

immediately after exposure to 400 r of X radiation and found that contrary to our experience with animal tissues at this dose, there is no morphologic effect nor decrease in the mitotic rate.

2) The Luminescent Bacteria as Test System of Extreme Small Size for Studying Biological Effectiveness in Physical Systems of High Rate Capacity

The count scaler, counting rate meter and Brown Recording device were repaired and standardized. As a result of the increased sensitivity of the apparatus several good growth curves were obtained of Achromobacter fischeri, a salt water bacterium. The curves were actual measurements of the rate of increase in numbers of photons emitted by the bacteria as they themselves increased in numbers. One culture, for example, was emitting 200,000 photons per minute at the start of the experiment and 1,080,000 photons per minute about three hours later. Physical and chemical conditions are, however, not quite optimal because this curve cannot always be reproduced.

c. The Effect of Spleen Shielding as a Means of Increasing Resistance to Radiation (C. Lushbaugh, L. Hughes, D. Hale, J. Wellnitz, J. Spalding)

1) Following up the observations reported previously that splenic ATP enzyme activity is greatly increased as a function of time after radiation, mice were exposed to 50, 100, 250, 500, 800, and 1000 r and killed 5 days later. The spleens were removed, weighed and assayed for ATP enzyme activity. The following table reports the results of the three experiments done to date:

Splenic ATPase Activity in Mice 5 Days Post X Radiation

Dose R	No. Mice	No. Determinations	Av. ATPase Activity ug	Av. % Normal ATPase Activity	Av. Body Wt. gms	Av. Spleen Wt. gms	Ratio Spleen wt/ Body wt.
0	29	12	6.4	100	16.0	0.151	0.0094
50	30	12	5.8	91	17.3	0.117	0.0068
100	30	12	8.2	128	16.4	0.096	0.0058
250	29	12	10.0	156	16.7	0.091	0.0055
500	30	12	19.3	302	16.9	0.044	0.0026
800	24	12	25.9	405	12.7	0.040	0.0032
1000	11	4	22.7	358	11.4	0.034	0.0030

When the log of the per cent of normal ATP enzyme activity for each group of spleen is plotted against the ratio of splenic weight to total body weight a remarkable straight line is obtained. This relationship, in our opinion, proves that the increase in the activity of this enzyme following radiation is apparent rather than real and results from the loss of radiosensitive tissues in the spleen that are not involved in the activity of the ATP enzyme system.

2) Sufficient observations have now been obtained on the resistance to X radiation of intrauterine and immediately postpartum rats to show that any protection afforded by the circulating blood of the shielded maternal rat is not demonstrable by this method. It would appear, in fact, that the presence of the placenta between the fetal and the maternal blood streams does not allow the passage of the unknown elements involved in protection by means of spleen shielding to enter the fetal blood. The LD_{50} for 33 liters of postpartum rats (332 individuals) was approximately 150 r, while 200 r killed all of the 24 liters of antepartum rats (about 180 individuals) that were exposed in utero while they were apparently shielded by the maternal spleen. In order to test and strengthen our observations, experiments are now under way to determine whether the spleens of the unborn rat can protect the mother from irradiation if the intrauterine young are shielded during the exposure of the mother.

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V. GROUP H-5, INDUSTRIAL HYGIENE (H. F. Schulte)

A. Beryllium:

A survey has been completed for CMR-7 at Two Mile Mesa to determine the degree of exposure during evaporation of beryllium for the production of foils. Eleven air samples were collected and showed high air concentrations at the vacuum pump exhaust and in the air during stripping of the foils. Swipe samples showed surface contamination on adjacent equipment. The room was thoroughly cleaned and this project has been abandoned.

The Beryllium Shop operated only one day during this period. Three samples were collected on this day and all were below the permissible level.

A request was received from CMR Special Problems Group to monitor equipment that had been returned from the Brush Beryllium Corporation. Considerable surface beryllium was found and assistance was given in cleaning it. As a result of this visit, it was found that members of this group had been conducting beryllium work at the Detroit plant of the Revere Copper and Brass Company during 1952 and 1953. Details of this exposure have been written up and sent to Group H-2 for Medical Records.

The problem of beryllium exposures during test firing of beryllium pieces in conjunction with explosives was discussed with CMR-6 personnel at Ancho Canyon.

B. Uranium:

By _____

CMR-6 has started experimental work on the powder metallurgy of uranium metal. The material will be hot-pressed into various shapes and sizes. Air concentrations will be measured during various phases of this process, which is unique in that all operations must be done in an inert atmosphere.

C. Lithium Hydride:

During this period, the various groups processing lithium hydride were visited and it was found that all facilities were used at irregular intervals.

M-1 Shop is being operated almost continually on very small pieces. An air sample collected during machining of large pieces was found to be below the permissible level. Thirteen air samples were collected in the [redacted] of CMR Building during milling operations when concentrations were high enough to cause nasal irritation to persons unaccustomed to this exposure. It was found that the concentrations varied considerably from time to time, but most concentrations were close to the permissible level.

D. TNT:

Air samples collected in the Press Building at S Site were found to contain excessive concentrations of TNT. Recommendations were made for ventilation of the ovens in the pressing bay. This operation will be restudied when the ventilation is installed.

A study was made in the new Melt Building at S Site during steam cleaning of kettles. It was found that the ventilation was completely inadequate for the removal of the large volumes of steam released. The Engineering Department is currently working on improved ventilation for this building and recommendations were made for the control of the steam. This work is now being carried out.

(Person ... (Date)

By _____

E. Boron:

Five air samples were collected during processing of boric acid at S Site and all were below the permissible limit. Machining of boron carbide in the Shop Building was investigated and ten air samples were collected. The analysis of the ten samples has not been completed.

F. Noise:

At the request of W-5 Group at Pajarito Canyon, an investigation was made of the noise problem produced by a high pressure air jet in one of their laboratories. Because it was not possible to provide shielding without interfering with the operation, the men were supplied with ear plugs which gave them

immediate relief. An adequate supply of such plugs has been ordered. The investigation will continue in an attempt to measure the decibel level and the frequency. Instruments presently on hand for analyzing noise were found to be inadequate for this problem.

G. Miscellaneous Exposures:

Silastic, a synthetic rubber compound used at several places within the Laboratory, was found to produce extremely irritating vapors when heated. Some work has been completed on the analysis of these vapors but additional information is needed before the work can be completed.

Trinitrostilbene and alpha nitronaphthalene are being used as new additive materials at S Site. While no toxicological data is available on either of these compounds, instructions were given for careful handling of these materials.

Assistance was given in locating and tracing a gas leak near the ceramics furnace room in Sigma Building. The leak was found and has been eliminated.

A survey is being made of all outlying site shops to determine whether toxic materials are being handled. Four shops have been surveyed during this period and the need for a local exhaust ventilation for silver soldering and similar operations was revealed in two of these shops.

Air samples are still being collected by H-1 and H-5 in conjunction with the demolition of D-Building. Also, the continuous alpha sampling recording instrument was run for fourteen days during this period. All results indicate that there have been no extremely high concentrations in the working area and there have been no measurable concentrations of plutonium throughout the project.

H. Analytical Methods:

Intensive work has begun on an improved method for the determination of mercury in urine. One of the most serious difficulties with all mercury procedures has been the loss of mercury during ashing or evaporation of the sample.

Various factors influencing the determination of barium by the spot test method are being investigated. Glass filter papers apparently contain a trace of impurity which interferes with this procedure.

Studies are continuing on the influence of various fusing techniques for the sodium fluoride flux used in the determination of uranium. The Ceramics Section of CMR-6 has been assisting in this problem.

As soon as the work load permits, an intensive study will be made of the factors in the plutonium procedure which influence the percentage recovery. Every effort will be made to increase the percentage recovery of this procedure.

Work has started again on the determination of curium in urine. 8-hydroxyquinolin is being investigated as a possible extractant. Also, plastic will be used in place of glass wherever possible because of the tendency of curium to plate out on glass surfaces. The possibility of using scintillation counting for the determination of tritium in urine is being investigated.

I. Fallout Problems:

Requests have been received from both the Las Vegas Field Office and the U. S. Public Health Service for assistance in obtaining various equipment items for special fallout work. A number of items of equipment have been returned from the Nevada Proving Grounds and from the Pacific Proving Grounds, and these have been reconditioned and placed in service for other H-5 projects. Spare parts for the Electrolux high volume air samplers have been received and several of these samplers have now been renovated and placed back in service.

Background sampling for possible fallout material was discontinued during this period after collecting eight additional samples. However, the air sampler will continue to be used to collect samples for the detection of material from the demolition of D-Building. Work is proceeding on providing facilities for a permanent monitoring station at HRL Building.

A supplementary report on fallout at NPG has been submitted to Group D-6

for processing. One of the observations of this report has been that certain material collected on the fallout tray was not collected by the air samplers. An experiment is being planned at present utilizing irradiated glass beads to simulate fallout and study the effectiveness of collection by various devices.

A summary of off-site rad-safe monitoring procedures was prepared for the Santa Fe Operations Office for use in conjunction with several pending court cases.

J. Ventilation:

Studies have been made on the efficiency of the Venturi scrubber as a means of removing radioactive iodine from a gas stream. Efficiencies of 85 to 90% have been obtained over a very wide range of concentrations. This study is being made to evaluate a proposed method of air cleaning for the new Radiochemistry Building. A new, small slot-type hood designed and built by H-5 was tested and demonstrated for Group J-11. The tests on this hood were quite successful and this unit, with slight modifications, probably will be adopted for use in the new Radiochemistry Building.

A local exhaust hood and acid gas scrubber have been designed for use within the Group at HRL Building. This is designed to trap highly corrosive acids used during certain digestion operations and to prevent further corrosion of the fume hoods. Also, in HRL Building, plans were approved on ventilation for the large scintillation counter in the subbasement. Additional plans have been approved for ventilation modifications in Sigma Building, CMR Building, DP East, Anchor Ranch, the Physics Building and HRL Building.

K. Miscellaneous:

A representative of each Section of Group H-5 attended the Instrument Symposium at Ann Arbor, Michigan. A number of instruments developed here at Los Alamos were exhibited and attracted considerable attention.

One member of the Group spent a week at Berkeley, California, observing

the work of the Occupational Health Group of the University of California. This involved visits and inspections of buildings on the Berkeley campus, the Radiation Laboratory, Livermore, the Medical School and the Engineering Experiment Station at Richmond. A great deal of useful information was exchanged with this group.

A member of the Group spoke on industrial hygiene at the luncheon meeting of the local Kiwanis group.

Robert Wilson and Doctor Newell Stannard of the University of Rochester visited the Group and in conjunction with Group H-1 were shown a number of locations and operations where particulate matter presents a health problem. The University of Rochester is undertaking experiments relating to particulate hazards and these observations were of considerable help to them.

Kermit Larson and James Neel of the AEC Project of UCLA also visited the Group to discuss problems of mutual interest on the forthcoming continental test operations.

The talk recently given by M. Chain Robbins at the Health Division Seminar on "The Calibration of Tritium Monitoring Instruments" is being prepared for publication.

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For [illegible] (Group Leader) [illegible] (Date)
By [illegible] (Signature of person making change, and date)

L. Statistical Summary:

1. Air samples collected or field tests made for:

Atmospheric pollution (D Shap.)	118
Beryllium (air)	8
Beryllium (swipes)	36
Boron	15
Lithium hydride	14
Special test Venturi Scrubber (stack)	7

2. Water samples — 28

3. Plans approved — 6

4. Analyses completed:

Air	60
Beryllium	7
Lithium	16
Radioiodine	4
TNT	
Biological (urine)	167
Plutonium	25
Polonium	1
Sulfate ratio	268
Tritium	309
Uranium	18
Uranium^{235}	
Miscellaneous	4
Tritium in water	

VI. GROUP H-6, RADIOLOGIC PHYSICS (T. N. White)

A. General:

The new method of calculating fallout has been partially coded for the IBM Model 701. During the next month the code should be completed, debugged, and a test run made for comparison with manual calculations of BRAVO fallout in the Rongelap area. A short report on a simplified version of the method, used for pre-NECTAR briefing, was prepared for inclusion in JTF-7 report on CASTLE.

B. Special Problems Section (S. Shlaer, H. Israeli)

1. General:

a. George Angleton returned from leave on June 7.

b. Robert Barker returned from the Pacific Proving Grounds on May 25.

c. Simon Shlaer attended a symposium on instrumentation and industrial hygiene at Ann Arbor on May 24 - 27, and exhibited his densitometer there.

2. Work in Progress:

a. An examination has been made of the beam obtained from the

fluorescence sensitometer being used in the film development program. By exposing film at two positions in the beam, information was obtained about the uniformity and direction of the beam. Certain corrections were indicated as necessary. Unfortunately, this phase of the work has come to a temporary halt brought on by the enforced return of the 150 KVP X-ray unit to GMX-1 for, it is hoped, a short time. In the meantime, the free air ionization chamber is being assembled. Also in the process of construction is a pressure chamber in which it is planned to observe the performance of the free air ionization chamber at sea level pressure as compared with its performance at local atmospheric pressure.

b. Work has been started on an experiment to determine the fraction of thoron daughters that is retained in the lung when daughter-free thoron is inhaled. The experiment is a joint venture of H-4 and this Section. At present, effort is being directed toward producing solutions containing known concentrations of thorium B. Once provided, it is planned to have fixed amounts of such solutions placed in the lung tissue of mice. These animals will then be placed in a whole animal counter and the efficiency of the counter determined for this particular situation. Eventually, it is planned to expose mice to an atmosphere containing a known concentration of thoron (such atmospheres have been produced in connection with previous work), and after a suitable interval to determine the amount of thorium B present in the animals by using the counters mentioned above. From this data, the fraction of inhaled thoron daughters retained in the lung can be determined.

c. Specifications for a calibration building are being drawn up.

d. Assistance is being given to H-1 in evaluating methods of testing leaking radium sources and in establishing criteria for determining the existence of leaks in sources.

C. Meteorology Section (Geo. J. Newgarden, 3rd. OIC):

1. Operations:

a. Prepared fallout plots based on wind forecast[redacted] simulated atomic tests at NPG. The simulated tests were part of a pr[redacted]ducted by the NPG weather team, headed by Lt. Col. W. H. Wyatt, Kirtl[redacted] Force Base. The project was conducted by NPG during March and April and was twofold: familiarize and determine the capabilities of the weather team, which is made up of personnel new to NPG operations, and study the short time variability of winds aloft over NPG. The fallout plots indicated that the wind forecasts of the new team were on a par with those of past teams. The fallout plots also showed that the weather teams' forecasts based on wind observations made 1 to 2 hours prior to shot time are approximately 10% more accurate than the evening briefing forecasts. The fallout plots were forwarded to Lt. Col. Wyatt who is tabulating the results of the project. Col. Wyatt was advised to visit LASL and brief interested personnel, including Dr. Alvin Graves, upon completion of the tabulation.

b. Opened the Weather Station during the week end of the local forest fire and furnished the Forest Service and Fire Department two 24-hour weather forecasts daily until the fire was extinguished.

c. Furnished Dr. White atomic cloud growth data.

d. Advised Air Weather Service that LASL is considering requesting Major Orin Stopinski, a member of the CASTLE weather team, as successor to Major Newgarden, whose present tour terminates 10 December 1954.

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By [redacted] (Date)
(Signature of person making the change, and date)

D. Nuclear Field Test Section (W. [redacted], P. R. Schuyler):

1. General:

a. An evaluation is being made of residual atoll contamination following each of the CASTLE detonations in order that the best values for fallout from each of the shots may be arrived at.

b. Discussions were held with representatives of AFSWP, AFSWC, and J-Division relative to test problems.

c. Discussions with the AEC Industrial Waste Section were held. Our Section will co-operate insofar as possible in a survey of contamination conditions to be made in Pueblo Canyon run-off area from the industrial waste disposal plant.

2. Laboratory Activities (A. Dodd, R. Schnap):

a. A specific strontium separation was achieved on material from Mortendad Canyon and a series of counts is being made to follow the growth of yttrium^{90}. Soil sampling has started in Pueblo Canyon and a system of permanent marking sampling locations is being installed. This will help eliminate uncertainties arising over questions of sample locations.

b. No plutonium was detected in drinking water from CMR Building or DP West Site. Activities varying from trace amounts to just below drinking water MPC's were found in circulating water systems having a past history of contamination.

c. Approximately 230,000 gallons of waste from holdup tanks in CMR Building were assayed for plutonium. Activities for individual lots varied from zero to a maximum of 20 times drinking water MPC with an average activity of one-fourth drinking water MPC.

July 26, 1954

T. L. SHIPMAN, M. D.,
Health Division Leader

clA- H-Div. Files (following circulation to H-Div. Group Leaders)