

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Potassium Transport in the Heart of the Dog			2. Date: JUNE 1955	
3. Budget Activity No: 6320-10	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-	
10. Person in Charge: H. L. Conn			11. Starting Date:	
12. Purpose and Need: The purpose is to evaluate the rate constants and rates of transfer of potassium between plasma and interstitial compartments and between the interstitial and intracellular compartments of the living dog heart. Potassium-42 used as tracer.				
13. Related Projects:				
6320 - 8 <u>In vitro</u> uptake and disappearance of radioactive xenon by dog tissues				
6320 - 9 Measurement of organ blood flow by external counting				
6320 - 11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output.				
6320 - 34 Effects of boron on the human myocardium as reflected in the electrocardiogram.				
14. Accomplishments - F. Y. 1954: Not started				
15. Expected Results - F. Y. 1955: Project begun and completed. The kinetics of potassium transfer in the left ventricle of the intact dog H. L. Conn, Jr. and J. S. Robertson Am. J. Physiol. In press, after presentation before Am. Soc. for Clin. Research, Dec. 1954				
REPOSITORY <u>Brookhaven Natl Lab</u>				
COLLECTION <u>IM109 Med Dept. 1952-61</u>				
BOX No. _____				
FOLDER _____				

4001932

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Potassium Transport in the Heart of the Dog			2. Date: JUNE 1955	
3. Budget Activity No: 6320-10	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-	
10. Person in Charge: H. L. Conn			11. Starting Date:	
12. Purpose and Need: The purpose is to evaluate the rate constants and rates of transfer of potassium between plasma and interstitial compartments and between the interstitial and intracellular compartments of the living dog heart. Potassium-42 used as tracer.				
13. Related Projects:				
6320 - 8	<u>In vitro</u> uptake and disappearance of radioactive xenon by dog tissues			
6320 - 9	Measurement of organ blood flow by external counting			
6320 - 11	Accuracy of a radiopotassium dilution technique for the measurement of cardiac output.			
6320 - 34	Effects of boron on the human myocardium as reflected in the electrocardiogram.			
14. Accomplishments - F. Y. 1954: Not started				
15. Expected Results - F. Y. 1955: Project begun and completed. The kinetics of potassium transfer in the left ventricle of the intact dog H. L. Conn, Jr. and J. S. Robertson Am. J. Physiol. In press, after presentation before Am. Soc. for Clin. Research, Dec. 1954				

REPOSITORY Brookhaven Nat'l Lab
COLLECTION AT-189 Med. Dept. 1956-61
BOX No _____
FOLDER _____

4001933

Project Title: Potassium Transport in the Heart of the Dog (6320-10)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Costs		\$13,000	-	-
Prorated by scientific effort.				

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.3		
Other		.9		
Total		1.2	-	-
"Other" man-years prorated by scientific effort.				

20. Comments
<p>REPOSITORY <u>Brookhaven Natl Lab</u></p> <p>COLLECTION <u>7M189 Med Dept 1956</u></p> <p>BOX No. _____</p> <p>FOLDER _____</p>

400193

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project and Title: Accuracy of a Radiopotassium Dilution Technique for the Measurement of Cardiac Output			2. Date: JUNE 1955		
3. Budget Activity No: 6320-11	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: H. L. Conn			11. Starting Date:		
12. Purpose and Need: The purpose was to provide a more accurate method for the measurement of cardiac output and for the evaluation of intravascular shunts with animal and human investigations.					
13. Related Projects: 6320 - 10 Potassium transport in the heart of the dog 6320 - 34 Effects of boron on the human myocardium as reflected in the electrocardiogram					
14. Accomplishments - F. Y. 1954: Not begun					
15. Expected Results - F. Y. 1955: Study begun and completed Accuracy of a radiopotassium dilution (Stewart principle) method for the measurement of cardiac output. H. L. Conn, Jr. J. Appl. Physiol. In press					

REPOSITORY Brookhaven Nat'l Lab
 COLLECTION Med. Dept. 1950-61
 BOX No. _____
 FOLDER _____

4001935

Project Title: Connective Tissue Proteins (6320-17)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Cost		\$33,000	\$35,000	\$39,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only).				
	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				
19. Direct Man Power				
	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.75	.85	1.0
Other		2.25	2.35	2.6
Total		3.0	3.2	3.6
"Other" man-years prorated by scientific effort (F.Y.1956 analysis) (F. Y. 1954 details not available.)				
20. Comments				
REPOSITORY <u>Brookhaven Nat'l Lab.</u> COLLECTION <u>PH189 Med. Dept. 1950-61</u> BOX No. _____ FOLDER _____				

4001936

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Preparation of Labeled Proteins			2. Date: JUNE 1955		
3. Budget Activity No: 6320-12	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: W. L. Hughes			11. Starting Date:		
12. Purpose and Need: For clinical studies there is an increasing need of labeled proteins. It is proposed to study both biological labeling and chemical labeling. It is expected that these studies will also provide information relative to protein synthesis from tissue slice, organ perfusion and tissue culture techniques.					
13. Related Projects: 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution 6320 - 7 Distribution of radioactively labeled albumin and its kinetics in myxedema and euthyroidism 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 5 Localization of radiological effects to cellular dimensions 6320 - 17 Connective tissue proteins 6320 - 18 Studies on glycoproteins 6320 - 19 The development of new methods for the study of carbon-14 labeled compounds 6320 - 21 The structure of hemoglobin					
14. Accomplishments - F. Y. 1954: Not started					
15. Expected Results - F. Y. 1955: Planning and initiation of project in last quarter of this year.					
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: F. Y. 1956: Active prosecution of project F. Y. 1957: Continuing					
REPOSITORY <i>Brookhaven Nat'l Lab.</i> COLLECTION <i>M189 Med. Dept. 1955-61</i> BOX No _____ FOLDER _____					

4001937

Project Title: Preparation of Labeled Proteins (6320-12)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$13,000	\$42,000	\$39,000
Prorated by scientific effort based on F.Y. 1956 analysis (F. Y. 1954 details not available)				

18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	1.0	1.0
Other		.9	2.9	2.6
Total		1.2	3.9	3.6

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
(F.Y. 1954 details not available)

20. Comments

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
MB9 Med Dept. 1954-57

4001938

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Investigation of the Basic Physiology of Manganese Using Its Radioactive Isotopes			2. Date: JUNE 1955	
3. Budget Activity No: 6320-13	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: G. C. Cotzias		11. Starting Date:		
12. Purpose and Need: Further knowledge is necessary of the mechanisms by which manganese is made available to the systems in which it is used and the mechanisms and pathways of excretion				
13. Related Projects: 6310 - 3 Therapeutic use of Mn ⁵⁶ in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver 6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 5 Localization of radiological effects to cellular dimensions. 6320 - 16 The effects of radiation upon enzyme systems <u>in vitro</u> and <u>in vivo</u> : both in tissue samples and intact animals 6320 - 22 Development and application of new radioactive isotopes for medical and research purposes.				
14. Accomplishments - F. Y. 1954: Work outlined				
15. Expected Results - F. Y. 1955: Project is active and roles of various substances in the body capable of forming complex ions with manganese are being elucidated. Evidence pointing towards formation of bile and plasma complex manganese ions has been obtained. Studies of biliary excretion in humans are in progress.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Continuing				

4001939

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
7M189 Med Dept 1950-61

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$18,000	\$17,000	-
Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available)				
18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power				
	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years Scientists & Engineers		.4	.4	
Other		1.2	1.2	
Total		1.6	1.6	-
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				
20. Comments				
REPOSITORY <u>Brookhaven Nat'l Lab</u> COLLECTION <u>TM 89 Med Dept 1950-01</u> BOX No. _____ FOLDER _____				

4001940

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: The Affinity of Thyroid Tissue for Elements of the Seventh Periodic Group			2. Date: JUNE 1955	
3. Budget Activity No: 6320-14	4. Budget Item No:	5. Contractor's NO:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: C. J. Shellabarger			11. Starting Date:	
12. Purpose and Need: It has been suggested that the thyroid gland selectively concentrates all elements of the seventh periodic group. Its affinity for iodine is well known and the substitution of bromine and astatine for iodine has been studied. Relative affinities for fluorine, manganese, technetium and rhenium will be studied.				
13. Related Projects: 6310 - 2 Treatment of metastatic thyroid carcinoma with I ¹³¹ 6320 - 15 Treatment of thyrotoxicosis with I ¹³¹ and polycythemia vera with P ³²				
14. Accomplishments - F. Y. 1954: Not started				
15. Expected Results - F. Y. 1955: A comparison of thyroidal accumulation of rhenium-188 and iodine-131 has been made on rats, both with and without antithyroid compounds. Rhenium-188 is concentrated to a lesser degree than iodine-131.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Continuing as suitable isotopes become available.				
REPOSITORY <u>Brookhaven Natl Lab.</u> COLLECTION <u>Julien Med. Dept. 1956</u> BOX No. _____ FOLDER _____				

4001941

Investigation of the Basic Physiology of Manganese
 Project Title: Using its Radioactive Isotopes (6320-13)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$33,000	\$31,000	\$30,000
Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available)				
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18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
<hr/>				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.75	.75	.75
Other		2.25	2.25	1.95
Total		3.0	3.0	2.7
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				
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20. Comments				
REPOSITORY <u>Brookhaven Nat'l Lab</u> COLLECTION <u>JM 89 Med. Dept. 100-61</u> BOX No. _____ FOLDER _____				

4001942

Radiation Sensitivity of
 1. Project Title: Different Strains of D. Pneumoniae (6320-27)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 5,000	\$ 5,000	\$ 10,000
Prorated by scientific effort based on F.Y. 1956 analysis (F. Y. 1954 details not available).				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. Of Man Years				
Scientists & Engineers		.1	.1	.25
Other		.3	.3	.75
Total		.4	.4	1.0
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available).				
REPOSITORY <u>Goodhouse Natl Lab</u> COLLECTION <u>FMCG Med. Dept. 1956-61</u> BOX No. _____ FOLDER _____				

OFFICIAL USE ONLY

4001943

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Treatment of Thyrotoxicosis with I ¹³¹ and Polycythemia Vera with P ³² .			2. Date: June 1955	
3. Budget Activity No. 6320 - 15	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: L. K. Dahl			11. Starting Date:	
12. Purpose and Need: Sufficient patients with thyrotoxicosis are admitted each year to provide necessary training-experience for junior staff members in treating this disease, including follow-up. Similar admissions are made of patients with polycythemia vera for P ³² therapy.				
13. Related Projects: 6310 - 2 Treatment of metastatic thyroid carcinoma with I ¹³¹ . 6120 - 4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies.				
14. Accomplishments - F. Y. 1954: Continuing.				
15. Expected Results - F. Y. 1955: Nine patients admitted for therapy.				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: Continuing.				
			REPOSITORY <u>Brookhaven Natl. Lab.</u>	
			COLLECTION <u>FM 189 Med. Dept. 1956</u>	
			BOX No. _____	
			FOLDER _____	

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: The Effects of Radiation upon Enzyme Systems <u>in Vitro</u> and <u>in Vivo</u> , Both in Tissue Samples and Intact Animals.			2. Date: JUNE 1955	
3. Budget Activity No: 6320 - 16	4. Budget Item NO:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: G. C. Cotzias			11. Starting Date:	
12. Purpose and Need: The basic physiological processes of the body are carried out by enzyme systems. As the components of these systems can be purified and studied for radiation effects, one may gather information regarding possible mechanisms whereby radiation affects biological systems. Much study is necessary for the development of sources of suitable enzymes and their purification as well as methods for studying enzyme action under chosen conditions.				
13. Related Projects: 6120 - 1 Effects of radiation on histological structure. 6120 - 2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6120 - 3 Effects of radiation upon immune mechanisms. 6120 - 5 <u>In vitro</u> radiation effects on coenzyme liver concentrations following neutron exposures of intact animals. 6320 - 5 Localization of radiological effects to cellular dimensions. 6320 - 17 Connective tissue proteins. 6320 - 23 Desoxyribonucleic acid and its role with the pneumococcus. 6320 - 33 The effect of gamma irradiation on <u>D. pneumoniae</u> .				
14. Accomplishments - F. Y. 1954: Soluble monoamine oxidase was prepared for the first time. This enzyme, previously believed inseparable from certain other cell constituents, has been found to be released from cells by long chain alcohols. This makes possible a study in which this enzyme system can be tested comparatively as relates to radiation damage both within original cells ^{in solution} and in solution. COLLECTION <i>7 JUN 59 Med. Dept. 1958-61</i>				
15. Expected Results - F. Y. 1955:			BOX No. _____	
Preparation of soluble monoamine oxidase. G. C. Cotzias, I. Serlin and J. J. Greenough Science <u>120</u> , <u>144</u> (1954).			FOLDER _____	
A new and simplified, flexible method for assay of cholinesterase was developed. (See continuation sheet.)				

4001945

Project Title: The Affinity of Thyroid Tissue for Elements
of The Seventh Periodic Group (6320-14)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$13,000	\$12,000	\$12,000

Prorated by scientific effort based on F.Y. 1956 analysis
(F. Y. 1954 details not available)

18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power

	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years Scientists & Engineers		.3	.3	.3
Other		.9	.9	.9
Total		1.2	1.2	1.2

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
(F. Y. 1954 details not available)

20. Comments

REPOSITORY: Goodman North Lab.
COLLECTION: TM 89 Med Dept 180-61
BOX No. _____
FOLDER _____

4001946

15. Expected Results - F. Y. 1955 (Continued)

Microdiffusion of acetic acid as an assay for acetylcholinesterase.
I. Serlin and G. C. Cotzias
J. Biol. Chem. In press.

Considerable confusion and controversy has existed in the field of amine metabolism, in part caused by differences in amine oxidase methodology. The present study developed new methods to measure both oxygen consumption and ammonia evolution during oxidative deamination of one system. The present study using new methods developed has shown that there is no necessary correlation between oxygen consumption and ammonia production during oxidation. Conditions were discovered which can effect either one of the measurements. It was concluded that a coupled oxidation probably takes place during the deamination.

Acetyl cholinesterase shows two kinds of inactivation by radiation. Plasma cholinesterase shows a single first order reaction of inactivation, while brain and nerve acetylcholinesterase show a two-phase inactivation. Findings to date suggest this enzyme not to be implicated per se in radiation disease. This is being tested further in living animals.

16. Anticipated Problems - F. Y. 1956 and F. Y. 1957:

Effects of irradiation on monoamine oxidase. The procedures previously listed have made possible a study of the effects of radiation on this enzyme system while still located within its natural carrier. Radiation of monoamine oxidase within and without the cellular particles suggests this to be associated with marked differences in sensitivity.

The relationship between activation-inhibition of enzymes and their susceptibility to gamma rays.

REPOSITORY Dracharya Nat'l Lab.
COLLECTION MB9 Med. Dept. 1953-61
BOX No. _____
FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Connective Tissue Proteins			2. Date: JUNE 1955	
3. Budget Activity No. 6320 - 17	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: D. D. Van Slyke			11. Starting Date:	
12. Purpose and Need: Collagen as the chief protein of connective tissue is of interest because of its extracellular location and its unique composition. The many reactions provoking increases in connective tissue make this tissue one of great importance for understanding both disease and separative processes. Associated proteins are of interest.				
13. Related Projects: 6320 - 12 Preparation of labeled proteins. 6120 - 2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6320 - 19 The development of new methods for the study of carbon-14 labeled compounds.				
14. Accomplishments - F. Y. 1954: The finding of hydroxylysine in hydrolysates of collagen does not completely answer the question of the state of hydroxylysine in collagen. The role played by this amino acid in structure of collagen may be unique since this protein is characterized by presence of hydroxylysine. Following treatment of gelatin with fluorodinitrobenzene, chromatograms of hydrolysates showed only faint dinitrophenyl hydroxylysine spots. This was reported by others in literature before work here was completed. Spongin, the primitive collagen of the sponge, was found to contain hydroxylysine. Carbon-14 labeled lysine and hydroxylysine was fed to rats. Subsequently collagen tissue was obtained and it was shown the hydroxylysine in the tissue derived from the labeled lysine but not from labeled hydroxylysine.				
15. Expected Results - F. Y. 1955: Intact collagen reduces periodate with the evolution of ammonia and formaldehyde in a manner which is consistent with its hydroxylysine content. Hydrolysates of collagen are now being studied with chromatographic methods to determine whether or not the destruction of the exposed epsilon-amino, delta-hydroxy configuration of hydroxylysine can be demonstrated. Further studies are required to establish certainly the fact that hydroxylysine is not utilized by the body to synthesize collagen.				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: Continuing.				
			REPOSITORY <i>Brookhaven Natl Lab</i>	
			COLLECTION <i>114189 Med. Dept. 1954</i>	
			BOX No. _____	
			FOLDER _____	

4001948

The Effects of Radiation Upon Enzyme Systems In Vitro
 Project Title: and In Vivo, Both in Tissue Samples and Intact Animals (6320-16)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$61,000	\$62,000	\$79,000
Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.4	1.5	2.0
Other		4.2	4.2	5.2
Total		5.6	5.7	7.2
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F. Y. 1954 details not available)				

20. Comments

REPOSITORY Bredhara Natl Lab
 COLLECTION FM 189 Med. Dept. 1950-61
 BOX No. _____
 FOLDER _____

4001949

AEC-189

1. Project Title: Radiation Effects on Biological Systems - Cancer Research			2. Starting Date: JUNE 1955	
3. Budget Activity No: 6110	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: E. P. Cronkite, L. E. Farr			11. Starting Date: Continuing	
12. Purpose and Need: One important late effect of exposure to radiation is the development of cancer. In some instances this is the result of local exposure and in other, tumors may result in an organ not receiving primary radiation. In the first type of response, cutaneous cancer may well be a common product of contact radiation exposure. The dosage and type of radiation required to produce cutaneous malignancies as well as malignancies of the bowel and other organs is being studied. Explorations will also be made of possible metabolic factors which may result in metastatic spread. An example of the second type of response may be the formation of pituitary tumors following ^{radioactive} irradiation as illustrated reported by Chaikoff et al. <i>7/18/59 Med Dept. 1950</i>				
13. Related Projects: BOX No. _____				
6120 - 1 Effects of radiation on histological structure.				
6120 - 3 Effects of radiation upon immune mechanisms.				
6220 - 1 Effects of radiation upon skin and measures for altering expected results.				
6310 - 1 Neutron capture therapy.				
6310 - 3 Therapeutic use of Mn^{56} in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver.				
6320 - 5 Localization of radiological effects to cellular dimensions.				
6320 -22 Development and application of new radioactive isotopes for medical and research purposes.				
14. Accomplishments - F. Y. 1954: The role of I^{131} in the late production of pituitary tumors in rats. Results confirmed Chaikoff.				
15. Expected Results - F. Y. 1955: Pituitary tumors have been found by Chaikoff in a small sample of rats treated with I^{131} eighteen months previously. Repetition of this work at BNL has thus far confirmed Chaikoff's work in relation to Long-Evans strain of rats. When Sprague-Dawley rats were used in a manner exactly similar to the use of Long-Evans rats no pituitary tumors have been found. This is despite the fact that time intervals longer than 18 months after I^{131} administration were used. The problem is being investigated from the standpoint of difference in strains and the role thyroid removal rather than I^{131} radiation may play in tumor production.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: a. Strain differences between Long-Evans and Sprague-Dawley rats in production of pituitary tumors following I^{131} radiation will be investigated when thyroidectomy is performed surgically rather than radiologically.				

4001950

1955

Project Title: Radiation Effects on Biological Systems—Medical Research (6120)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
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Total Costs	\$150,000*	\$164,000	\$175,000	\$190,000
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*Calculated from F.Y. 1954 total cost for Cancer and Medical Research and relative effort for this activity in F.Y. 1955 - F.Y. 1956.

Total Cost includes:

25% of Research Hospital Cost	-	90,000	100,000	104,000
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18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
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(A) Construction

(B) Equipment

19. Direct Man Power	1954	1955	1956	1957
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No. of Man Years				
Scientists & Engineers	1.5	2.0	2.5	2.5
Technical	10.5	13.0	14.5	15.5
Administration & Service	3.0	3.0	3.0	3.0

Total	15.0*	18.0	20.0	21.0
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*Calculated from F.Y. 1954 total effort for Cancer and Medical Research and relative effort for this activity in F.Y. 1955 - F.Y. 1956

20. Comments

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Nat'l Lab
7M189 Med. Dept 1950-61

4001951

16. Anticipated Problems - F. Y. 1956 & F. Y. 1957 (continued)

b. As a result of the accidental exposure of human beings to heavy local skin exposure and sub-lethal whole-body exposure to gamma radiation, knowledge regarding the potential synergistic effect of these radiations in producing cutaneous cancer is needed for aiding in prognosticating the ultimate fate of the humans accidentally exposed. Studies of Bond et al have shown that local non-metastasizing tumors are produced by local irradiation of bowel. Brecher et al have shown that metastasizing carcinomata develop in rats surviving potentially lethal doses of X-ray protected by parabiosis. Investigation of production of a general metabolic disturbance by whole-body radiation that leads to metastasis is needed. Tumors and local radiation injury will be produced by local irradiation and the influence of graded doses of whole-body radiation in their life history will be studied.

REPOSITORY Brookhaven Natl Lab
COLLECTION JM 499 Med. Dept. 1950-61
BOX No. _____
FOLDER _____

4001952

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Radiation Effects on Biological Systems - Medical Research			2. Starting Date: JUNE 1955	
3. Budget Activity No: 6120	4. Budget Item No: Summary	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly & Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting Date: Continuing	

SUMMARY

<u>Sub-Activity No.</u>	<u>Project Title</u>	<u>Page No.</u>
6120-1	Effects of Radiation on Histological Structures.	6000- 5
6120-2	Effects of Radiation Upon Collagen and Collagenous Tissues as Revealed by Chemical Studies.	6000- 6
6120-3	Effects of Radiation Upon Immune Mechanisms.	6000- 7
6120-4	Prediction of Hematopoietic Effects of Large Doses of Internally Administered Radioactive Isotopes from Initial Tracer Dose Studies.	6000- 9
6120-5	<u>In Vitro</u> Radiation Effects on Coenzyme Liver Concentrations Following Neutron Exposures of Intact Animals.	6000-11

REPOSITORY
COLLECTION

Brookhaven Natl Lab
7M189 Med. Dept. 1950-61

BOX No. _____

FOLDER _____

4001953

Project Title: Radiation effects on Biological Systems-Cancer Research (6110)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs	\$ 37,000*	\$ 42,000	\$ 45,000	\$ 50,000

* Calculated from F. Y. 1954 total cost for Cancer and Medical Research and relative effort for this activity in F.Y. 1955 - F.Y. 1956.

18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers	1.0	1.0	1.0	1.5
Technical	1.5	1.5	1.5	2.0
Administration & Service	.5	.5	.5	.5
Total	3.0*	3.0	3.0	4.0

*Calculated from F.Y. 1954 total effort in Cancer and Medical Research and relative effort for this activity in F.Y. 1955 - F.Y. 1956.

20. Comments

REPOSITORY Brookhaven Natl. Lab
 COLLECTION 7M129 Med. Dept. 1950-61
 BOX No. _____
 FOLDER _____

400195

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Effects of Radiation on Collagen and Collagenous Tissues As Revealed By Chemical Studies.			2. Date: JUNE 1955	
3. Budget Activity No: 6120-2	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York 9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: D. D. Van Slyke		11. Starting Date: continuing		
12. Purpose and Need: The macromolecules of proteins of connective tissue are unique in that they are extracellular and are present in specific characteristic geometric form. It is believed they are not renewed during an individual's life. Ageing may be related to a gradual denaturation of these extracellular proteins. Radiation may accelerate this denaturation. Studies are being carried out with incorporation of labelled amino acids and by various physical chemical methods.				
13. Related Projects: 6120 - 1 Effects of radiation on histological structure. 6120 - 5 <u>In vitro</u> radiation effects on coenzyme liver concentrations following neutron exposures of intact animals. 6220 - 3 Dynamics of production and destruction of blood formed elements. 6310 - 1 Neutron capture therapy. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 12 Preparation of labeled proteins. 6320 - 17 Connective tissue proteins. 6320 - 19 The development of new methods for the study of carbon-14 labeled compounds.				
14. Accomplishments - F. Y. 1954: Project not begun.		REPOSITORY <u>Brookhaven Nat'l Lab</u> COLLECTION <u>7M189 Med. Dept 1950-61</u> BOX No. _____ FOLDER _____		
15. Expected Results - F. Y. 1955: The program was planned and initial design studies are being carried out.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Project will continue as results warrant.				

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Page 6000-6

4001955

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Effects of Radiation on Histological Structure			2. Date: JUNE 1955	
3. Budget Activity No: 6120 - 1	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEH-1	
10. Person in Charge: L. E. Farr		11. Starting Date: Continuing		
12. Purpose and Need: The need is great for information regarding all aspects of biological effects of radiation to correlate effects with physically measured dose. To provide a satisfactory background of tissue effects specimens are obtained whenever possible from animals radiated and from patients. These specimens are studied collatorally. The data when published appear in the primary study but slides are catalogued to provide ready and accessible comparative data. Gamma, beta and neutron radiations are being compared.				
13. Related Projects: <ul style="list-style-type: none"> 6110 - 1 Cancerogenic effects of radiation. 6120 - 2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6220 - 1 Effects of radiation upon skin and measures for altering expected results. 6310 - 1 Neutron capture therapy. 6310 - 2 Treatment of metastatic thyroid carcinoma with I¹³¹. 6310 - 3 Therapeutic use of Mn⁵⁶ in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver. 6310 - 4 An evaluation of the therapeutic potentialities of radioactive gallium (Ga⁷²) in relief of intractable pain from malignancy primary in or metastatic to bone. 6320 - 5 Localization of radiological effects to cellular dimensions. 6320 - 15 Treatment of thyrotoxicosis with I¹³¹ and polycythemia vera with P³². 6320 - 22 Development and application of new radioactive isotopes for medical and research purposes. 				
14. Accomplishments - F. Y. 1954: <p>Considerable numbers of specimens were processed and examined during this year. Slides are filed.</p> <p style="text-align: right;">REPOSITORY <i>Brookhaven Natl Lab</i> COLLECTION <i>JM 189 Med Dept. 1950-61</i></p>				
15. Expected Results - F. Y. 1955; BOX No. _____ This project will continue as facilities of the tissue laboratory will permit.				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: Prominent among results and problems will be a better evaluation of neutron capture therapy than would otherwise be possible. Responses to radiation of organ systems other than the brain will be continued.				
OFFICIAL USE ONLY			Page 6000-5	

4001956

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Effects of Radiation upon Collagen and Collagenous Tissues As Revealed By Chemical Studies.			2. Date: JUNE 1955	
3. Budget Activity No: 6120-2	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: D. D. Van Slyke			11. Starting Date: continuing	
12. Purpose and Need: The macromolecules of proteins of connective tissue are unique in that they are extracellular and are present in specific characteristic geometric form. It is believed they are not renewed during an individual's life. Ageing may be related to a gradual denaturation of these extracellular proteins. Radiation may accelerate this denaturation. Studies are being carried out with incorporation of labelled amino acids and by various physical chemical methods.				
13. Related Projects: 6120 - 1 Effects of radiation on histological structure. 6120 - 5 <u>In vitro</u> radiation effects on coenzyme liver concentrations following neutron exposures of intact animals. 6220 - 3 Dynamics of production and destruction of blood formed elements. 6310 - 1 Neutron capture therapy. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 12 Preparation of labeled proteins. 6320 - 17 Connective tissue proteins. 6320 - 19 The development of new methods for the study of carbon-14 labeled compounds.				
14. Accomplishments - F. Y. 1954: Project not begun.			REPOSITORY <u>Brookhaven Natl Lab.</u> COLLECTION <u>M189 Med. Dept. ASD-C.</u> BOX No. _____ FOLDER _____	
15. Expected Results - F. Y. 1955: The program was planned and initial design studies are being carried out.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Project will continue as results warrant.				
			OFFICIAL USE ONLY	
			Page 6000-6	

4001957

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Effects of Radiation upon Immune Mechanisms			2. Date: JUNE 1955	
3. Budget Activity No: 6120 - 3	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge L. E. Farr			11. Starting Date: Continuing	
12. Purpose and Need: Radiation appears to have an apparently specific effect upon immune mechanisms whereby the normal responses of these systems are suppressed proportionately to the radiation delivered. The changing relationship between radiated subjects and pathogenic invaders results in complications following radiation and opportunities to study mechanisms of immunity and the specific roles played by various tissues in immune responses. These systems are being comprehensively studied as a long range project with somewhat different emphasis from year to year.				
13. Related Projects: 6120 - 1 Effects of radiation on histological structure. 6120 - 4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6220 - 2 Immunological studies on irradiated animals protected with bone marrow. 6220 - 3 Dynamics of production and destruction of blood formed elements. 6320 - 5 Localization of radiological effects to cellular dimensions. 6320 - 12 Preparation of labeled proteins. 6320 - 16 The effects of radiation upon enzymes ^{in systems} both in tissue samples and intact animals. <i>Brookhaven Nat'l Lab</i> <i>7/18/59 Med. Dept. 1950-61</i> COLLECTION				
14. Accomplishments - F. Y. 1954: BOX No. _____ During this period two main studies received primary <u>primary</u> attention: a. The effects of radiation upon anaphylactic responses. Following cobalt 60 gamma radiation it was found that previously sensitized animals were more sensitive to anaphylactic reactions than non-irradiated animals. These findings were observed in mice. Increased susceptibility of mice to anaphylactic shock following cobalt-60 gamma radiation. R. D. Stoner and W. M. Hale J. Immunol. <u>72</u> , 419 (1954). b. Radiosensitivity of various antibody producing tissues. Intraocular transplants of tissues capable of forming antibodies such as spleen, thymus, lymph nodes and Peyer's patch are studied after radiation doses locally administered to determine quantitative relationships between radiation and antibody formation. Transplants are previously sensitized to form precipitins or antitoxin. During F.Y. 1954 a thallium-204 beta source was designed and constructed. Local radiation of transplants was used to calibrate.				

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>	
Total Costs		\$ 33,000	\$ 35,000	\$ 38,000	
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)					
18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)					
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>	
(A) Construction					
(B) Equipment					
19. Direct Man Power					
No. of Man Years		<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
Scientists & Engineers			.4	.5	.5
Other			3.2	3.5	3.7
Total			3.6	4.0	4.2
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available).					
20. Comments					
REPOSITORY <u>Bombay Natl Lab</u> COLLECTION <u>M 189 Med Dept 1953-54</u> BOX No. _____ FOLDER _____					

Project Title: Effects of Radiation upon Immune Mechanisms

15. Expected Results - F. Y. 1955:

- a. Because the mechanisms involved in anaphylaxis in mice are less well defined than in guinea pigs, the latter animals are being used as the primary test object.
- b. A number of different tissues are being studied after varying radiation dose to determine effects of dose upon response and influence of mode of antigenic presentation to response elicited.

16. Anticipated Problems - F. Y. 1956 and F. Y. 1957:

Projects a. and b. will continue.

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REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
74189 Med. Dept. 1950-61

4001960

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Prediction of Hematopoietic Effects of Large Doses of Internally Administered Radioactive Isotopes from Initial Tracer Dose Studies				2. Date: JUNE 1955	
3. Budget Activity No. 6120 - 4	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16		
10. Person in Charge L. E. Farr			11. Starting Date: Continuing		
12. Purpose and Need: Since hematological tolerance limits appear in most instances to be the factors limiting the dosage of radioactive isotopes internally administered for cancer therapy, it becomes of considerable importance accurately to predict response to a given dose of isotope. After tracer doses of the isotope are given, blood concentrations are plotted daily and a curve constructed the area under which is presumably proportional to dose delivered to the hematopoietic system. The initial studies were planned on patients receiving I-131 for metastatic thyroid cancer and with establishment of this as a basis, other internally administered radioactive isotopes will be studied in a similar fashion.					
13. Related Projects: 6110 - 1 Cancerogenic effects of radiation. 6220 - 1 Effects of radiation upon skin and measures for altering expected results. 6220 - 2 Immunological studies on irradiated animals protected with bone marrow. 6220 - 3 Dynamics of production and destruction of blood formed elements. 6310 - 2 Treatment of metastatic thyroid carcinoma with I-131. 6310 - 3 Therapeutic use of Mn ⁵⁶ in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver. 6310 - 4 An evaluation of the therapeutic potentialities of radioactive gallium (Ga ⁷²) in relief of intractable pain from malignancy primary in or metastatic to bone. 6320 - 15 Treatment of thyrotoxicosis with I-131 and polycythemia vera with P32.					
14. Accomplishments - F. Y. 1954: As shown in a publication in Am. J. Roent. Rad. Therap. & Nucl. Med. 70, 274, 1953, iodine effects could be quite satisfactorily predicted. A further correction which can be applied was published in British J. Radiol. 27, 241, 1954. Using these bases, a calculated beta dose of 400 to 500 rep to the blood will be safe. During F. Y. 1954 similar studies were begun on patients with osseous metastases of breast and prostatic cancer being treated for intractable pain with Ga ⁷² .					

(See continuation sheet)

DEPOSITORY
COLLECTION

Brookhaven Natl Lab
7M189 Med. Dept. 1950

BOX No.

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FOLDER

Page 6000-9

4001961

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$16,000	\$24,000	\$26,000
Prorated by scientific effort based on F.Y. 1956 analysis				

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.2	.35	.35
Other		1.6	2.45	2.55
Total		1.8	2.8	2.9
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)				

20. Comments

REPOSITORY Brookhaven Natl Lab
 COLLECTION JM 189 Med. Dept. 1958-6
 BOX No. _____
 FOLDER _____

15. Expected Results - F. Y. 1955:

From blood concentrations of tracer and pain alleviation doses of Ga⁷², the calculated radiation of gallium has much more profound effects hematologically than I-131 and cannot readily be predicted using the same system of approach. The effects of gallium and recovery therefrom are being studied. In some instances it seems possible that pretreatment may have delayed the critical response.

Similar lack of predictability from blood concentrations alone but of much greater severity have been observed preliminarily in patients receiving Mn⁵⁶ for therapy of metastases to the liver.

16. Anticipated Problems - F.Y. 1956 and F.Y. 1957:

Studies of blood responses to gallium-72 and Mn⁵⁶ will be continued in an effort to develop a system of predictability for hematological effects of these elements. Other short lived radioisotopes will be similarly studied as they receive clinical application. This is expected to increase hospital loads during this interval.

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REPOSITORY

COLLECTION

BOX No

FOLDER

Brookhaven Natl Lab
FM 189 Med. Dept. 1950-61

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Costs		\$57,000	\$56,000	\$61,000

Prorated by scientific effort based on F.Y. 1956 analysis
(F.Y. 1954 details not available)

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.7	.8	.8
Other		5.6	5.6	6.0
Total		6.3	6.4	6.8

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
(F.Y. 1954 details not available)

20. Comments

REPOSITORY Brookhaven Metall. Lab.
 COLLECTION FM 189 Med. Dept. 1952-6
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: <u>In Vitro</u> Radiation Effects on Coenzyme Liver Concentrations Following Neutron Exposures of Intact Animals.		2. Date: JUNE 1955	
3. Budget Activity No. 6120 - 5	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Special and Quarterly Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16
10. Person in Charge: L. E. Farr		11. Starting Date:	
12. Purpose and Need: The effects of neutron radiation of organ systems in intact animals are not clearly defined. Tissue weight loss of testes and thymus have been investigated but specific chemical systems of importance have not been studied. The availability of methods for coenzyme I studies and the related work on metabolism of tryptophane permitted a preliminary study of neutron radiation effects in the liver of intact animals.			
13. Related Projects: 6120 - 2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6120 - 3 Effects of radiation upon immune mechanisms. 6310 - 1 Neutron capture therapy. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 9 Measurement of organ blood flow by external counting. 6320 - 17 Connective tissue proteins. 6320 - 24 Studies on the conversion of tryptophane to niacin.			
14. Accomplishments - F. Y. 1954: Preliminary observation of rats receiving primarily thermal or fast neutrons indicated possibilities of differing response of the coenzyme I system to these varying energies and the need for labelled niacin precursors which could be used to determine the rate of coenzyme synthesis of rat liver. Completed and published this fiscal year were: Intermediates in the synthesis of carboxyl C-14 labeled 3-hydroxyanthranilic acid. REPOSITORY L. S. Ciereszko and L. V. Hankes COLLECTION J. Am. Chem. Soc. 76, 2500 (1954). <i>Brookhaven Natl Lab JM 189 Med. Dept 1954</i> Mammalian conversion of C-14 labeled 3-hydroxyanthranilic acid into N ¹ methylnicotinamide. FOLDER M. Urivotsky and L. V. Hankes Arch. Biochem. & Biophys. 52, 484 (1954).			
15. Expected Results - F. Y. 1955: Kynurenine 4-C-14 and o-amino-acetophenone 2-C-14 syntheses are being completed. The majority of the steps for 3-hydroxy-kynurenine 4-C-14 and 2-amino-3-hydroxy-acetophenone 2-C-14 syntheses have been completed with non-radioactive materials.			
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: Syntheses previously mentioned will be carried out with C14 to label and upon establishment of satisfactory labeling, rat radiation studies will resume. It is hoped these labeled compounds will resolve certain contradictions suggested in original data.			

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$25,000	\$25,000	\$27,000
Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available)				

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) -Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	.35	.35
Other		2.4	2.45	2.55
Total		2.7	2.8	2.9
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				

20. Comments
<p>REPOSITORY <u>Brookhaven Natl Lab</u></p> <p>COLLECTION <u>TM 189 Med. Dept. 1950-61</u></p> <p>BOX No _____</p> <p>FOLDER _____</p>

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Combating Radiation's Detrimental Effects - Medical Research			2. Date: JUNE 1955	
3. Budget Activity No: 6220	4. Budget Item No: Summary	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr, E. P. Cronkite		11. Starting Date: Continuing		

SUMMARY

<u>Sub-Activity No.</u>	<u>Project Title</u>	<u>Page No.</u>
6220 - 1	Effects of Radiation Upon Skin and Measures for Altering Expected Responses	6000-38
6220 - 2	Immunological Studies on Irradiated Animals Protected with Bone Marrow	6000-39
6220 - 3	Dynamics of Production and Destruction of Blood Formed Elements	6000-40
6220 - 4	Methods for Separation and Utilization of Viable Leukocytes and Platelets	6000-41

REPOSITORY

COLLECTION

BOX No. _____

FOLDER _____

Brookhaven Natl Lab
JMB9 Med. Dept. 1955-61

4001967

Project Title: Combating Radiation's Detrimental Effects—Medical Research (6220)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost	\$101,000*	\$112,000	\$120,000	\$135,000

*Calculated from F. Y. 1954 total cost for Medical and Cancer Research and relative effort for this activity in F. Y. 1955 - F. Y. 1956.

18. Cost of Plant & Equipment Directly Required
(Financed in P & E program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers	2.5	3.0	3.5	4.5
Technical	4.0	4.5	5.0	5.0
Administration & Service	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>
Total	7.5*	8.5	9.5	10.5

*Calculated from F. Y. 1954 total effort for Medical & Cancer Research and relative effort for this activity in F. Y. 1955 - F. Y. 1956.

20. Comments

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
JM89 Med. Dept. 1950-61

4001968

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Effects of Radiation Upon Skin and Measures for Altering Expected Responses		2. Date: JUNE 1955	
3. Budget Activity No: 6220-1	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16
10. Person in Charge: L. E. Farr		11. Starting Date:	
12. Purpose and Need: The development of severe skin lesions in patients given neutron capture therapy when the flux of thermal neutrons was increased to 3×10^9 neutrons/cm ² /sec. demands studies on cause and prevention. These studies will be done on both patients and animals. The animal studies are designed primarily to indicate more clearly the nature of the unwanted reactions experienced during neutron capture therapy and the various factors concerned in exposure of skin to radiation which may result in significant change or damage. Methods of diminishing or eliminating undesirable effects will be explored. On patients, various suggested remedial measures both of shielding and topical therapy will be investigated.			
13. Related Projects: 6120-1 Effects of radiation on histological structure. 6120-2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6310-1 Neutron capture therapy. 6320-5 Localization of radiological effects to cellular dimensions. 6320-17 Connective tissue proteins.			
14. Accomplishments-FY 1954: Problem not in planned projects.			
15. Expected Results-FY 1955: Study of skin lesions and amelioration of them in patients suggested possibility of beta radiation as the cause. A project was planned and is starting on production of a stimulating beta burn using suitable fixed sources. Particular attention is being paid to recovery from apparently severe burns. In the animal projects at the reactor, preliminary experiences with visible damage to rat skin indicated that interposition of 1/16" lucite appreciably modified the lesion. The project is continuing using a variety of local shielding materials of different thickness. Concurrently the degree to which various types of shielding material influence the flux of thermal neutrons at depth will be determined by physical means.			
16. Anticipated Problems-FY 1956-FY 1957: Work is expected to continue with aggressive follow-up of positive leads.			
REPOSITORY		Brookhaven Natl Lab	
COLLECTION		AEC-189 Med. Dept. 1955-61	
BOX No.		_____	
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OFFICIAL USE ONLY

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Methods for Separation and Utilization of Viable Leukocytes and Platelets			2. Date: JUNE 1955	
3. Budget Activity No: 6220-4	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: E. P. Cronkite			11. Starting Date:	
12. Purpose and Need: This project contemplates studies on the separation, concentration, preservation and labeling of formed elements of the blood for basic studies on their properties, life span, fate and role in hemostasis and blood coagulation and clinical usefulness. Separation of leukocytes and platelets from red cells in a viable state for study and clinical use has long been desirable. Separation of these elements may reduce red cell transfusion reactions and increase bank life of red cells and lead to development of techniques for immunologic characterization of leukocytes and platelets. Separation and labeling in viable state will permit perfusion studies of organ systems for study of peripheral utilization and fate of these elements by techniques previously developed at BNL (Conn <u>et al</u>).				
13. Related Projects: 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6310-2 Treatment of metastatic thyroid carcinoma with I^{131} . 6310-3 Therapeutic use of Mn^{56} in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver. 6310-4 An evaluation of the therapeutic potentialities of radioactive gallium (Ga^{72}) in relief of intractable pain from malignancy primary in or metastatic to bone. 6220-3 Dynamics of production and destruction of blood formed elements.				
14. Accomplishments-FY 1954: Work under way by senior scientist at NMRI before coming to BNL.				
15. Expected Results-FY 1955: To be initiated at Brookhaven.				
16. Anticipated Problems-FY 1956-FY 1957: Animal work will be continued and clinical studies in hospital patients will be initiated.				
REPOSITORY: <i>Brookhaven Natl Lab</i> COLLECTION: <i>MB9 Med. Dept. 1950-66</i> BOX No. _____ FOLDER _____				

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Immunological Studies on Irradiated Animals Protected With Bone Marrow			2. Date: JUNE 1955	
3. Budget Activity No: 6220-2	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: E. P. Cronkite			11. Starting Date:	
12. Purpose and Need: It is now established that at least one type of heterologous bone marrow transfer (e.g. rat marrow in the mouse) will induce bone marrow regeneration in recipients and will, when given after exposure, protect against otherwise lethal doses of external radiation. The protection is ephemeral, however, and late deaths occur. Of considerable importance to the problem of whether such post-irradiation protection is mediated through intact cells or a humoral substance, is the question of whether peripheral blood and bone marrow cells in the heterologously treated animal are those of the donor or the recipient. It is proposed to answer this question by immunological techniques.				
13. Related Projects: 6110-1 Cancerogenic effects of radiation. 6120-1 Effects of radiation on histological structure. 6120-3 Effects of radiation upon immune mechanisms. 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6220-3 Dynamics of production and destruction of blood formed elements. 6220-4 Methods for separation and utilization of viable leukocytes and platelets.				
14. Accomplishments-FY 1954: Inactive.				
15. Expected Results-FY 1955: To be activated during FY 1955.				
16. Anticipated Problems-FY 1956-FY 1957: To continue at 1955 projection level of effort, i.e., 0.5 scientific man years.				

4001971

REPOSITORY *Brookhaven Natl Lab*
COLLECTION *FM 189 Med. Dept. 1950-6*
BOX No. _____
FOLDER _____

Project Title: Immunological Studies on Irradiated Animals
 Protected with Bone Marrow (6220-2)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 11,000	\$ 18,000	\$ 15,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	.5	.5
Other		.6	.9	.7
Total		.9	1.4	1.2
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				

20. Comments

REPOSITORY Brockhaven Nat'l Lab
 COLLECTION JM 139 Med. Dept. 1950-61
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Dynamics of Production and Destruction of Blood Formed Elements			2. Date: JUNE 1955	
3. Budget Activity No: 6220-3	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: E. P. Cronkite			11. Starting Date:	
12. Purpose and Need: The project is designed to develop a comprehensive study of the dynamics of production and destruction of formed elements of the blood under normal and abnormal conditions in man and animals, to elucidate productive capacities of hematopoietic tissues, rates of destruction and utilization in normal and morbid states and factors controlling productive and destructive rates. Little is known about the foregoing and such information is essential to the understanding of primary and secondary blood dyscrasias and their treatment. Productive capacities will be determined by repeated bleeding, separation of platelets and leukocytes and reinfusion of separated red cells to maintain constant erythrocyte mass. Bleeding, reinfusion and hemocytometer counting will be combined with radio-labeling techniques in order to determine the changes in total red cell, platelet and leukocyte mass.				
13. Related Projects: 6120-1 Effects of radiation on histological structure. 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6220-2 Immunological studies on irradiated animals protected with bone marrow. 6220-4 Methods for separation and utilization of viable leukocytes and platelets. 6320-15 Treatment of thyrotoxicosis with I ¹³¹ and polycythemia vera with P ³² .				
14. Accomplishments-FY 1954: Not active.				
15. Expected Results-FY 1955: To be initiated.				
16. Anticipated Problems-FY 1956-FY 1957: Animal work will be continued and if possible human studies will be initiated during FY 1956.				
REPOSITORY <u>Brookhaven Nat'l Lab</u> COLLECTION <u>FM 189 Med. Dept. 1950-61</u> BOX No. _____ FOLDER _____				

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4001973

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Beneficial Applications of Atomic Energy -Cancer Research		2. Date: JUNE 1955	
3. Budget Activity No: 6310	4. Budget Item No: Summary	5. Contractor's No:	6. Method & Time of Reporting Progress: Quarterly & Special Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16
10. Person in Charge: L. E. Farr		11. Starting Date: Continuing	

SUMMARY

<u>Sub-Activity No.</u>	<u>Project Title</u>	<u>Page No.</u>
6310 - 1	Neutron Capture Therapy	6000-45
6310 - 2	Treatment of Metastatic Thyroid Carcinoma with I-131	6000-48
6310 - 3	Therapeutic Use of Mn^{56} in Carcinoma of the Liver and Pancreas and in Metastatic Carcinoma of the Liver	6000-50
6310 - 4	An Evaluation of the Therapeutic Potentialities of Radioactive Gallium (Ga^{72}) in Relief of Intractable Pain from Malignancy Primary in or Metastatic to Bone	6000-51

REPOSITORY

COLLECTION

BOX No. _____

FOLDER _____

Brookhaven Natl Lab.
AT-189 Med. Dept. 1955-61

4001977

Effects of Radiation Upon Skin and Measures for Altering
 Project Title: Expected Responses (6220-1)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 19,000	\$ 16,000	\$ 30,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) <u>Construction</u>				
(B) <u>Equipment</u>				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.5	.5	1.0
Other		.9	.8	1.3
Total		1.4	1.3	2.3
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				

20. Comments

REPOSITORY Brookhaven Natl. Lab.
 COLLECTION JM 189 Med. Dept. 1950-61
 BOX No. _____
 FOLDER _____

Immunological Studies on Irradiated Animals
 Project Title: Protected with Bone Marrow (6220-2)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 11,000	\$ 18,000	\$ 15,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A)-Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	.5	.5
Other		.6	.9	.7
Total		.9	1.4	1.2
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				

20. Comments

REPOSITORY Brookhaven Natl Lab

COLLECTION FM 189 Med. Dept. 1956

BOX No. _____

FOLDER _____

4001976

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Dynamics of Production and Destruction of Blood Formed Elements			2. Date: JUNE 1955	
3. Budget Activity No: 6220-3	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: E. P. Cronkite			11. Starting Date:	
12. Purpose and Need: The project is designed to develop a comprehensive study of the dynamics of production and destruction of formed elements of the blood under normal and abnormal conditions in man and animals, to elucidate productive capacities of hematopoietic tissues, rates of destruction and utilization in normal and morbid states and factors controlling productive and destructive rates. Little is known about the foregoing and such information is essential to the understanding of primary and secondary blood dyscrasias and their treatment. Productive capacities will be determined by repeated bleeding, separation of platelets and leukocytes and reinfusion of separated red cells to maintain constant erythrocyte mass. Bleeding, reinfusion and hemocytometer counting will be combined with radio-labeling techniques in order to determine the changes in total red cell, platelet and leukocyte mass.				
13. Related Projects: 6120-1 Effects of radiation on histological structure. 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6220-2 Immunological studies on irradiated animals protected with bone marrow. 6220-4 Methods for separation and utilization of viable leukocytes and platelets. 6320-15 Treatment of thyrotoxicosis with I ¹³¹ and polycythemia vera with P ³² .				
14. Accomplishments-FY 1954: Not active.				
15. Expected Results-FY 1955: To be initiated.				
16. Anticipated Problems-FY 1956-FY 1957: Animal work will be continued and if possible human studies will be initiated during FY 1956.				

REPOSITORY Brookhaven Natl Lab
COLLECTION M189 Med. Dept 1955-6
BOX No. _____
FOLDER _____

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PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Beneficial Applications of Atomic Energy -Cancer Research			2. Date: JUNE 1955	
3. Budget Activity No: 6310	4. Budget Item No: Summary	5. Contractor's No:	6. Method & Time of Reporting Progress: Quarterly & Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr		11. Starting Date: Continuing		

SUMMARY

<u>Sub-Activity No.</u>	<u>Project Title</u>	<u>Page No.</u>
6310 - 1	Neutron Capture Therapy	6000-45
6310 - 2	Treatment of Metastatic Thyroid Carcinoma with I-131	6000-48
6310 - 3	Therapeutic Use of Mn ⁵⁶ in Carcinoma of the Liver and Pancreas and in Metastatic Carcinoma of the Liver	6000-50
6310 - 4	An Evaluation of the Therapeutic Potentialities of Radioactive Gallium (Ga ⁷²) in Relief of Intractable Pain from Malignancy Primary in or Metastatic to Bone	6000-51

REPOSITORY Brookhaven Natl Lab
 COLLECTION 7M189 Med. Dept. 1950-41
 BOX No. _____
 FOLDER _____

4001978

Methods for Separation and Utilization of Viable
 Project Title: Leukocytes and Platelets (6220-4)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 56,000	\$ 57,000	\$ 60,000
Prorated by scientific effort based on F. Y. 1956 analysis (F.Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.5	1.65	2.0
Other		2.7	2.85	2.7
Total		4.2	4.5	4.7

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
 (F.Y. 1954 details not available)

20. Comments

REPOSITORY Brookhaven Natl Lab
 COLLECTION FM 109 Med. Dept. 1958-61
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Neutron Capture Therapy			2. Date: JUNE 1955	
3. Budget Activity No: 6310-1	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting date:	
12. Purpose and Need: The concept of neutron capture therapy requires extensive experience to determine if significantly practical results can be obtained in the control of malignancies for which other therapeutic measures are totally inadequate. The use of a nuclear reactor requires the development of a suitably shielded facility; the exploration to the full of neutron effects at all energies; extensive pharmacological investigation of compounds of target elements; and necessary experimental, clinical and histological study to permit critical evaluation.				
13. Related Projects: 6110 - 1 Cancerogenic effects of radiation. 6120 - 1 Effects of radiation on histological structure. 6220 - 1 Effects of radiation upon skin and measures for altering expected results. 6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320 - 2 The use of radioactive isotopes as tracer materials to elucidate basic problems concerning electrolytes in the study of hypertension. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 4 Ion transport across cell surfaces. 6320 - 5 Localization of radiological effects to cellular dimensions. 6320 - 9 Measurement of organ blood flow by external counting. 6320 - 16 The effects of radiation upon enzyme systems <u>in vitro</u> and <u>in vivo</u> , both in tissue samples and intact animals. 6320 - 17 Connective tissue proteins. 6320 - 30 Neutron dosimetry by pile activation methods, biological dosimetry and tissue-equivalent ionization chambers. 6320 - 31 Characteristics of bacterial growth during continuous irradiation. 6320 - 32 Physical measurements of dose delivered by internally administered isotopes. 6320 - 34 Effects of boron on the human myocardium as reflected in the electrocardiogram.				
REPOSITORY <u>Brookhaven Math Lab</u> COLLECTION <u>189 Med. Dept. 950-41</u> BOX No. _____				

(See Continuation Sheet)

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Page 6000-45

4001980

Project Title: Beneficial Applications of Atomic Energy-Cancer Research (6310)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Cost	\$249,000*	\$275,000	\$295,000	\$335,000

*Calculated from F. Y. 1954 total cost for Medical & Cancer Research and relative effort for this activity in F. Y. 1955 - F. Y. 1956.

Total Cost includes:

25% of Research Hospital Cost	-	90,000	102,000	107,000
Reactor Usage	-	57,000	47,000	42,000

18. Cost of Plant & Equipment Directly Required
(Financed in P & E program - shown here for information only)

	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers	3.5	4.5	5.0	7.0
Technical	13.0	15.5	17.0	18.5
Administration & Service	3.5	3.5	3.5	4.0
Total	20.0*	23.5	25.5	29.5

*Calculated from F. Y. 1954 total effort for Medical & Cancer Research and relative effort for this activity in F. Y. 1955 - F. Y. 1956.

20. Comments

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
GM 189 Med. Dept. 1950-61

4001981

14. Accomplishments FY 1954:

Publication of clinical results in first ten patients.

Neutron capture therapy with boron in the treatment of glioblastoma multiforme.

L. E. Farr, W. H. Sweet, J. S. Robertson, C. G. Foster, H.B. Locksley, D. L. Sutherland, H. L. Mendelsohn, and E. E. Stickley
Am. J. Roent., Rad. Therap. & Nucl. Med. 71, 279 (1954).

Design completed of modifications of medical facility in BNL Reactor to increase its effectiveness for use in neutron capture therapy. New facility installed and shown to provide an increased thermal neutron flux and also a satisfactory shutter control of facility permitting simplification and improvement of reactor operation practices.

Four patients treated in new facility. One received two treatments four weeks apart.

From experience gained at the large Brookhaven Reactor it was apparent that a reactor and its shielding designed specifically for medical use is necessary for complete exploration of the possibilities inherent in neutron capture therapy.

In conjunction with Reactor Engineering and Reactor Operations Departments at Brookhaven and Advance Technology Corporation as a subcontractor, general operating requirements of a medical use reactor were established. Results of these studies are incorporated in ATC reports to BNL.

Pharmacologically, additional data were obtained on boron distribution in mice with experimental transplantable brain tumor. Blood disappearance and urine excretion curves were obtained on dogs. Similar data were obtained on patients. Preliminary toxicity data on lithium compounds similar to that for boron were obtained to establish lethality ranges.

To increase knowledge regarding localization of boron in tumor and normal tissues studies were begun on radioautography of tissues containing boron by slow neutron radiation. Attempts were made to expose boron-loaded films and emulsions in the side reactor facility, W-15, in the biology thermal column facility, and in the new medical facility. For the last named, a new bismuth and graphite cassette was developed to minimize the extraneous effects of gamma radiation, and of heavy particle or energetic electrons on the emulsion.

15. Expected Results FY 1955:

Through January 1955, three additional patients were treated, and one patient in earlier series was retreated after 7 months. Results are interim and not conclusive but indicate a marked lengthening of interval during which effective control is maintained over tumor growth as compared to first series of 10 patients. Additional patients will be treated with variations in procedure as indicated.

Histological study was completed and manuscript submitted for publication on:

Pathological study of eight patients with glioblastoma multiforme treated by neutron capture using boron-10.

J.T. Godwin, L.E. Farr, W.H. Sweet and J.S. Robertson
Cancer. In press.

Additional data were obtained on blood disappearance of and urinary excretion of boron in patients, dogs and mice. Latter data partially reported in:

Physics and physiology of neutron capture therapy.
L.E. Farr, J.S. Robertson, and E.E. Stickley
Proc. Soc. Nat. Acad. Sci. 40, 1087 (1954).

REPOSITORY
COLLECTION

BOX No. _____

(See Continuation Sheet)

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Page 6000-46

4001982

Brookhaven Natl Lab
J.M. 189 Med. Dept.

Project Title: Neutron Capture Therapy (6310-1)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$184,000	\$197,000	\$215,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
<hr/>				
18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
<hr/>				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		3.0	3.35	4.5
Other		12.7	13.75	14.6
Total		15.7	17.1	19.1
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				
<hr/>				
20. Comments				

REPOSITORY Brockhaven Natl Lab.
 COLLECTION M89 Med. Dept. 1956
 BOX No. _____
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15. Expected Results FY 1955: (continued)

A study of specific design factors for a medical reactor carried out by the above groups led to a proposal of an air cooled graphite moderated assembly with the core of the Oak Ridge swimming pool variety cooled by a two-stage natural water system. The design provides a high degree of flexibility necessary in a research machine. Results incorporated in ATC reports to BNL.

Preliminary histological studies were completed on first two patients receiving higher flux neutron capture therapy. Tissues show increased radiation effects in agreement with presumed greater exposure.

Pharmacologically, toxicity studies have been completed or are in progress wherein the following factors are observed:

1. The effect of glucose upon boron toxicity in the mouse.
2. The effect of rate of administration on toxicity.
3. The influence of various complexing agents on toxicity.
4. The effect of age of the animal upon susceptibility to boron intoxication.
5. The effects of other drugs used in patients upon boron toxicity.

Designed studies on lithium compounds is continuing.

Suitable methods for boron analysis with requisite accuracy and precision were found not available. Modification of previous methods was necessary but extensive testing of method is required to assure complete reliability. A satisfactory procedure is now believed to have been developed, but further testing is required. This has been a continuing project over the past several fiscal years and will continue. A program has been set up to provide for cooperation with any group who synthesizes organic boron compounds whereby at BNL acute toxicity and initial tumor distribution studies can be made on any boron containing compound. General pharmacological studies are continuing on boron in dose and manner employed in current patient procedures.

Localization work by radioautography of boron was extended and new procedures were developed in an attempt to minimize the effects of secondary particles created in the surrounding air, better emulsions were investigated, and improved microtome and microscope techniques were devised.

16. Anticipated Problems FY 1956 & 1957:

The work on this general problem will continue at an increased level of activity. Additional studies will be carried on on all continuing projects and several experimental animal studies including a study on the incorporation of C-14 labeled amino acids by a transplantable mouse glioblastoma and effects of neutron radiation thereon.

REPOSITORY

COLLECTION

BOX No. _____

FOLDER _____

Brookhaven Nat'l Lab
M 189 Med. Dept. 1950-61

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Therapeutic use of Mn ⁵⁶ in Carcinoma of the Liver and Pancreas and in Metastatic Carcinoma of the Liver			2. Date: JUNE 1955	
3. Budget Activity No: 6310-3	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-15	
10. Person in Charge: G. C. Cotzias			11. Starting Date:	
12. Purpose and Need: Basic physiological studies with this isotope of 2.4 hour half life suggested it might prove useful in malignancies involving the liver and pancreas. Patient evaluation of therapy was therefore begun.				
13. Related Projects: 6110-1 Cancerogenic effects of radiation. 6120-1 Effects of radiation on histological structure. 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6120-5 <u>In vitro</u> radiation effects on coenzyme liver concentrations following neutron exposures of intact animals. 6220-3 Dynamics of production and destruction of blood formed elements. 6320-1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320-3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320-9 Measurement of organ blood flow by external counting. 6320-16 The effects of radiation upon enzyme systems <u>in vitro</u> and <u>in vivo</u> , both in tissue samples and intact animals.				
14. Accomplishments - F.Y. 1954: Two patients were treated. One had carcinoma of the liver but was believed premortem to have had malignancy of the pancreas metastasizing to the liver. This was the first patient treated. Amelioration of symptomatology was noted. No complications of serious import developed. Dosage was obviously inadequate. Second patient had primary malignancy of the large bowel metastasizing to the liver. Shrinkage of enlarged liver containing palpable metastases resulted without apparent significant interference with liver function. Hematological complications developed and a second treatment series had to be abandoned in this patient.				
15. Expected Results - F.Y. 1955: A third patient with metastatic cancer to the liver was treated. Again symptomatic relief was obtained. Hematological complications developed but apparently controlled. Patient died from primary malignancy. Further patient trials will be carried out as suitable subjects become available.				
16. Anticipated Problems - F.Y. 1956 & F.Y. 1957: Continuing.				
			REPOSITORY <i>Brookhaven Natl Lab</i> COLLECTION <i>MB9 Med Dept. 1956</i>	
			BOX No. _____	

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Page 6000-30

4001985

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Treatment of Metastatic Thyroid Carcinoma with I ¹³¹ .			2. Date: JUNE 1955	
3. Budget Activity No: 6310-2	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting Date:	
12. Purpose and Need: To critically evaluate the long term efficacy of I ¹³¹ as a therapeutic agent in thyroid carcinoma and to define its limitations and the complications attendant upon its long continued use, the following studies are in progress: a) Comparison of calculated rep to blood with hematological parameters. b) Evaluation of clinical and roentgenological response of metastases to therapy. c) Comparison of quantitative physiological behavior of tracer and therapeutic doses of I ¹³¹ . d) Study of the efficacy of thiouracil and other thyroid-blocking agents in inducing uptake in non-functioning tumors.				
13. Related Projects: 6120-1 Effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6110-1 Cancerogenic effects of radiation. 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6320-6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320-7 Distribution of radioactively labeled albumin and its kinetics in myxedema and euthyroidism. 6320-11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output. 6320-14 The affinity of thyroid tissue for elements of the seventh periodic group. 6320-15 Treatment of thyrotoxicosis with I ¹³¹ and polycythemia vera with P ³² .				
14. Accomplishments - F.Y. 1954: Completion of autopsy material on one patient indicates early leukemia was present, presumably caused by radiation. Details are being written up. Routine follow-ups on group continue. REPOSITORY: Brookhaven Natl Lab COLLECTION: M189 Med Dept. 1950-6				
15. Expected Results - F.Y. 1955: Total average number of patients in study group of thyroid carcinoma is 14. Studies correlating effects, suggest I ¹³¹ is effective in partial destruction of lung metastases; is effective in shrinking of pulmonary metastases; and quite regularly produces regression in other soft tissue metastases. (See Continuation Sheet)				

Project Title: Treatment of Metastatic Thyroid Carcinoma with I-131 (6310-2)

17. Operating Costs	<u>Actual 1954</u>	<u>Estimated 1955</u>	<u>Estimated 1956</u>	<u>Estimated 1957</u>
Total Cost		\$ 61,000	\$ 65,000	\$ 96,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
<hr/>				
18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	<u>Actual 1954</u>	<u>Estimated 1955</u>	<u>Estimated 1956</u>	<u>Estimated 1957</u>
(A) Construction				
(B) Equipment				
<hr/>				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.0	1.1	2.0
Other		4.2	4.5	6.3
Total		5.2	5.6	8.3
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
<hr/>				
20. Comments				

REPOSITORY Brookhaven Natl Lab
 COLLECTION 7M189 Med. Dept. 1950-6
 BOX No. _____
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4001987

16. Anticipated Problems - F.Y. 1956 & F.Y. 1957:

Continuing. Especial attention will be paid to bone marrow and possible development of pre-leukemia or leukemia state.

4001988

REPOSITORY

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BOX No.

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Brookhaven Natl Lab
FM 109 Med. Dept. 1956-61

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 12,000	\$ 15,000	\$ 24,000

Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.2	.25	.5
Other		.8	1.05	1.6
Total		1.0	1.3	2.1

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
(F.Y. 1954 details not available)

20. Comments

REPOSITORY Brookhaven Natl Lab
 COLLECTION MIB9 Met Dept 18041
 BOX No. _____
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4001989

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: An Evaluation of the Therapeutic Potentialities of Radioactive Gallium (Ga^{72}) in Relief of Intractable Pain From Malignancy Primary in or Metastatic to Bone.			2. Date: JUNE 1955	
3. Budget Activity No: 6310-4	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: W. W. Wolins			11. Starting Date:	
12. Purpose and Need: During casual tracer studies with gallium-72 to determine its uptake by metastatic tumors it was noted in two patients that relief of pain followed. A preliminary test in two patients, one with metastatic breast cancer and one with metastatic prostatic cancer, resulted in significant pain relief for over three weeks. The present study was begun to evaluate more fully this observation.				
13. Related Projects: 6110-1 Cancerogenic effects of radiation. 6120-1 Effects of radiation on histological structure. 6120-4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies. 6220-3 Dynamics of production and destruction of blood formed elements. 6310-2 Treatment of metastatic thyroid carcinoma with I^{131} . 6310-3 Therapeutic use of Mn^{56} in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver. 6320-1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320-3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals.				
14. Accomplishments - F.Y. 1954: Project was outlined, designed, and preliminary studies were made.				
15. Expected Results - F.Y. 1955: To date a total of 15 patients have been treated. Ten had metastases from breast cancer. Of these ten, one had dramatic relief from pain and marked improvement; one had pain relief but disease progressed; eight were unaffected. Three patients with multiple myeloma were treated; one obtained dramatic relief of pain. One patient with osteogenic sarcoma had no relief. One patient with prostatic metastases had very significant relief.				
16. Anticipated Problems - F.Y. 1956: Metastatic prostatic cancer has been apparently relieved in two out of two patients. This will be further explored. Project expected to be completed this fiscal year.				

COLLECTION

BOX No

FOLDER

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Page 6000-51

4001990

Project title: Beneficial Applications of Atomic Energy
 Medical Research (6320)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost	\$759,100 *	\$835,000	\$895,000	\$990,000
*Calculated from F. Y. 1954 total cost for Medical and Cancer Research and relative effort for this activity in F. Y. 1955 - F. Y. 1956.				
Total Cost Includes:				
50% of Research Hospital Cost	- -	\$185,000	\$203,000	\$214,000
Reactor Usage	- -	\$ 26,000	\$ 22,000	\$ 20,000
18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power				
	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists and Engineers	15.5	19.0	21.5	25.0
Technical	40.0	45.5	50.5	54.0
Administrative & Service	11.0	11.0	11.0	11.5
Total	66.5(2.0)*	75.5(2.0)	83.0(2.0)	90.5(2.0)
*Calculated from F.Y. 1954 total effort for Medical and Cancer Research and relative effort for this activity in F. Y. 1955 - F. Y. 1956				

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 COLLECTION FM 189 Med. Dept. 1956-60
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PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Beneficial Applications of Atomic Energy - Medical Research			2. Date: JUNE 1955	
3. Budget Activity No: 6320	4. Budget Item No: Summary	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting Date: Continuing	

SUMMARY

<u>Sub-Activity No.</u>	<u>Project Title</u>	<u>Page No.</u>
6320 - 1	Application of Tracer Theory to Analysis of the Kinetics of Electrolytes in Physiological Systems	6000-54
6320 - 2	The Use of Radioactive Isotopes as Tracer Materials to Elucidate Basic Problems Concerning Electrolytes in the Study of Hypertension	6000-56
6320 - 3	The Use of Short Lived Radioisotopes as Tracers in the Study of Normal and Abnormal Physiology Both in Man and Animals	6000-57
6320 - 4	Ion Transport Across Cell Surfaces	6000-59
6320 - 5	Localization of Radiological Effects to Cellular Dimensions	6000-60
6320 - 6	The Use of Radioactively Labeled Protein to Study Certain Physiological Aspects of Body Water Distribution and the Effects of Thyroid Hormone on this Distribution	6000-61
6320 - 7	Distribution of Radioactively Labeled Albumin and its Kinetics in Myxedema and Euthyroidism	6000-62
6320 - 8	<u>In Vitro</u> Uptake and Disappearance of Radioactive Xenon by Dog Tissue	6000-63
6320 - 9	Measurement of Organ Blood Flow by External Counting	6000-64
6320 - 10	Potassium Transport in the Heart of the Dog	6000-65
6320 - 11	Accuracy of a Radiopotassium Dilution Technique for the Measurement of Cardiac Output	6000-66
6320 - 12	Preparation of Labeled Proteins	6000-67
6320 - 13	Investigation of the Basic Physiology of Manganese Using Its Radioactive Isotopes	6000-68
6320 - 14	The Affinity of Thyroid Tissue for Elements of the Seventh Periodic Group	6000-69
6320 - 15	Treatment of Thyrotoxicosis with I-131 and Polycythemia Vera with P ³²	6000-70
6320 - 16	The Effects of Radiation upon Enzyme Systems <u>In Vitro</u> and <u>In Vivo</u> , both in Tissue Samples and Intact Animals	6000-71
6320 - 17	Connective Tissue Proteins	6000-73
6320 - 18	Studies on Glycoproteins	6000-74
6320 - 19	The Development of New Methods for the Study of Carbon-14 Labeled Compounds	6000-75

4001992

Brookhaven Natl. Lab
AEC-189 Med. Dept. 1955

BOX No. _____

(see continuation sheet)

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Page 6000-52

- 2 -

SUMMARY
(continued)

<u>Sub-Activity No.</u>	<u>Project Title</u>	<u>Page No.</u>
6320 - 20	Incorporation of Carbon-14 Labeled Amino Acids by <u>Trichinella Spiralis</u> Larvae	6000-76
6320 - 21	The Structure of Hemoglobin	6000-77
6320 - 22	Development and Application of New Radioactive Isotopes for Medical and Research Purposes	6000-78
6320 - 23	Deoxyribonucleic Acid and its Role Within the Pneumococcus	6000-80
6320 - 24	Studies on the Conversion of Tryptophane to Niacin	6000-81
6320 - 25	Study of Fats and Triglyceride Absorption Using C14 Labeled Glycerine	6000-82
6320 - 26	A Study of Conversion of Fat to Carbohydrate in Normal and Diabetic Animals and in Human Subjects by Analysis of Carbon-14 Distribution in Glucose	6000-83
6320 - 27	Radiation Sensitivity of Different Strains of <u>D. Pneumoniae</u>	6000-84
6320 - 28	Calcium and Magnesium Metabolism in the Nephrotic Syndrome	6000-85
6320 - 29	Electrolyte Balance Study in Animals	6000-86
6320 - 30	Neutron Dosimetry by Pile Activation Methods, Biological Dosimetry and Tissue Equivalent Ionization Chambers	6000-87
6320 - 31	Characteristics of Bacterial Growth During Continuous Irradiation	6000-89
6320 - 32	Physical Measurements of Dose Delivered by Internally Administered Isotopes	6000-90
6320 - 33	Effects of Boron on the Human Myocardium as Reflected in the Electrocardiogram	6000-91

4001992

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REPOSITORY

COLLECTION

BOX No. _____

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Brookhaven Natl Lab
7M189 Med. Dept 1950-61

An Evaluation of the Therapeutic Potentialities of Radioactive
 Project Title: Gallium (Ga^{72}) in Relief of Intractable Pain from Malignancy Primary
 in or Metastatic to Bone (6310-4)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Cost		\$ 18,000	\$ 18,000	--
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.3	.3	
Other		1.3	1.2	
Total		1.6	1.5	-

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
(F.Y. 1954 details not available)

20. Comments

REPOSITORY: Brookhaven Natl Lab
 COLLECTION: 7M189 Med. Dept. 1958-61
 BOX No. _____
 FOLDER _____

4001997

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Application of Tracer Theory to Analysis of the Kinetics of Electrolytes in Physiological Systems			2. Date: JUNE 1955	
3. Budget Activity No: 6320-1	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Special and Quarterly Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: J. S. Robertson			11. Starting Date:	
12. Purpose and Need: Mathematical analyses of data purporting to show distribution between various body compartments and the relationships existing therein. Some data are collected from animal studies and patient studies specifically to elucidate points in regard to distribution. However, the majority of data available for this type of analysis is obtained in the course of other studies.				
13. Related Projects: 6320 - 2 The use of radioactive isotopes as tracer materials to elucidate basic problems concerning electrolytes in the study of hypertension. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 4 Ion transport across cell surfaces. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 7 Distribution of radioactively labeled albumin and its kinetics in myxedema and oothyroidism. 6320 - 10 Potassium transport in the heart of the dog. 6320 - 11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output. 6320 - 13 Investigation of the basic physiology of manganese using its radioactive isotopes. 6320 - 22 Development and application of new radioactive isotopes for medical and research purposes. 6320 - 28 Calcium and magnesium metabolism in the nephrotic syndrome. 6320 - 29 Electrolyte balance studies in animals. 6310 - 1 Neutron capture therapy.				
14. Accomplishments - F. Y. 1954: During this period data were collected by J. S. Robertson, J. L. Gamble, Jr. and staff on distribution of Na ²⁴ , Cl ³⁶ , Cl ³⁸ , K ⁴² , Br, Br ⁸² , antipyrine and sucrose in animals and patients. Data were given mathematical treatment in preliminary form and comments on analysis were invited from interested specialists in various universities and institutions. <i>Brookhaven Nat. Lab J.M. 189 Med. Dept. 1955-61</i>				

COLLECTION

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Page 6000-54

BOX No. _____

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400199E.

Project Title: Application of Tracer Theory to Analysis of the Kinetics of Electrolytes in Physiological Systems (6320 - 1)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$ 13,000	\$ 29,000	\$ 49,000

Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available).

18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	.7	1.25
Other		.9	1.9	3.25
Total		1.2	2.6	4.5

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis).
(F.Y. 1954 details not available.)

20. Comments

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15. Expected Results - F. Y. 1955:

Data were unified and two papers were submitted for publication by J. S. Robertson while on military leave at NRDL.

16. Anticipated Problems - F. Y. 1956 & F. Y. 1957:

F. Y. 56: With return of Dr. Robertson and addition to staff of Dr. V. P. Bond, vigorous prosecution of the problem is anticipated.

F. Y. 57: Continuing.

REPOSITORY

COLLECTION

BOX No. _____

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Brookhaven Natl Lab
1189 Med. Dept. 1950-61

4001997

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

Project Title: The Use of Radioactive Isotopes as Tracer Materials to Elucidate Basic Problems Concerning Electrolytes in the Study of Hypertension.			2. Date: JUNE 1955		
3. Budget Activity No: 6320 - 2		4. Budget Item No:	5. Contractor's No:		6. Method and Time of Reporting Progress: Quarterly and Special Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory			8. Working Location Upton, New York		9. Contract No: AT-30-2-GEN-16
10. Person in Charge: L. K. Dahl				11. Starting Date:	
12. Purpose and Need: The present tentative working hypothesis is that there is a metabolic defect in patients with hypertension which may be related to sodium metabolism.					
13. Related Projects: 6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 4 Ion transport across cell surfaces. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 9 Measurement of organ blood flow by external counting. 6320 - 10 Potassium transport in the heart of the dog. 6320 - 11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output.					
14. Accomplishments - F. Y. 1954: Basic methods of study were established and procedures developed for tracer studies with Na ²⁴ , Br ⁸² , K ⁴² .					
15. Expected Results - F. Y. 1955: Metabolic effects of marked sodium restriction in hypertensive patients. Changes in total exchangeable sodium and potassium. L. K. Dahl, B. G. Stall and G. C. Cotzias, J. Clin. Invest. 33, 1377, 1954. Evidence for a relationship between sodium (chloride) intake and essential hypertension. L. K. Dahl and R. A. Love. AMA Arch. Int. Med. 94, 535, (1954). Metabolic effects of marked sodium restriction in hypertensive patients. Skin electrolyte losses. L. K. Dahl, B. G. Stall and G. C. Cotzias, J. Clin. Invest. In press. <i>Brookhaven Natl Lab REPOSITORY COLLECTION 1954 Med. Dep. 1956</i>					
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: F. Y. 56: Above studies will continue and comparisons be made between normal and hypertensive individuals. F. Y. 57: Continuing.					

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project and Title: The Use of Short Lived Radioisotopes as Tracers in the Study of Normal and Abnormal Physiology Both in Men and Animals		2. Date: JUNE 1955	
3. Budget Activity No: 6320-3	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16
10. Person in Charge: J. S. Robertson		11. Starting Date:	
12. Purpose and Need: Studies are carried out to establish the normal values using radioactive isotopes for quantitative measurements and to compare these with values found in disease states or following specific types of stress including whole body and local radiation.			
13. Related Projects:			
6120 - 1 Effects of radiation on histological structure			
6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems			
6320 - 4 Ion transport across cell surfaces			
6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution			
6320 - 7 Distribution of radioactively labeled albumin and its kinetics in myxedema and outhyroidism			
6320 - 8 <u>In vitro</u> uptake and disappearance of radioactive xenon by dog tissues			
6320 - 9 Measurement of organ blood flow by external counting			
6320 - 10 Potassium transport in the heart of the dog			
6320 - 11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output			
6320 - 12 Preparation of labeled proteins			
6320 - 14 The affinity of thyroid tissue for elements of the seventh periodic group			
14. Accomplishments - F. Y. 1954:			
The effect of variation of sodium intake and of DOCA on the relationship of the sodium space to the chloride space in dogs.		REPOSITORY: Brookhaven Natl. Lab.	
J. L. Gamble, Jr.		COLLECTION: Jul 189 Med. Dept. 189	
Am. J. Physiol. 175 , 276 (1953)			
15. Expected Results - F. Y. 1955:			
Accuracy of a radiopotassium dilution (Stewart principle) method for the measurement of cardiac output.		BOX No. _____	
H. L. Conn, Jr.			
J. Appl. Physiol. In press			
The kinetics of potassium transfer in the left ventricle of the intact dog.			
H. L. Conn, Jr. and J. S. Robertson			
Am. J. Physiol. In press			

(See continuation sheet)

4001999

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$ 83,000	\$80,000	\$ 75,000

Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available).

18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.9	1.9	1.9
Other		5.6	5.6	5.0
Total		7.5	7.5	6.9

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis).
(F.Y. 1954 details not available.)

20. Comments

REPOSITORY Brookhaven Natl Lab.
 COLLECTION Phys Med Dept. 1958-60
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17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Costs		\$ 9,000	\$ 8,000	\$ 20,000

Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available).

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.2	.2	.5
Other		.6	.6	1.3
Total		.8	.8	1.8

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis). (F.Y. 1954 details not available).

20. Comments

REPOSITORY Brookhaven Natl Lab
 COLLECTION 7M189 Med Dept 1950-61
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Ion Transport Across Cell Surfaces			2. Date: June 1955	
3. Budget Activity No: 6320 - 4	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Special and Quarterly Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-Gen-15	
10. Person in Charge: L. E. Farr			11. Starting Date:	
12. Purpose and Need: As part of the study of distribution of body water and its solutes and the effect of radiation thereon, specific studies are carried out to learn the mechanisms and rates of movement of ions across cell surfaces. The red cell has been used as the model.				
13. Related Projects: 6120 -1 Effects of radiation on histological structure. 6320 -1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320 -5 Localization of radiological effects to cellular dimensions.				
14. Accomplishments - F. Y. 1954: Methods were devised, experiments planned and observations made on the transport of sodium and potassium across the red cell membrane in normal red blood cells and those from patients with sickle cell anemia.				
15. Expected Results - F. Y. 1955: The effects of sickling on ion transport: I. Effect of sickling on potassium transport. D. C. Tosteson, E. Carlson, and E. T. Dunham II. Effect of sickling on sodium and cesium transport: D. C. Tosteson. In manuscript. During this past year cesium and rubidium have been further studied in this system.				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: F. Y. 1956 - Senior investigator for this problem will complete required military service and will return to renew studies. F. Y. 1957 - Continuing.				

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REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
AT-189 Med. Dept. 1950-61

4002002

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$ 44,000	\$ 62,000	\$ 79,000
Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available).				

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual	Estimated	Estimated	Estimated
(A) <u>Construction</u>				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.0	1.5	2.0
Other		2.9	4.2	5.2
Total		3.9	5.7	7.2
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis). (F.Y. 1954 details not available)				

20. Comments

REPOSITORY Brookhaven Natl Lab

COLLECTION M189 Med. Dept. 1950-61

BOX No. _____

FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Localization of Radiological Effects to Cellular Dimensions.			2. Date: JUNE 1955	
3. Budget Activity No: 6320 - 5	4. Budget Item No:	5. Contractor's No:	6. Method and time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: W. L. Hughes		11. Starting Date:		
12. Purpose and Need: It is possible to obtain energy production in highly discrete regions of cellular dimensions by the use of certain types of atomic transmutations. Astatine-211 is one isotope of interest, but it is planned to begin exploration of other transmutations delivering energy in a very short range, e.g. potassium capture. &				
13. Related Projects: 6110 - 1 Carcinogenic effects of radiation. 6120 - 1 Effects of radiation on histological structure. 6310 - 1 Neutron capture therapy 6320 - 12 Preparation of labeled proteins. 6320 - 27 Radiation sensitivity of different strains of <u>D. pneumoniae</u> . 6320 - 22 Development and application of new radioactive isotopes for medical and research purposes.				
14. Accomplishments - F. Y. 1954: Work has begun with astatine in June of this year as summer visitor program.				
15. Expected Results - F. Y. 1955: Experiments with astatine were begun and localization problems were attacked.				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: F. Y. 1956 - Planned work includes beginning of K capture observations. F. Y. 1957 - Continuing.				

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REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl. Lab
7M189 Med. Dept. 1950-61

4002004

Project Title: Localization of Radiological Effects to Cellular Dimensions (6320-5)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$15,000	\$14,000	\$14,000
Prorated by scientific effort based on F. Y. 1956 analysis (F.Y. 1954 details not available.)				

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Years	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.35	.35	.35
Other		1.05	1.05	.95
Total		<u>1.4</u>	<u>1.4</u>	<u>1.3</u>
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F. Y. 1954 details not available)				

20. Comments

REPOSITORY: Brookhaven Natl Lab
 COLLECTION: FM 189 Med. Dept. 1006
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: The Use of Radioactively Labeled Protein to Study Certain Physiological Aspects of Body Water Distribution and the Effects of Thyroid Hormone on this Distribution.				Date: JUNE 1955	
3. Budget Activity No: 6320 - 6	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory			8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr				11. Starting Date:	
12. Purpose and Need: As part of the general study of kinetics, observations of interest were indicated in patients with reversible myxedema. Human serum albumin labeled with I-131 was used as a tracer. Observations were made in patients when myxedematous and when euthyroid. In addition myxedema patients are studied with Na-24, K-42, Cl-38 and antipyrine. The studies are repeated on return to a euthyroid state. As rapidly as possible, data which can be subjected to kinetic analysis are being obtained. The purpose of this project is to elucidate the mechanism of action of thyroid hormone.					
13. Related Projects: 6310 - 1 Neutron capture therapy 6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320 - 2 The use of radioactive isotopes as tracer materials to elucidate basic problems concerning electrolytes in the study of hypertension. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 7 Distribution of radioactively labeled albumin and its kinetics in myxedema and euthyroidism.					
14. Accomplishments - F. Y. 1954: Studies were begun and experimental design validity was verified.					
15. Expected Results - F. Y. 1955: Urine and plasma data were analyzed with reference to a three-compartment doubly open model. The results and conclusions have been included in a manuscript now ready for publication.					
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: Continuing					

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COLLECTION

BOX No.

FOLDER

Page 100-11
Brookhaven Natl Lab
TM 109 Med Dept 1956

4002006

Project Title: the use of radioactively labeled protein Study Certain
 Physiological Aspects of Body Water Distribution and the
 Effects of Thyroid Hormone on This Distribution (6320-6)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$13,000	\$50,000	\$48,000

Prorated by scientific effort based on F. Y. 1956 analysis
 (F.Y. 1954 details not available).

18. Cost of Plant and Equipment Directly Required
 (Financed in F & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	1.2	1.2
Other		.9	3.3	3.1
Total		<u>1.2</u>	<u>4.5</u>	<u>4.3</u>

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
 (F.Y. 1954 details not available)

20. Comments

REPOSITORY Brookhaven Natl Lab
 COLLECTION 7M109 Med. Dept 1956
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Distribution of Radioactively Labeled Albumin and its Kinetics in Myxedema and Euthyroidism.			2. Date: JUNE 1955	
3. Budget Activity No: 6320 - 7	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: C. G. Lewallen		11. Starting Date:		
12. Purpose and Need: The effects of thyroid hormone on organ distribution and kinetics of tagged albumin will be observed in dogs and rats rendered myxedematous. Effects of thyroid hormone on large molecule kinetics may thereby be obtained.				
13. Related Projects: <ul style="list-style-type: none"> 6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320 - 2 The use of radioactive isotopes as tracer materials to elucidate basic problems concerning electrolytes in the study of hypertension. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 10 Potassium transport in the heart of the dog. 6320 - 11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output. 6320 - 12 Preparation of labeled proteins. 6320 - 19 The development of new methods for the study of carbon-14 labeled compounds. 				
14. Accomplishments - F. Y. 1954: Experiment designed and beginning of study.				
15. Expected Results - F. Y. 1955: Completion of study.				

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REPOSITORY

COLLECTION

BOX No. _____

FOLDER _____

Brookhaven Natl Lab
FM 189 Med. Dept. 1856

4002008

Project Title: Distribution of Radioactively Labeled Albumin and Its Kinetics in Myxedema and Euthyroidism (6320-7)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs	-	\$40,000	-	-

Prorated by scientific effort. (F.Y. 1954 details not available)

18. Cost of Plant and Equipment Directly Required
(Financed in P & E Program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.9		
Other		2.7		
Total		3.6		

"Other" man-years prorated by scientific effort. (F.Y. 1954 details not available)

20. Comments

REPOSITORY Brookhaven Natl Lab.
 COLLECTION FM189 Med. Dept. 1954
 BOX No _____
 FOLDER _____

4002009

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: <u>In Vitro</u> Uptake and Dis- appearance of Radioactive Xenon by Dog Tissue			2. Date: JUNE 1955	
3. Budget Activity No: 6320 - 8	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly; and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr		11. Starting Date:		
12. Purpose and Need: The purpose is to ascertain the partition coefficients which might be applied in the evaluation of organ blood flows determined by a radioxenon external counting method, and to learn more about differential solubilities of inert gases in body fluids.				
13. Related Projects: 6320 - 1 Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems. 6320 - 3 The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 7 Distribution of radioactively labeled albumin and its kinetics in myxedema and oothyroidism. 6320 - 9 Measurement of organ blood flow by external counting. 6320 - 11 Accuracy of a radiopotassium dilution technique for the measurement of cardiac output.				
14. Accomplishments - F.Y. 1954: Not started.				
15. Expected Results - F.Y. 1955: Study designed and preliminary observations made.				
16. Anticipated Problems - F.Y. 1956: Study will continue with H. L. Conn as Research Collaborator from the University of Pennsylvania Medical School. It is believed project will be completed during this year.				

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REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
TM 189 Med. Dept. 1955-61

4002010

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Measurement of Organ Blood Flow by External Counting			2. Date: JUNE 1955	
3. Budget Activity No: 6320-9	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting Date:	
12. Purpose and need: The purpose is to develop simpler and more readily applicable methods of measurement of blood flow in various organs and tissues of the human. The need is based on the lack of simple methods to measure such organ blood flow as muscle flow, hepatic flow and cerebral blood flow. Radioactive xenon appears to be a logical selection as the tracer substance.				
13. Related Projects:				
6320 - 1	Application of tracer theory to analysis of the kinetics of electrolytes in physiological systems.			
6320 - 3	The use of short lived radioisotopes as tracers in the study of normal and abnormal physiology both in man and animals.			
6320 - 6	The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution.			
6320 - 7	Distribution of radioactively labeled albumin and its kinetics in myxedema and euthyroidism.			
6320 - 8	<u>In vitro</u> uptake and disappearance of radioactive xenon by dog tissues			
6320 - 11	Accuracy of a radiopotassium dilution technique for the measurement of cardiac output.			
6320 - 12	Preparation of labeled proteins.			
14. Accomplishments - F. Y. 1954: Not started				
15. Expected Results - F. Y. 1955: Project designed and preliminary experiments done. This technique was compared with a Kety-Schmidt technique for cerebral blood flow and gave similar results in the dog. To be applied to patients when proper subjects become available.				
16. Anticipated Problems - F. Y. 1956: None - Probable completion - F. Y. 1956				
REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>MIB 9 Med. Dept. ASD-61</u> BOX No. _____ FOLDER _____				

4002011

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Costs		\$5,000	\$5,000	-

Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available)

18. Cost of Plant and Equipment Directly Required
(Financed in P&E Program - shown here for information only)

	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.1	.1	
Other		.3	.3	
Total		.4	.4	

"Other" man-years prorated by scientific effort (F.Y. 1956 analysis)
(F. Y. 1954 details not available)

20. Comments

REPOSITORY Brookhaven Natl Lab
 COLLECTION FM 109 Mat Dept. 1958-61
 BOX No. _____
 FOLDER _____

Treatment of Thyrotoxicosis With I-131 and
 Project Title: Polycythemia Vera With P³² (6320-15)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Cost		\$13,000	\$17,000	\$20,000
Prorated by scientific effort based on F.Y. 1956 analysis (F.Y. 1954 details not available)				

18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A) Construction				
(B) Equipment				

19. Direct Man Power	1954	1955	1956	1957
No. of Man Years				
Scientists & Engineers		.3	.4	.5
Other		.9	.8	1.3
Total		1.2	1.2	1.8
"Other" man-years prorated by scientific effort (F.Y. 1956 analysis) (F.Y. 1954 details not available)				

20. Comments				

4002013

REPOSITORY Brookhaven Natl Lab
 COLLECTION 7M189 Med. Dept. 1950-60
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT.

AEC-189

1. Project Title: Effects of Boron on the Human Myocardium as Reflected in the Electrocardiogram.			2. Date: JUNE 1955		
3. Budget Activity No: 6320-33	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16		
10. Person in Charge: L. E. Farr			11. Starting Date:		
12. Purpose and Need: The purpose was to ascertain (1) whether any deleterious cardiac effects result from the boron dosages used in neutron capture therapy for glioblastoma, and (2) to ascertain the nature of such effects. Based upon the fact that large doses of boron in the toxic range were being administered to patients, these studies were undertaken, since the doses have been known to cause cardiovascular collapse. The study showed that consistent EKG abnormalities developed and they were temporary, lasting 24 to 72 hours, their regression grossly paralleling the decline in blood-boron concentration.					
13. Related Project: 6310 - 1 Neutron capture therapy.					
14. Accomplishments FY 1954: Project begun.					
15. Expected Results FY 1955: Completed. Report to be submitted for publication.					

REPOSITORY *Brookhaven Natl Lab*
 COLLECTION *Med. Dept. 100-61*
 BOX No. _____
 FOLDER _____

4002014

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Studies on Glycoproteins.			2. Date: JUNE 1955		
3. Budget Activity No. 6320 - 18	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16		
10. Person in Charge: E. Popenoe			11. Starting Date:		
12. Purpose and Need: It has been known for some time that in the urine of nephrotic children there existed a protein which was not precipitated by trichloroacetic acid. The quantity present or its significance in the disease are not known. Further characteristics are required before more definitive studies can be done or labeling considered.					
13. Related Projects: 6320 - 28 Calcium and magnesium metabolism in the nephrotic syndrome. 6320 - 12 Preparation of labeled proteins.					
14. Accomplishments - F. Y. 1954: From February through June 1954, a survey of the patients available was made to find a suitable source of the protein. Techniques for isolation and manipulation of the protein were developed.					
15. Expected Results - F. Y. 1955: The identity of the urinary and plasma glycoproteins was established by immunology, ultra-centrifugation, electrophoresis and by analysis for nitrogen, hexose and hexose amine. Samples were prepared which were at least 95% pure. Chromatographic analyses are under way. Enzymatic analysis is being probed.					
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: An elevation of alpha ₁ -glycoprotein occurs not only in nephrosis but also in cancer and other wasting disease. If chemical studies are sufficiently advanced, studies will be made of glycoproteins before <i>Brookhaven Natl Lab</i> REPOSITORY <i>MB9 Med. Dept. A3-61</i> COLLECTION _____ BOX No. _____ FOLDER _____					

4002015

Project Title: Studies On Glycoproteins (6320-18)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$44,000	\$42,000	\$39,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power				
	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.0	1.0	1.0
Other		2.9	2.9	2.6
Total		3.9	3.9	3.6
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
20. Comments				
REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>JM 189 Med Dept. 1950-61</u> BOX No. _____ FOLDER _____				

4002012

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: The Development of New Methods for the Study of Carbon-14 Labeled Compounds.			2. Date: JUNE 1955	
3. Budget Activity No. 6320 - 19	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: D. D. Van Slyke			11. Starting Date:	
12. Purpose and Need: Improvements in counting and preparation procedures of carbon-14 labeled compounds will extend the usefulness of this type of labeling.				
13. Related Projects: 6120 - 2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6120 - 5 <u>In vitro</u> radiation effects on coenzyme liver concentrations following neutron exposures of intact animals. 6320 - 6 The use of radioactively labeled protein to study certain physiological aspects of body water distribution and the effects of thyroid hormone on this distribution. 6320 - 7 Distribution of radioactively labeled albumin and its kinetics in myxedema and euthyroidism. 6320 - 20 Incorporation of carbon-14 labeled amino acids by <u>Trichinella spiralis</u> larvae. 6320 - 21 The structure of hemoglobin. 6320 - 25 Study of fats and triglyceride absorption using C^{14} labeled glycerine. 6320 - 26 A study of conversion of fat to carbohydrate in normal and diabetic animals and in human subjects by analysis of carbon-14 distribution in glucose.				
14. Accomplishments - F. Y. 1954: The determination of $C^{14}O_2$ by proportional counting in the gas phase formerly required 3800 volts. The required voltage was reduced to 2100 volts by substituting a mixture of 90% argon and 10% methane for 100% methane. Determination of total carbon and its radioactivity II. Reduction of required voltage and other F. M. Sinex, J. Plazin, D. Clareus, W. Bernstein, D. D. Van Slyke and R. Chase. J. Biol. Chem. In press. COLLECTION <i>Brookhaven Natl Lab</i> <i>Physiol. Med. Dept. 1950-61</i>				
15. Expected Results - F. Y. 1955: A modified version of the Van Slyke-Neill manometric apparatus has been developed in which the measuring volume has been reduced from 0.5 ml to 0.1 ml. The performance of this apparatus is now being studied.				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: Continuing.				

4002017

The Development of New Methods For The
 Project Title: Study of Carbon-14 Labeled Compounds (6320-19)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$33,000	\$33,000	\$32,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power				
	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.75	.8	.8
Other		2.25	2.3	2.1
Total		3.0	3.1	2.9
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
20. Comments				
REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>JM 189 Med. Dept. 1950-61</u> BOX No. _____ FOLDER _____				

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4002016

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Incorporation of Carbon-14 Labeled Amino Acids by <u>Trichinella Spiralis</u> Larvae.			2. Date: JUNE 1955		
3. Budget Activity No: 6320-20	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: L. V. Hankos			11. Starting Date:		
12. Purpose and Need: The incorporation of glycino-1-C-14 and glycino-2-C-14 is being studied in newborn and oncyted Trichinella larvae. Similar studies are planned with labeled alanino, tyrosino and tryptophano. Body tissues and blood of host animals as well as parasites are being analyzed. The protein metabolism of parasitic helminths is largely unknown. The present problem presents a new approach to the study of the relationship of this parasitic nematode to its host.					
13. Related Projects: 6120 - 2 The effects of radiation upon collagen and collagenous tissues as revealed by chemical studies. 6320 - 19 The development of new methods for the study of carbon-14 labeled compounds. 6320 - 25 Study of fats and triglyceride absorption using C ¹⁴ labeled glycerine. 6320 - 26 A study of conversion of fat to carbohydrate in normal and diabetic animals and in human subjects by analysis of carbon-14 distribution in glucoso.					
14. Accomplishments - F. Y. 1954: Not started.					
15. Expected Results - F. Y. 1955: Project designed and test analysis made.					
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Continuing.					
REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>M189 Med. Dept. 1950-61</u> BOX No. _____ FOLDER _____					

4002019

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: The Structure of Hemoglobin			2. Date: JUNE 1955	
3. Budget Activity No: 6320-21	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: W. L. Hughes			11. Starting Date:	
12. Purpose and Need: Knowledge of the structure of hemoglobin is desirable not only because of the important role of this protein in mammalian physiology but also because hemoglobin in its various components enters into several physiological processes some of which may be of great interest in the study of carrier substances to radiate specific mechanisms.				
13. Related Project: 6120 - 4 Prediction of hematopoietic effects of large doses of internally administered radioactive isotopes from initial tracer dose studies.				
14. Accomplishments - F. Y. 1954: Not started.				
15. Expected Results - F. Y. 1955: The problem is one in which the senior investigator has been engaged for a number of years. Structure will be studied by partially splitting the hemoglobin molecule and studying the recombination of hemo and globin. The relationship of various groupings in globin, e. g. SH groups, to this combination and to the function of hemoglobin is being particularly investigated.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Continuing.				

REPOSITORY

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BOX No. _____

FOLDER _____

Brookhaven Natl Lab
7M 189 Med. Dept. 1950-61

4002020

Project Title: The Structure of Hemoglobin (6320-21)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$22,000	\$33,000	\$32,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.5	.8	.8
Other		1.5	2.3	2.1
Total		2.0	3.1	2.9
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
20. Comments				
REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>IBM Med. Dept</u> 1950 BOX No _____ FOLDER _____				

4002021

Accuracy of a Radiopotassium Dilution Technique for the
 Project Title: Measurement of Cardiac Output (6320-11)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Costs		\$13,000	-	-
Prorated by scientific effort.				

18. Cost of Plant and Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		2.3		
Other		.9		
Total		1.2		
"Other" man-years prorated by scientific effort.				

20. Comments

REPOSITOR: Brookhaven Natl Lab
 COLLECTION: TM 189 Med Dept 1956-6
 BOX No. _____
 FOLDER _____

4002022

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Development and Application of New Radioactive Isotopes for Medical and Research Purposes			2. Date: JUNE 1955	
3. Budget Activity No: 6320-22	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting Date:	
12. Purpose and Need: During the present fiscal year a continuing program has been more clearly outlined and search started for senior personnel who would be most useful in providing necessary continuity for some major portions of this program.				
13. Related Projects: None.				
14. Accomplishments - F. Y. 1954: The untoward death of Dr. Steinfield prevented further exploitation of the use of Kr^{87} . Shortage of adequate senior personnel prevented full follow-up of Cl^{38} and A^{41} studies. Despite these difficulties a reasonable amount of exploration has continued. Pharmacological studies of radiogermanium (Ge^{71}). II. Inhalation of dusts. H. C. Dudley AMA Arch. Indus. Hyg. and Occup. Med. <u>8</u> , 528 (1953). Xenon concentration changes in brain and other body tissues of the dog during inhalation of the gas. C. B. Pittinger, R. H. Featherstone, E. G. Cross, E. E. Stickley and L. Lovy J. Pharm. and Exp. Therap. <u>110</u> , 45C (1954).				
15. Expected Results - F. Y. 1955: Studies on the thyroidal uptake of astatine in the rat. C. J. Shellabarger and J. T. Godwin J. Clin. Endo. & Metab. <u>14</u> , 1149 (1954). The <u>in vivo</u> partition of manganese among some organs and intracellular organelles of the rat. L. S. Maynard and G. C. Cotzias J. Biol. Chem. In press. (Recipient of 1954 A. Crossy Morrison Prize of N. Y. Academy of Sciences) The reaction of astatine with protein. W. L. Hughes and D. Gitlin BNL Quarterly Report July 1 - Sept. 30, 1954 (BNL 314 (S-23)) The effects of thyroxine and KSCN on capacity of rat thyroid gland to accumulate At^{211} . C. J. Shellabarger, P. W. Durbin, M. W. Parrott and <i>Brookhaven Natl. Lab. REPOSITORY</i> Proc. Soc. Exp. Biol. & Med. <u>87</u> , 626 (1954) <i>Collection M89 Med Dept 1950-61</i>				
BOX No. _____				
(See continuation sheet)				

4002025

Development and Application of New Radioactive
Project Title: Isotopes for Medical and Research Purposes (6320-22)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
17. Operating Costs				
Total Cost		\$13,000	\$27,000	\$60,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.3	.65	1.5
Other		.9	1.75	3.9
Total		1.2	2.4	5.4
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
20. Comments				
<div style="text-align: right;"> REPOSITORY <u>Leadhouse Natl Lab</u> COLLECTION <u>MB9 Med. Dept. 1950-61</u> BOX No. _____ FOLDER _____ </div>				

4002027

16. Anticipated Problems - F. Y. 1956 & F. Y. 1957:

F. Y. 56: It is planned by one senior staff addition to provide for greater continuity in development and for moderate expansion of this program. Particularly it is planned to integrate more closely preparation of isotopes in the Hot Laboratory with work in medicine.

F. Y. 57: Continuing.

4002025

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BOX No

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Brookhaven Natl Lab
FM 109 Med. Dept. 1956-61

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Deoxyribonucleic Acid and Its Role Within the Pneumococcus.			2. Date: JUNE 1955	
3. Budget Activity No: 6320-23	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: R. M. Drew		11. Starting Date:		
12. Purpose and Need: Isotopic labeled DNA from <u>D. pneumoniae</u> will be given to other cells to determine its uptake by and distribution within the pneumococcal cell. When these facts are established, they can be used for base line studies of radiation effects.				
13. Related projects: 6320 - 27 Radiation sensitivity of different strains of <u>D. pneumoniae</u> . 6320 - 31 Characteristics of bacterial growth during continuous irradiation. 6320 - 33 The effect of gamma irradiation on <u>D. pneumoniae</u> .				
14. Accomplishments - F. Y. 1954: Not begun.				
15. Expected Results - F. Y. 1955: Project will be designed in detail and necessary procedures developed.				
16. Anticipated Problems: F. Y. 1956 and F. Y. 1957 - Continuing if warranted.				

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400202

REPOSITORY *Brookhaven Natl Lab*
COLLECTION *FM¹⁸ Med. Dept. 1950-61*
BOX No _____
FOLDER _____

Project Title: Desoxyribonucleic Acid and Its Role
Within the Pneumococcus (6320-23)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$26,000	\$25,000	\$24,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
<hr/>				
18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
<hr/>				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.6	.6	.6
Other		1.8	1.8	1.7
Total		2.4	2.4	2.3
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
<hr/>				
20. Comments				

4002027

REPOSITORY *Brookhaven Natl. Lab*
 COLLECTION *M189 Med Dept 1950-61*
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PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Studies on the Conversion of Tryptophane to Niacine			2. Date: JUNE 1955		
3. Budget Activity No: 6320 - 24	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: L. V. Hanks			11. Starting Date:		
12. Purpose and Need: A study of the synthesis of liver diphosphopyridine nucleotide and the excretion of metabolic products of tryptophane may be proven useful in studies of radiation effects in mammals. Niacin is a component of these nucleotides and is itself a result in part of tryptophane conversion. Degradation products can be isolated in the urine but without labels their significance cannot be assessed.					
13. Related Projects: 6120 - 5 <u>In vitro</u> radiation effects on coenzyme liver concentrations following neutron exposures of intact animals. 6310 - 3 Therapeutic use of Mn-56 in carcinoma of the liver and pancreas and in metastatic carcinoma of the liver.					
14. Accomplishments - F. Y. 1954: Labeled synthetic 3-hydroxyanthranilic acid injected into rats permitted isolation from urine of pure labeled N-methylnicotinamide containing carbon-14. Labeled glycine, alanine and anthranilic acid injected into rabbits gave rise to two as yet unidentified compounds separable by chromatographic analysis.					
15. Expected Results - F. Y. 1955: Continuing					
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Continuing					

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4002028

REPOSITORY: Brookhaven Natl. Lab
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 FOLDER _____

Studies On The Conversion of Tryptophane
 Project Title: To Niacin (6320-24)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$15,000	\$14,000	\$14,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)				
<hr/>				
18. Cost of Plant & Equipment Directly Required Financed in P & E Program - shown here for information only)	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
<hr/>				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years Scientists & Engineers		.35	.35	.35
Other		1.05	1.05	.95
Total		1.4	1.4	1.3
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available)				
<hr/>				
20. Comments				

4002029

REPOSITORY Brookhaven Natl Lab
 COLLECTION TM 189 Med. Dept. 1953-61
 BOX No. _____
 FOLDER _____

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Study of Fats and Triglyceride Absorption using C-14 Labeled Glycerine			2. Date: JUNE 1955	
3. Budget Activity No: 6320-25	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: D. D. Van Slyke		11. Starting Date:		
12. Purpose and Need: <p>a) Studies on the absorption from the gastrointestinal tract and the metabolism of triglycerides were begun to obtain quantitative information on the absorption of triglycerides from the small intestine, the lipolysis of these compounds and their metabolism during and after absorption. Besides throwing light on some aspects of lipid metabolism the project provides basic information on the behavior of the intestinal tract. Because of the susceptibility of the intestinal tract to radiation such studies may be of value in uncovering specific effects of radiation. Carbon-14 labeled glycerol was used as the tracer material.</p> <p>b) Although it is well known that certain unsaturated fatty acids are essential for the normal growth and development of mammals, knowledge of the metabolic role of these acids is relatively obscure. Through studies with labeled compounds, chemical or metabolic lesions may be demonstrated to occur in essential fatty acid deficient rats.</p>				
13. Related Project: <p>6320 - 26 A study of conversion of fat to carbohydrate in normal and diabetic animals and in human subjects by analysis of carbon-14 distribution in glucose.</p>				
14. Accomplishments - F. Y. 1954: <p>a) The metabolism of C-14 glycerol in the intact rat. L. I. Gidez and M. L. Karnovsky (Awarded second prize in 1954 awards of the Glycerine Producers Association.)</p> <p>b) Animals (rats) showing classical signs of essential fatty acid deficiency were produced. Carbon-14 labeled glycerol was given and production of $C^{14}O_2$ and incorporation of the glycerol into liver lipids was determined.</p>				
15. Expected Results - F. Y. 1955: <p>a) Studies were completed on rats on the absorption, extent of lipolysis and incorporation of glycerol labeled triolein into the lipids of intestinal mucosa, liver and plasma.</p> <p>b) Chemical and isotopic studies of liver glycerides and phosphatides and of depot lipids are under way.</p>				
16. Anticipated Problems - F. Y. 1956 and F. Y. 1957: <p>a. and b. continuing</p>				

4002030

REPOSITORY *Brookhaven Natl. Lab*
COLLECTION *7M 189 Med. Dept. 1955-61*

Study of Fats and Triglyceride Absorption
 Project Title: Using C14 Labeled Glycerine (6320-25)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
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Total Cost		\$33,000	\$37,000	\$36,000
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Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available)

18. Cost of Plant & Equipment Directly Required
 (Financed in P & E Program - shown here for information only)

	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
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(A) Construction

(B) Equipment

19. Direct Man Power	1954	1955	1956	1957
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No. of Man Years				
Scientists & Engineers		.75	.9	.9
Other		2.25	2.5	2.3
Total		3.0	3.4	3.2

"Other" man-years prorated by scientific effort (F. Y. 1956 analysis)
 (F. Y. 1954 details not available)

20. Comments

REPOSITORY: *Beechham Natl Lab*
 COLLECTION: *M 189 Med. Dept. 400-01*
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4002031

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC 189

1. Project Title: A Study of Conversion of Fat to Carbohydrate in Normal and Diabetic Animals and in Human Subjects by Analysis of Carbon-14 Distribution in Glucose.		2. Date: June 1955	
3. Budget Activity No: 6320 - 26	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16
10. Person in Charge: W. W. Shreeve		11. Starting Date:	
12. Purpose and Need: By the use of carbon-14 labeled acetic acid it is possible to introduce the labeled carbon atom into glucose. Study of glucose, its metabolic products and end products then yield information of the pathways of intermediary carbohydrate metabolism. In diabetes and related conditions abnormal production of carbohydrate from fat may prevail.			
13. Related Projects: 6320 - 25 Study of fats and triglyceride absorption using C-14 labeled glycerine.			
14. Accomplishments - F. Y. 1954: Study planned and initial observations were made on rats. Studies are now under way on a patient with diabetes.			
15. Expected Results - F. Y. 1955: Sufficient data will be obtained in studies previously begun to indicate whether or not abnormal conversion of fat to carbohydrate exists.			
16. Anticipated Problems - F. Y. 1956 and F.Y. 1957: Continuing if data warrant.			

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4002032

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BOX No.

FOLDER

Brookhaven Natl Lab
1189 Med. Dept. 1955-61

Project Title: A Study of Conversion of Fat to Carbohydrate in Normal and Diabetic Animals and in Human Subjects by Analysis of Carbon-14 Distribution in Glucose (6320-26)

17. Operating Costs	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
Total Cost		\$44,000	\$42,000	\$39,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available).				
18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual 1954	Estimated 1955	Estimated 1956	Estimated 1957
(A)-Construction				
(B) Equipment				
19. Direct Man Power				
No. of Man Years				
Scientists & Engineers		1.0	1.0	1.0
Other		2.9	2.9	2.6
		3.9	3.9	3.6
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available).				

4002035

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COLLECTION

BOX No.

FOLDER

Brookhaven Natl. Lab
1189 Med. Dept. 1950-64

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Radiation Sensitivity of Different Strains of <u>D. pneumoniae</u> .			2. Date: JUNE 1955	
3. Budget Activity No. 6320-27	4. Budget Item No.	5. Contractor's No.	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16	
10. Person in Charge: R. M. Drew			11. Starting Date:	
12. Purpose and Need: Radiation affects not only immunological response of host but also infecting organism. It has been suggested by plant geneticists that a correlation may exist between radiation sensitivity and number of chromosomes in a cell. Since it is possible to take one strain of pneumococcus and add at least two new genetic factors to the cell, it is proposed to compare the radiation sensitivity of the transformed organisms with that of the parent strain.				
13. Related Projects: 6320 - 23 Desoxyribonucleic acid and its role within the pneumococcus. 6320 - 31 Characteristics of bacterial growth during continuous irradiation. 6320 - 33 The effect of gamma irradiation on <u>D. pneumoniae</u> .				
14. Accomplishments - F. Y. 1954: Not begun.				
15. Expected Results - F. Y. 1955: Study planned and initiated. Preliminary experiments suggest that the acquisition of additional macromolecules (nucleoproteins) by the cell renders it more radiosensitive.				
16. Anticipated Problems - F. Y. 1956 & F. Y. 1957: Continuing				
REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>FM 189 Med Dept. 1950-61</u> BOX No. _____ FOLDER _____				

50203

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Calcium and Magnesium Metabolism in the Nephrotic Syndrome.			2. Date: JUNE 1955	
3. Budget Activity No: 6320-28	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge: L. E. Farr			11. Starting Date:	
12. Purpose and Need: In children with the nephrotic syndrome a marked abnormality of calcium metabolism appears to exist. Because of the importance of this element in many physiological processes such as nervous response, muscle metabolism, bone growth, blood coagulation and others, it becomes of importance more fully to explain the aberrations noted in nephrosis. It is desirable to have a method which will yield information on the ionized as well as the total calcium. Magnesium acts in part as a calcium antagonist but for magnesium no satisfactory clinical methods are at hand.				
13. Related Projects: None.				
14. Accomplishments - F. Y. 1954: Methods were given preliminary formulation for determination of calcium and magnesium in a single sample of plasma by measurement of coordination compounds with a dye.				
15. Expected Results - F. Y. 1955: Final testing of above color method for calcium determination and initial studies on feasibility of combining ion exchange methods to determine at the same time ionized calcium as measured by the isolated frog heart technique of McClean and Hastings.				
16. Anticipated Problems - F. Y. 1956: Work will be interrupted by requirement that primary scientist concerned fulfill obligations under Selective Service Act as applied to physicians.				

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
71109 Med. Dept. 1955-61

4002035

Calcium and Magnesium Metabolism
 Project Title: in the Nephrotic Syndrome (6320-28)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 44,000	\$ 42,000	\$ 39,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available).				
18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		1.0	1.0	1.0
Other		2.9	2.9	2.6
Total		3.9	3.9	3.6
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis). (F. Y. 1954 details not available)				
REPOSITORY <u>Brookhaven Natl. Lab</u> COLLECTION <u>M 189 Med. Dept. 1950-54</u> BOX No. _____ FOLDER _____				

002036

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Electrolyte Balance Studies in Animals		2. Date: JUNE 1955	
3. Budget Activity No: 6920-29	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No. AT-30-2-GEN-16
10. Person in Charge: L. E. Farr		11. Starting Date:	
12. Purpose and Need: A technique for <u>in vivo</u> evaluation of ion transport between plasma and extracellular fluid, and between extracellular and intracellular fluid has been evolved and applied by J.S. Robertson, H.L. Conn, and others at DNL. It is anticipated that the approach can be adapted to studies of electrolyte balance in the gastrointestinal tract, following which the electrolyte changes occurring in the animal receiving large doses of penetrating radiation will be studied.			
13. Related Projects: None.			
14. Accomplishments FY 1954: Not started.			
15. Expected Results FY 1955: Modifications of the technique to allow the additional studies indicated are being made.			
16. Anticipated Problems FY 1956 & FY 1957: Continuing.			

REPOSITORY

COLLECTION

BOX No. _____

FOLDER _____

Brookhaven Natl Lab
FM 186 Med. Dept 1955-61

4002037

Project Title: Electrolyte Balance Study in Animals (6320-29)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 22,000	\$ 21,000	\$ 28,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available).				

18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man-years				
Scientists & Engineers		.5	.5	.7
Other		1.5	1.5	1.8
Total		2.0	2.0	2.5

"Other" man-years prorated by scientific effort (F. Y. 1956 analysis)
(F. Y. 1954 details not available)

REPOSITORY Brookhaven Natl Lab
 COLLECTION TM 189 Med. Dept. 1950-61
 BOX No. _____
 FOLDER _____

4002038

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AFC-189

1. Project Title: Neutron Dosimetry by Pile Activation Methods, Biological Dosimetry and Tissue Equivalent Ionization Chambers.			2. Date : JUNE 1955		
3. Budget Activity No: 6320-30	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: E. E. Stickley			11. Starting Date:		
12. Purpose and Need:					
<p>a. The success of neutron capture therapy of brain tumors results to a large degree from the differential localization of boron compounds. However, it depends also on the relatively greater effect (RBE), as compared with x- or gamma radiation, of the heavy particles resulting from disintegration of the boron. The degree of increased RBE of heavy particles, such as alpha radiations, is known accurately only for micro-organisms. It is therefore necessary to explore the possibilities of this type of therapy to attempt quantification of the RBE of alpha rays in mammalian tissues.</p> <p>b. Foil activation measurements of neutron flux density and spectrum in phantoms is being done to provide data for proper calculation of the depth dose in neutron capture therapy. The principal approach utilizes neutron activation of gold foils distributed in depth throughout tissue-equivalent materials, or in special arrangements as indicated. It will be extended to include other techniques, so that a determination of the energy spectrum of the neutrons may also be evaluated.</p> <p>c. Tissue-equivalent ionization chamber dosimetry of reactor radiation in tissue is designed to provide a more complete picture of the pattern of deposition of radiation energy throughout a tissue-equivalent phantom using purely physical means, principally ionization chambers. Results will be compared with measurements made with foil activation techniques.</p>					
13. Related Projects:					
6310 - 1 Neutron capture therapy.			REPOSITORY <u>Brookhaven Natl Lab</u> COLLECTION <u>IM 189 Med. Dept. 1950-11</u>		
14. Accomplishments FY 1954:			BOX No. _____ FOLDER _____		
<p>a. Preliminary data on the biological effects of the slow neutron beam, as well as on the enhancement of these effects by the injection of boron-10 compounds prior to exposure, have been obtained.</p> <p>b. Two extensive series of measurements were made with tissue-equivalent phantoms. This work provided measurements on a one-inch module grid throughout a phantom somewhat larger than a human head. By interpolation, isoflux lines were drawn, and this analysis was used in the calculation of the neutron capture dose from boron. Measurements of the half-value layer for neutrons in tissue were also obtained. The work was done using gold foils principally, but some measurements used indium foils. Attenuation measurements in liquid-tissue-equivalent phantoms were also made.</p> <p>c. A tissue-equivalent ionization chamber constructed in Dr. Failla's laboratory was used to indicate relative neutron doses in tissue-equivalent liquid phantoms. Measurements were made with both fully tissue-equivalent, and with nitrogen-lacking tissue-equivalent conditions. Early condenser-chamber types of tissue-equivalent ionization chambers were tried in the old medical reactor facility under treatment conditions.</p>					

4002039

Project Title: Neutron Dosimetry by Film Activation Methods, Biological
Dosimetry and Tissue Equivalent Ionization Chambers. (Continued)

14. Accomplishments FY 1954: (continued)

- d. Preliminary experiments were done on the effect on bacteria of radioactivity induced by neutron capture using the low flux facility, W-15. A more extensive series of irradiations has been initiated using the new higher flux medical facility. Thus far, we have determined the survival of D. pneumoniae in broth containing different concentrations of H_3BO_3 and exposed to varying quantities of neutrons. The study will include an investigation of the growth cycle of alpha-irradiated cells. Preliminary experiments designed to compare glucose utilization by unirradiated and irradiated cells have been unfruitful, since it was found that unirradiated cells suspended in H_3BO_3 broth show decreased utilization of glucose.

15. Expected Results FY 1955:

- a. Attempts will be made to accurately assess the degree of enhancement of slow neutron effects in mice resulting from boron-10 injection.
- b. The work was extended to include measurements on the new medical facility. A complete survey throughout a large phantom has not yet been made, but special investigations of such points as the flux build-up as the neutron beam enters tissue, and back scatter effects on leaving a phantom, have been determined.
- c. A new triple chamber was fabricated according to a Rossi design, to provide measurements of tissue-equivalent, tissue-equivalent less nitrogen, and tissue-equivalent, plus boron dose rates, under identical irradiation conditions. A manipulator to allow use of this device at the new medical facility as a routine experiment was assembled, and present efforts are toward getting the assembly into stable operation.
- d. Two test organisms are being used in this work on effect on bacteria of radioactivity induced by neutron capture. In the case of E. coli, the purpose is to determine the effect of alpha-irradiation on bacterial cells in a tissue-equivalent medium. A second test organism, D. pneumoniae, is being used for the purpose of comparing the relative biological effectiveness of gamma and alpha irradiation.

16. Anticipated Problems: FY 1956 & 1957:

- a. Continuation at same level as in FY 1955.
- b. This work will continue because of the need to investigate new types of arrangement for the neutron capture therapy experiment. While techniques are fairly well standardized, they will be extended to include foil and filter methods, such that a further knowledge of the energy distribution among the neutrons penetrating the phantom will be better known. In particular, neutrons in the kilovolt energy range will be studied.
- c. The work will be extended to cover the full range of neutron exposures of clinical and of disaster survey interest.
- d. Continuing.

REPOSITORY

COLLECTION

BOX No. _____

FOLDER _____

Brookhaven Natl Lab
M 189 Med. Dept. 1950-61

002040

Project Title: Characteristics of Bacterial Growth During
Continuous Irradiation (6320-31)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$ 11,000	\$ 14,000	\$ 14,000
Prorated by scientific effort based on F.Y. 1956 analysis (F. Y. 1954 details not available).				

18. Cost of Plant & Equipment Directly Required (Financed in P & E Program - shown here for information only)	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.25	.35	.35
Other		.75	1.05	.95
		1.0	1.4	1.3
"Other" man-years prorated by scientific effort (F. Y. 1956 analysis) (F. Y. 1954 details not available).				
REPOSITORY	<i>Brookhaven Natl. Lab.</i>			
COLLECTION	<i>IM 189 Med. Dept. 1950-61</i>			
BOX No.	_____			
FOLDER	_____			

2041

Project Title: Physical Measurements of Dose Delivered by Internally Administered Isotopes (6320-32)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$5,000	\$13,000	\$20,000
Prorated by scientific effort based on F. Y. 1956 analysis (F. Y. 1954 details not available).				

18. Cost of Plant & Equipment Directly Required
(Financed in P & E program - shown here for information only)

	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				

19. Direct Man Power	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.1	.3	.5
Other		.3	.9	1.3
Total		.4	1.2	1.8

"Other" man-years prorated by scientific effort (F. Y. 1956 analysis)
(F. Y. 1954 details not available).

REPOSITORY

COLLECTION

BOX No.

FOLDER

Brookhaven Natl Lab
IM 189 Med. Dept. 1958-61

4002042

Project Title: Effects of Boron on the Human Myocardium as Reflected in the Electrocardiogram (6320-33)

17. Operating Costs	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
Total Cost		\$9,000	--	--
Prorated by scientific effort (F. Y. 1954 details not available).				
18. Cost of Plant & Equipment Directly Required (Financed in P & E program - shown here for information only)				
	Actual <u>1954</u>	Estimated <u>1955</u>	Estimated <u>1956</u>	Estimated <u>1957</u>
(A) Construction				
(B) Equipment				
19. Direct Man Power				
	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>
No. of Man Years				
Scientists & Engineers		.2		
Other		.6		
Total		.8		
"Other" man-years prorated by scientific effort. (F. Y. 1954 details not available)				
REPOSITORY <u>Brookhaven Natl Lab</u>				
COLLECTION <u>TM 189 Med Dept. 1950-61</u>				
BOX No. _____				
FOLDER _____				

4002042

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AFC-189

1. Project Title: Neutron Dosimetry by Pile Activation Methods, Biological Dosimetry and Tissue Equivalent Ionization Chambers.			2. Date : JUNE 1955		
3. Budget Activity No: 6320-30	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location: Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: E. E. Stickley			11. Starting Date:		
12. Purpose and Need:					
<p>a. The success of neutron capture therapy of brain tumors results to a large degree from the differential localization of boron compounds. However, it depends also on the relatively greater effect (RBE), as compared with x- or gamma radiation, of the heavy particles resulting from disintegration of the boron. The degree of increased RBE of heavy particles, such as alpha radiations, is known accurately only for micro-organisms. It is therefore necessary to explore the possibilities of this type of therapy to attempt quantification of the RBE of alpha rays in mammalian tissues.</p> <p>b. Foil activation measurements of neutron flux density and spectrum in phantoms is being done to provide data for proper calculation of the depth dose in neutron capture therapy. The principal approach utilizes neutron activation of gold foils distributed in depth throughout tissue-equivalent materials, or in special arrangements as indicated. It will be extended to include other techniques, so that a determination of the energy spectrum of the neutrons may also be evaluated.</p> <p>c. Tissue-equivalent ionization chamber dosimetry of reactor radiation in tissue is designed to provide a more complete picture of the pattern of deposition of radiation energy throughout a tissue-equivalent phantom using purely physical means, principally ionization chambers. Results will be compared with measurements made with the foil activation techniques.</p>					
13. Related Projects:			REPOSITORY		
6310 - 1 Neutron capture therapy.			COLLECTION		
			<i>Brookhaven Natl Lab</i> <i>TM 189 Med. Dept. 1950-61</i>		
14. Accomplishments FY 1954:			BOX No. _____		
<p>a. Preliminary data on the biological effects of the slow neutron beam, as well as on the enhancement of these effects by the injection of boron-10 compounds prior to exposure, have been obtained.</p> <p>b. Two extensive series of measurements were made with tissue-equivalent phantoms. This work provided measurements on a one-inch module grid throughout a phantom somewhat larger than a human head. By interpolation, isoflux lines were drawn, and this analysis was used in the calculation of the neutron capture dose from boron. Measurements of the half-value layer for neutrons in tissue were also obtained. The work was done using gold foils principally, but some measurements used indium foils. Attenuation measurements in liquid tissue-equivalent phantoms were also made.</p> <p>c. A tissue-equivalent ionization chamber constructed in Dr. Failla's laboratory was used to indicate relative neutron doses in tissue-equivalent liquid phantoms. Measurements were made with both fully tissue-equivalent, and with nitrogen-lacking tissue-equivalent conditions. Early condenser-chamber types of tissue-equivalent ionization chambers were tried in the old medical reactor facility under treatment conditions.</p>					

4002044

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Characteristics of Bacterial Growth during Continuous Irradiation.			2. Date: JUNE 1955		
3. Budget Activity No: 6320-31	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports		
7. Contractor: Associated Universities, Inc. Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16		
10. Person in Charge: R. M. Drew			11. Starting Date:		
12. Purpose and Need: These studies were undertaken in the interest of determining increase or decrease in radiation sensitivity as a result of continuous irradiation during cell growth. We are particularly interested in producing radiation resistant <u>D. pneumoniae</u> and determining whether or not the property which confers resistance is associated with the cell DNA. It is entirely possible that resistant organisms may be selected from a population exposed to continuous low dose irradiation.					
13. Related Projects: 6320 - 23 Desoxyribonucleic acid and its role within the pneumococcus. 6320 - 27 Radiation sensitivity of different strains of <u>D. pneumoniae</u> . 6320 - 33 The effect of gamma irradiation on <u>D. pneumoniae</u> .					
14. Accomplishments FY 1954: Not begun.					
15. Expected Results FY 1955: Initial studies showed thallium-204 source to be inadequate. Project will be resumed when hotter source now in reactor becomes available.					
16. Anticipated Problems FY 1956 & 1957: Continuing.					

REPOSITORY Brookhaven Natl Lab
COLLECTION TM 189 Med Dept. 1950-51
BOX No. _____
FOLDER _____

4002045

PROPOSAL AND AUTHORIZATION
FOR RESEARCH OR DEVELOPMENT

AEC-189

1. Project Title: Physical Measurements of Dose Delivered by Internally Administered Isotopes			2. Date: JUNE 1955	
3. Budget Activity No: 6320-32	4. Budget Item No:	5. Contractor's No:	6. Method and Time of Reporting Progress: Quarterly and Special Reports	
7. Contractor: Associated Universities, Inc., Brookhaven National Laboratory		8. Working Location Upton, New York	9. Contract No: AT-30-2-GEN-16	
10. Person in Charge V. F. Bond			11. Starting Date:	

12. Purpose and Need:

Although a considerable amount of clinical and laboratory data, particularly hematological, are available on human beings exposed to whole-body penetrating external radiations (atomic bomb exposures, Los Alamos and Argonne accidents), the doses received are poorly known. Thus, inadequate data are available to satisfactorily quantify the severity and time course of human response as a function of dose. With the administration of therapeutic doses of internally administered gamma and beta emitting isotopes, large doses of radiation approaching total-body exposure are received as the administered isotope localizes and is excreted. A large body of clinical and laboratory information on patients who received large therapeutic doses of internally administered isotopes has been collected at BNL. If the total dose of whole-body radiation received were known accurately for these patients, the available clinical data would contribute greatly to characterizing the response on human beings to various doses of penetrating radiation. From the amount of isotope administered, it has been possible to calculate approximately the total dose received by the tissues. The calculations, however, involve a number of assumptions. It is therefore proposed to check the calculated doses by measurements of dose received by the patients. For this, ionization chambers will be adapted for insertion into body orifices and attempts will be made to measure the dose rate or total dose of gamma and beta radiations received. It is anticipated that clinical work will be preceded by applicable procedures carried out on large animals.

13. Related Projects:

6320-30 Neutron dosimetry by pile activation methods, biological dosimetry and tissue-equivalent ionization chambers.

14. Accomplishments FY 1954:

Not started.

15. Expected Results FY 1955:

Initiation.

16. Anticipated Problems FY 1956 & 1957:

Continuing.

REPOSITORY *Brookhaven Natl Lab*
COLLECTION *AEC-189 Med. Dept. 1950-61*
BOX No. _____
FOLDER _____