

Contract No. AT-(40-1)-289
 Duke University
 Modification No. 13

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 3rd day of November, 1960 by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for performance of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 12; and

WHEREAS, the Commission desires to provide for additional research as more particularly described in Supplement No. 13 to Appendix "A", to obtain reports thereon, and to effect certain other changes as are hereinafter more particularly described; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree that said contract is hereby modified in the following particulars, but in no others:

1. The following new section "9." is added to Article II:

"9. The period during which the work under this contract may be conducted is hereby extended to September 30, 1961."

2. The following new subsection "1.1." is added in Article III:

"1. In consideration of the performance of the additional work described in Supplement No. 13 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Seventy-One Thousand, Six Hundred forty-eight Dollars (\$71,648.00), the Government will pay to the Contractor Nineteen Thousand Dollars (\$19,000.00)."

REPOSITORY

Oak Ridge Operations

COLLECTION

Records Holding Area
Documental 1944-1994

BOX No.

H-177-2 Bldg. 2714-H

FOLDER

Contract No. AT(40-1)289
Duke Univ.

3. The following sentence is added to subparagraph 3.a.(4) of Appendix "B":

"Access to classified information other than Restricted Data shall not be granted unless the recipient possesses appropriate security clearance."

4. The following new paragraph "16." is added to Appendix "B":

"16. Use of Concerns in Labor Surplus Areas

It is the policy of the Government to place supply contracts with suppliers who will perform such contracts substantially in areas of current labor surplus where this can be done at prices no higher than are obtainable elsewhere. The Contractor agrees to use its best efforts to place its subcontracts in accordance with this policy to the extent consistent with the efficient performance of this contract. In complying with the foregoing, the Contractor, in placing its subcontracts, shall observe the following order of preference:

- a. small business concerns located in labor surplus areas;
- b. other concerns located in labor surplus areas;
- c. small business concerns not located in labor surplus areas; and
- d. any other concerns."

5. The following new paragraph "17." is added to Appendix "B":

"17. Use of Small Business Concerns

a. It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services be procured from small business concerns.

b. The Contractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Contractor finds to be consistent with the efficient performance of this contract."

6. The Supplement No. 13 attached hereto and made a part hereof is added to Appendix "A".

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *Herman M. Roth*
HERMAN M. ROTH
DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION
(Contracting Officer)

WITNESSES:

Ralph Earle, Jr.
Ralph Earle, Jr.
Durham, N. C.
(Address)

Mary D. Harris
Mary D. Harris
Durham, N. C.
(Address)

DUKE UNIVERSITY

BY: *G. C. Henricksen* 137
G. C. Henricksen
TITLE: Business Manager & Comptroller

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and the Supplement No. 13 attached hereto and made a part hereof and agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

APPENDIX "A"

SUPPLEMENT NO. 13

This SUPPLEMENT NO. 13 describes the research program and cost estimates agreed upon between the Commission and the Contractor.

1. PROGRAM

a. Scope and Plan of Approach:

The Contractor will continue the investigation of metabolic processes by the use of radioisotopes. These investigations will include studies of (1) the mechanism of action of the enzyme xanthine oxidase, (2) the mechanism of sulfite oxidation in the liver, (3) pyridine nucleotide metabolism, (4) trigonelline metabolism, and (5) the metabolism of nitrogen compounds.

2. BUDGET

a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>		\$48,870.00
Dr. Philip Handler (50% of time)	\$ 8,500.00	
Research Associates	27,650.00	
Research Assistants	12,720.00	
(2) <u>Equipment and Shop Time:</u>		2,500.00
(3) <u>Equipment:</u>		5,400.00
(4) <u>Supplies:</u>		7,000.00
(5) <u>Indirect Costs</u> (55% of salaries and wages):		<u>26,878.00</u>
	TOTAL	\$90,648.00

- b. Items of property to be procured or manufactured by the Contractor, or to be furnished by the Government, title to which will vest or remain in the Government (see Article V): None

Contract No. AT-(40-1)-289
Duke University
Modification No. 12

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 5th day of November, 1959, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for performance of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 11; and

WHEREAS, the Commission desires to provide for additional research as more particularly described in Supplement No. 12 to Appendix "A", to obtain reports thereon, and to effect certain other changes as are hereinafter more particularly described; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree that said contract is hereby modified in the following particulars, but in no others:

1. The following new section "8." is added to Article II:

"8. The period during which the work under this contract may be conducted is hereby extended to September 30, 1960."

2. The following new subsection "l. k." is added in Article III:

"k. In consideration of the performance of the additional work described in Supplement No. 12 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Fifty-five Thousand, Six Hundred Seventy-five Dollars (\$55,675.00), the Government will pay to the Contractor Nineteen Thousand, Ninety-eight Dollars (\$19,098.00)."

3. In subsections 2. a., 2. b. and 2. c. of Article III, delete the words "properly certified voucher" and substitute therefor the words "proper voucher."

4. In subsection 2. d. of Article III, delete the word "term" and substitute therefor the word "work".

5. Subsections a. and b. of section 4., Examination of Records, of Article IV are revised to read as follows:

"a. The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any directly pertinent books, documents, papers and records of the Contractor involving transactions related to this contract.

b. The Contractor further agrees to include in all its subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term 'subcontract' as used in this clause excludes (1) purchase orders not exceeding \$2500; (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public; and (3) subcontracts or purchase orders for general inventory items not specifically identifiable with the work under this contract."

6. Article V is deleted in its entirety, and the following new Article V is substituted therefor:

"ARTICLE V - PROPERTY

"In consideration of the Contractor's contribution to the research project described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies acquired from any source, including the Government, or manufactured by the Contractor under this contract, shall vest in the Contractor, except that title to items of property described in section 2. b. of Appendix "A" shall vest or remain in the Government. Additional items may be added to such section 2. b. in writing without the necessity for a formal modification of the contract."

7. In Appendix "B", paragraph 4. is revised to read as follows:

"4. Disputes

a. Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or

otherwise furnishes to the Contracting Officer a written appeal addressed to the Commission. The decision of the Commission or its duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

b. This 'Disputes' clause does not preclude consideration of law questions in connection with decisions provided for in paragraph a., above; Provided, that nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law."

8. In Appendix "B", subparagraph 7. b. is revised to read as follows:

"b. The Contractor further agrees to insert the foregoing provision in all subcontracts hereunder, except subcontracts for standard commercial supplies -- raw materials."

9. In Appendix "B", the second sentence of paragraph 11, Covenant Against Contingent Fees, is revised to read as follows:

"For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee."

10. The Supplement No. 12 attached hereto, and made a part hereof, is added to Appendix "A".

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: Herman M. Roth
HERMAN M. ROTH
DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION
(Contracting Officer)

WITNESSES:

Ralph Earle, Jr.
Ralph Earle, Jr.
Durham, N. C.
(Address)

Mary D. Harris
Mary D. Harris
Durham, N. C.
(Address)

DUKE UNIVERSITY

BY: G. C. Henricksen
G. C. Henricksen
TITLE: Business Manager & Comptroller

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and the Supplement No. 12 to Appendix "A" attached hereto and made a part hereof and agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

APPENDIX "A"

SUPPLEMENT NO. 12

This SUPPLEMENT NO. 12 describes the research program and cost estimates agreed upon between the Commission and the Contractor.

1. PROGRAM

a. Scope and Plan of Approach:

The Contractor will continue studies of metabolism with use of radioisotopes to include:

1. Mechanism of action of the enzyme xanthine oxidase, localization of important sulfhydryl groups, relation to other components, and chemical characterization.
2. Nature of the sulfite-cytochrome C reductase including changes occurring in this system when subjected to exposure to trypsin.
3. Mechanism of sulfite oxidation in the liver, particularly the enzymatic basis for the sulfite oxidation in mitochondria and the role of lipoic acid in the process.
4. Properties of the hypoxanthine dehydrogenase of liver, sensitivity to sulfhydryl reagents, purification, and mechanism of action.
5. Fatty Acid Metabolism. Mechanism of conversion of long-chain fatty acids, etc.
6. Metabolism of pyridine nucleotides, purification mechanism of action utilizing Carbon-14 labeling, enzyme isolation.

2. BUDGET

a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>		\$45,625.00
Dr. Philip Handler (50% of time)	\$ 7,750.00	
Research Associates	17,875.00	
Research Assistants	20,000.00	
(2) <u>Equipment and Shop Time:</u>		1,500.00

(3) <u>Equipment:</u>	5,400.00
(4) <u>Supplies:</u>	6,900.00
(5) <u>Indirect Costs</u> (33.64% of Salaries and Wages)	<u>15,348.00</u>
	Total \$74,773.00

- b. Items of property to be procured or manufactured by the Contractor, or to be furnished by the Government, title to which will vest or remain in the Government (see Article V): None

Contract No. AT-(40-1)-289
Duke University
Modification No. 11

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 29th day of October, 1958, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for performance of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 10; and

WHEREAS, the Commission desires to provide for additional research as more particularly described in Supplement No. 11 to Appendix "A", to obtain reports thereon, and to effect certain other changes as are hereinafter more particularly described; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree that said contract is hereby modified in the following particulars, but in no others:

1. The following new section "7." is added to Article II:

"7. The period during which the work under this contract may be conducted is hereby extended to September 30, 1959."

2. The following new subsection "1. j." is added in Article III:

"j. In consideration of the performance of the additional work described in Supplement No. 11 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Fifty-six Thousand, Six Hundred Ninety-six Dollars (\$56,696.00), the Government will pay to the Contractor Eighteen Thousand, Six Hundred Forty-three Dollars (\$18,643.00)."

3. Subsection 2. a. of Article III is revised to read as follows:

"a. On or before the date of commencement of the work on the project described in Appendix "A", the Government shall pay to the Contractor upon submission by the Contractor of a properly certified voucher, 45 per cent of the agreed consideration."

4. The following new Supplement No. 11 is added to Appendix "A":

"SUPPLEMENT NO. 11

"This SUPPLEMENT NO. 11 describes the research program and cost estimates agreed upon between the Commission and the Contractor.

"1. PROGRAM

"a. Scope and Plan of Approach:

The Contractor will continue studies related to problems of metabolism, utilizing radioisotopes, to include (1) studies of the mechanism of enzyme action, on glutaminase and its autocatalytic inactivation in absence of anions and the failure of azaserine to inhibit exchange between substrate glutamine and $N^{15}H_3$, and (2) on Xanthine oxidase with relation to fragmentation and relation to molybdenum. Work will also include studies of the metabolic role of glutamine, studies of sulfur metabolism with the aid of S^{35} as tracer on the path of sulfite oxidation, cysteine oxidation, and the path of sulfate fixation in bacteria and plants. Studies of fatty acid synthesis and the metabolism of pyridine nucleotides will be made with assistance of Carbon-14 labeling.

"2. BUDGET

"a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>		\$45,600.00
Dr. Philip Handler (50% of time)	\$ 7,250.00	
Research Associates	23,150.00	
Research Assistants, Technicians, and Laboratory Aide	13,700.00	
Equipment and Shop Time	1,500.00	
(2) <u>Equipment:</u>		5,400.00
(3) <u>Supplies:</u>		6,900.00
(4) <u>Travel and Communication:</u>		900.00
(5) <u>Indirect Costs (36.27% of salaries and wages):</u>		<u>16,539.00</u>
	TOTAL	\$75,339.00*

*It is recognized that the project may receive additional support as described in the Contractor's proposal.

"b. Items of property to be procured or manufactured by the Contractor, title to which will vest in the Government (see Article V): None."

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *Herman M. Roth*
HERMAN M. ROTH
DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION
(Contracting Officer)

WITNESSES:

Ralph Earle, Jr.
Ralph Earle, Jr.

Duke University
(Address)

Gail P. Hudisill
Gail P. Hudisill

Duke University
(Address)

DUKE UNIVERSITY

BY: *A. Hollis Edens*
A. Hollis Edens

TITLE: President

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 20th day of November, 1957, effective as of October 1, 1957, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for performance of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 9; and

WHEREAS, the Commission desires to provide for additional research as more particularly described in Supplement No. 10 to Appendix "A", to obtain reports thereon, and to effect certain other changes as are hereinafter more particularly described; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree that said contract is hereby modified in the following particulars, but in no others:

1. The following new Section "5." is added to Article I:

"5. The Contractor shall commence the work as soon as feasible, prosecute it with due diligence and submit the reports required hereunder as early as practicable, and not later than the dates specified in Appendix 'C'."

2. The heading of Article II is changed from "TERM OF CONTRACT" to "SCHEDULE", and the following new Section "6." is added to Article II:

"6. The period during which the work under this contract may be conducted is hereby extended to September 30, 1958."

3. The following new subsection "1. i." is added in Article III:

"i. In consideration of the performance of the additional work described in Supplement No. 10 to Appendix 'A', and the Contractor's agreement to support that work in the estimated amount of Fifty-seven Thousand, Seven Hundred Eighty-six Dollars (\$57,786.00), the Government will pay to the Contractor Seventeen Thousand, Four Hundred Fifty-six Dollars (\$17,456.00)."

4. Subsection 2. a. of Article III is revised to read as follows:

"a. On or before the date of commencement of the work on the project described in Appendix 'A', the Government shall pay to the Contractor upon submission by the Contractor of a properly certified voucher, 45 per cent of the agreed consideration; provided, however, that this payment shall be reduced by the amount of the balance, if any, agreed to be remaining unexpended from the previous work under this contract."

5. In subsection 2. c. of Article III, the word "term" is deleted and the word "work" is substituted therefor.

6. Section 3. of Article III is revised to read as follows:

"3. Contract Renewal

"When renewal of the contract is desired, the Contractor shall submit to the Commission's Oak Ridge Operations Office a renewal proposal as outlined in Appendix 'C' attached hereto. The Contractor and the Commission shall then negotiate as to the amounts each will contribute for the additional research activities to be conducted, taking into consideration the actual costs incurred for the current work in comparison with the cost estimates in the contract, and, upon agreement, shall execute a formal modification of the contract."

7. The following new "SUPPLEMENT NO. 10" is added in Appendix "A":

"SUPPLEMENT NO. 10

"This SUPPLEMENT NO. 10 describes the research program and cost estimates agreed upon between the Commission and the Contractor.

"1. PROGRAM

"a. Scope and Plan of Approach:

The Contractor will continue work utilizing radioisotopes in studies of metabolism in laboratory animals, principally utilizing rats, to determine (1) mechanisms of enzyme action including glutaminase, xanthine oxidase, and the processes of oxidative phosphorylation, (2) the metabolic role of glutamine, (3) problems associated with sulfur metabolism, (4) fatty acid synthesis, (5) action of the parathyroid hormone, and (6) various aspects of the metabolism of pyridine nucleotides. Utilization will be made of

radioactive Phosphorus-32 and Sulfur-35 in these studies. Investigation of metabolic pathways will be emphasized, including stages and by-products, and influence of hormonal and vitamin control.

"2. BUDGET

"a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>	\$47,275.00
Dr. Paul Handler (50% of time)	\$ 7,000
Research Associates	10,075
Research Assistants, Technician and Laboratory Aide	30,200
(2) <u>Equipment and Shop Time:</u>	3,000.00
(3) <u>Supplies:</u>	6,400.00
(4) <u>Travel and Communications:</u>	900.00
(5) <u>Indirect Costs</u> (37.37% of Salaries and Wages):	17,667.00
	<hr/>
	TOTAL
	\$75,242.00*

*It is recognized that additional support may be received from other sources.

"b. Items of property to be procured or manufactured by the Contractor, title to which will vest in the Government (see Article V): None."

8. Paragraph 2. Publications of Appendix "B" is revised to read as follows:

"2. Publications

"It is intended that the Contractor shall have full freedom of publication of the results of the research under this contract and the Contractor is urged to disseminate the results of the work through customary scientific publication channels, except that 'restricted data' as defined in the Atomic Energy Act of 1954 shall be governed by the provisions of Paragraph 3. of this Appendix 'B'.

"However, in order to insure that the public disclosure of such results will not adversely affect the patent interests of the Government provided in Paragraph 1. of this Appendix 'B' entitled 'Patents' approval for such release shall be secured from the Commission prior to any such publication.

"All publications shall include a reference that the results were developed under a Commission sponsored project."

9. Appendix "C" is deleted in its entirety, and the new Appendix "C" attached hereto and made a part hereof is substituted therefor.

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: Herman M Roth
HERMAN M. ROTH
DIRECTOR
~~RESEARCH AND DEVELOPMENT~~
(Contracting Office) DIVISION

WITNESSES:

G. C. Henricksen
G. C. Henricksen
Durham, North Carolina
(Address)

Patricia Silver
Patricia Silver
Durham, North Carolina
(Address)

DUKE UNIVERSITY

BY: A. S. Brower
A. S. Brower
TITLE: Business Manager & Treasurer

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and the Appendix "C" attached hereto and made a part hereof and agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

APPENDIX "C"

REPORTS AND PROPOSALS
(FOR DIRECT AEC RESEARCH CONTRACTS)

	Date Due	Copies
1. Progress Report	JUL 1	Six
2. Renewal Proposal	JUL 1	Six
3. 200-word summary of purpose and scope with submittal date indicated thereon	Within 30 days after OCT 1	Three
4. Complete Scientific Report	On contract expiration or termination	Six
5. Radioisotopes Purchase Report	With renewal proposal if proposal is submitted, otherwise on contract expiration or termination	Three
6. Brief reports or manuscripts may be submitted as desired by Senior Investigator		

NOTES:

All of the above should be addressed to:

Research and Development Division
Oak Ridge Operations Office
U. S. Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

The progress report should briefly describe the scope of investigations undertaken and the significant results obtained. It should also explain any significant differences between the actual level of activity (expressed in the various categories of man-months, facilities procured, travel performed, etc.) and that contemplated in the contract. Technical reports and articles prepared for publication should be listed with bibliographic references. Reprints or preprints of all such material should be appended and material contained therein need not be duplicated in the report.

Renewal proposals, if any, should accompany the progress report and should contain the type of information outlined below unless the information is already contained in earlier proposals or in the accompanying progress report. Any contemplated change in program or scope for the additional work should be clearly explained and the cost estimated should be based upon past experience.

1062415

1. Title of the project.
2. The institution and department in which the work will be done.
3. Scientific background including literature relevant to the proposal, the significance, and the motivation. If the proposal is for continuation of work already in progress the extent of present support should be stated identifying amounts received from federal agencies.
4. Scientific scope of the proposed research, its objectives, its relation to present knowledge and to comparable work in progress elsewhere, and a plan of accomplishments for the work.
5. Scientific Personnel. Give the name, highest academic degree, position in the institution, scientific experience, publications and accomplishments of the Senior Investigator (the individual who will actively direct the research program) and of each regular staff scientist who it is proposed will engage in the work. Indicate the approximate fraction of the time of each to be devoted to the project. Scientific personnel to be newly employed for the project should be so designated, and professional records given if possible.
6. Other Personnel. The number of persons of each sub-professional grade and the fraction of the time of each to be devoted to the project should be listed. Graduate student employees should be identified as such if their thesis is to be related to the project.
7. Other Financial Assistance. If assistance for this or other activities involving the same personnel or facilities is to be proposed to, or received from other federal or non-university sources the extent of that assistance should be clearly stated, and the interplay of the arrangements should be fully explained.
8. Materials, Equipment and Facilities. List those already available for the work and justify the need for major items to be procured.
9. Travel and Other Items. Explain the purpose of the proposed travel, and of any other major items in the budget. Travel rates and the use of contract funds for attendance at regular scientific meetings should conform with the policy of the institution in the use of its own funds for these purposes.
10. Budget. This should list in detail all items of cost necessary to carry the project. It should include: a list of the individual salaries attributable to the project, supplies and services, equipment (defined as things individually costing more than \$500 which will retain their utility for more than a year), travel, communication and publication, and the indirect costs allocable to the project. The basis for computing the indirect costs should be briefly explained. The budget should not include the stipend of fellows. All salaries chargeable to the project should be in accord with the established policies of the institution, or, if not, an explanation should be submitted.

11. Amount Requested. A statement of the part of the total amount listed in the budget which the institution is prepared to bear, and the amounts requested from the AEC, and a statement of any other sponsors of the project with the amounts contributed by each. The proposal should be signed by the Senior Investigator and endorsed by a responsible administrative officer of the institution.
12. Statement of Current Expenditures. A current statement of its expenditures for the project, and an estimate of expenses to be incurred.
13. Residual Funds. Any difference in the scope of the work from that contemplated in the contract, as brought out in the report, may be reflected in the amount requested. If no new funds are required the contract may be renewed without funds. A proposal for such renewal should state the scope of the work proposed for use of residual funds.

The radioisotopes purchase report shall list all radioisotopes included in the budget at the regular price established by the Commission, but which are purchased, or will be purchased under the current budget, at a price less than the established price by utilizing the discount authorized by an AEC Discount Certificate issued to the Contractor. For each such purchase, the report shall state the price as established by the Commission, the price paid or to be paid using the discount, and the savings realized or to be realized. The report due on contract termination or expiration shall cover all such purchases actually made and not previously reported.

UNITED STATES
ATOMIC ENERGY COMMISSION

Letter Supplement to
Contract No. AT-(40-1)-289
September 13, 1956

Duke University
Durham
North Carolina

Attention: Mr. A. S. Brower
Business Manager and Treasurer

Gentlemen:

Reference is made to Modification No. 9 of your Contract No. AT-(40-1)-289.

Pursuant to Paragraph 13. of said modification, you are hereby notified that your contract is extended through September 30, 1957, and that the modifications provided for in said Paragraph 13. are effective as of October 1, 1956.

Please acknowledge receipt of this notice in the space provided below and return the original to this office.

Very truly yours,

THE UNITED STATES OF AMERICA

BY: U. S. ATOMIC ENERGY COMMISSION

BY: Herman M. Roth
Contracting Officer

HERMAN M. ROTH
DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION

RECEIVED:

Duke University

BY: A. S. Brower

TITLE: Business Manager and Treasurer

DATE: September 19, 1956

1062418

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 22nd day of June, 1956, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for performance of five separate training or research projects; and

WHEREAS, the Contract has been amended heretofore by Modifications Nos. 1 - 8; and

WHEREAS, the parties hereto desire to extend the term of the contract in order to continue the research activities previously undertaken, as such extended program is described in Supplement No. 8 to Appendix "A", and to effect certain other changes as are hereinafter more particularly described; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree that said contract is hereby modified in the following particulars, but in no others:

1. The following new section "4." is added to Article II:

"4. The eighth period of performance for the research project covered by this contract will commence on July 1, 1956, and will end on September 30, 1956."

2. a. The following new subsection "1. g." is added in Article III:

"g. In consideration of the performance of the research activities described in Supplement No. 8 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Eleven Thousand, Two Hundred Ninety-three Dollars (\$11,293.00), the Government will pay to the Contractor for the eighth period of performance the sum of Three Thousand, Two Hundred Fifty Dollars (\$3,250.00)."

b. Section 2. of Article III shall not be in effect during the eighth period of performance, but shall be in effect thereafter in the event this contract is renewed. During the eighth period of performance only, the following section 2. of Article III shall be in effect:

"2. Payment

"a. On or before the date of commencement of the work on the project described in Appendix "A", the Government shall pay to the Contractor upon submission by the Contractor of a properly certified voucher, the agreed consideration; provided, however, that this payment shall be reduced by the amount of the balance, if any, agreed to be remaining unexpended from the previous period of performance."

3. "ARTICLE VI - PURCHASE OF RADIOISOTOPES" is deleted in its entirety and the following new Article "VI" is inserted in lieu thereof:

"ARTICLE VI - PROCUREMENT OF MATERIAL AND SERVICES FROM COMMISSION FACILITIES; COMPLIANCE WITH COMMISSION REGULATIONS"

"The Contractor shall comply with all licensing and other requirements of the Commission with respect to possession and use of by-product material, source material, and special nuclear material (as these terms are defined in the Atomic Energy Act of 1954), and may purchase or acquire such materials, irradiation services, other radioactive material, cyclotron time, etc. from the Commission or Commission facilities in accordance with applicable procedures."

4. The following new Article "VI-A" is added immediately following Article VI:

"ARTICLE VI-A - PURCHASE OF RADIOISOTOPES UNDER AN AEC DISCOUNT CERTIFICATE"

"If any radioisotopes are budgeted in the outline of cost estimates at the full amount of the price as established by the Commission, but are purchased at less than such established prices under an AEC Discount Certificate issued to the Contractor (See: Title 10 C.F.R., Part 37), then any difference between the established price and the price so paid shall be paid by the Contractor to the Government or otherwise credited to the Government's account as the Contracting Officer may direct or approve. The requirement for a report to be submitted to the Commission indicating the purchases under the discount program is outlined in Appendix "C"."

5. In subsections a. and b. of section 1. Patents of Appendix "B", the words "in the course of any of the work under this contract" are deleted, and the words "in the course of, in connection with, or under the terms of this contract" are inserted in lieu thereof in both subsections.

6. In Appendix "B", section 7. Nondiscrimination in Employment is deleted in its entirety and the following new section "7." is inserted in lieu thereof:

"7. Nondiscrimination in Employment

- "a. In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color or national origin. The aforesaid provision shall include but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of the nondiscrimination clause.
- "b. The Contractor further agrees to insert the foregoing provision in all subcontracts hereunder, except (i) subcontracts for standard commercial supplies or raw materials, (ii) subcontracts to be performed outside the United States where no recruitment of workers within the limits of the United States is involved, (iii) purchase orders on pocket-size forms similar to U. S. Standard Form 44, and (iv) subcontracts to meet other special requirements or emergencies, if recommended by the Committee on Government Contracts. In the case of purchase orders hereunder which do not exceed \$5,000, the last sentence of paragraph a. above may be omitted."

7. In Appendix "B", the following new section "15. Buy American Act" is added immediately following section 14. Foreign Travel:

"15. Buy American Act

"In the event this contract provides for the acquisition of articles, materials, or supplies by the Government, the following provision shall apply with respect to such items: The Contractor agrees that there will be delivered under this contract only such unmanufactured articles, materials and supplies (which term 'articles, materials and supplies' is hereinafter referred to in this clause as 'supplies') as have been mined or produced in the United States, and only such manufactured supplies as have been manufactured in the United States substantially all from supplies mined, produced, or manufactured, as the case may be, in the United States. The foregoing provisions shall not apply (i) with respect

to supplies exempted by the Commission from the application of the Buy American Act (41 U.S.C. 10a-d), (ii) with respect to supplies for use outside the United States, or (iii) with respect to the supplies to be delivered under this contract which are of a class or kind determined by the Commission not to be mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, or (iv) with respect to such supplies, from which the supplies to be delivered under this contract are manufactured, as are of a class or kind determined by the Commission not to be mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality, provided that this exception (iv) shall not permit delivery of supplies manufactured outside the United States if such supplies are manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality."

8. In the list of reports on the first page of Appendix "C", the designation "5." is revised to read "6.", and the following new report is provided for as "5." of the list:

"Radioisotope Purchase Report	With renewal proposal if	Three"
	proposal is submitted, other-	
	wise on contract termination	

9. In Appendix "C", the following new paragraph is added immediately following the provision on page 3 entitled "13. Residual funds." :

"The radioisotopes purchase report shall list all radioisotopes included in the budget for the current period at the regular price established by the Commission, but which are purchased, or will be purchased during the current period, at a price less than the established price by utilizing the discount authorized by an AEC Discount Certificate issued to the Contractor. For each such purchase, the report shall state the price as established by the Commission, the price paid or to be paid using the discount, and the savings realized or to be realized. The report due on contract termination shall cover all such purchases actually made during the final period."

10. In Appendix "C", delete the words "Research and Medicine Division", and insert the words "Research and Development Division" in lieu thereof.

11. The following new "SUPPLEMENT NO. 8" is added to Appendix "A":

"SUPPLEMENT NO. 8

"July 1, 1956 - September 30, 1956

"This SUPPLEMENT NO. 8 describes the research program and cost estimates agreed upon between the Commission and the Contractor for the eighth period of performance.

"1. PROGRAM

"a. Scope and Plan of Approach:

The Contractor shall continue the following studies:

- (1) Mechanism of enzyme action.
- (2) Role of lactate in aerobic metabolism.
- (3) Metabolic role of glutamine.
- (4) The role of phosphate activated glutaminase of kidney.
- (5) Aspects of sulfur metabolism.
 - (a) The role of hyposanthine in biological oxidations.
 - (b) Possible role of thiosulfonate in sulfate esterification enzymatically.
 - (c) Pathway of SO_4 reduction and fixation in plants and bacteria.
 - (d) Chemistry of sulfite transformations induced by xanthine oxidase and glutathione.
 - (e) Mechanism of action of the α -hydroxysulfonic desmolase which is so widely distributed in the plant and animal world.
- (6) Previous studies, directed at purification of the parathyroid hormone will be resumed.

"2. BUDGET

"a. Outline of Cost Estimates for the Eighth Period:

(1) <u>Salaries and Wages:</u>		\$ 9,359.00
Dr. P. Handler (50% of time)	\$1,500.00	
Research Associates	4,769.00	
Research Assistants, Technicians, etc.	3,090.00	
(2) <u>Equipment and Shop Time:</u>		300.00

(BUDGET continued)

(3) <u>Supplies:</u>	1,200.00
(4) <u>Travel and Communication:</u>	125.00
(5) <u>Indirect Costs</u> (38.03% of Salaries and Wages):	<u>3,559.00</u>
TOTAL:	\$14,543.00

"b. Items of property to be procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article V): None."

12. In Appendix "C", delete the date "April 1" wherever it appears, and substitute the date "July 1" in lieu thereof in each instance.

13. Upon written notice by the Contracting Officer before September 30, 1956, this contract shall be automatically renewed and modified in the following particulars, but in no others:

a. The following new section "5." will be added in Article II:

"5. The ninth period of performance for the research project covered by this contract shall commence on October 1, 1956, and will end on September 30, 1957."

b. The following new subsection "l. h." will be added in Article III:

"h. In consideration of the performance of the research activities described in SUPPLEMENT NO. 9 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Forty-five Thousand, Seventy-three Dollars (\$45,073.00) the Government will pay to the Contractor for the ninth period of performance the sum of Thirteen Thousand Dollars (\$13,000.00). Notwithstanding anything else in this contract, any balance remaining unexpended from the eighth period of performance shall be carried forward and considered as an unexpended balance for the ninth period of performance."

c. The following new "SUPPLEMENT NO. 9" will be added to Appendix "A":

"SUPPLEMENT NO. 9

"October 1, 1956 - September 30, 1957

"This SUPPLEMENT NO. 9 describes the research program and cost estimates agreed upon between the Commission and the Contractor for the ninth period of performance.

"l. PROGRAM

"a. Scope and Plan of Approach:

The Contractor shall continue the research program outlined in SUPPLEMENT NO. 8.

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"2. BUDGET

"a. Outline of Cost Estimates for the Ninth Period:

(1) <u>Salaries and Wages:</u>		\$37,436.00
Dr. P. Handler (50% of time)	\$ 6,000.00	
Research Associates	19,076.00	
Research Assistants, Technicians, etc.	12,360.00	
(2) <u>Equipment and Shop Time:</u>		1,600.00
(3) <u>Supplies:</u>		4,400.00
(4) <u>Travel and Communication:</u>		400.00
(5) <u>Indirect Costs (38.03% of Salaries and Wages):</u>		14,237.00
		<hr/>
	TOTAL:	\$58,073.00

"b. Items of property to be procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article V): None."

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: Herman M. Roth
HERMAN M. ROTH
DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION
(Contracting Officer)

WITNESSES:

G. C. Henricksen
G. C. Henricksen
Durham, North Carolina
(Address)

Patricia Silver
Patricia Silver
Durham, North Carolina
(Address)

CONTRACTOR: Duke University

BY: A. S. Brower
A. S. Brower
TITLE: Business Manager and Treasurer

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

Contract No. AT-(40-1)-289
Duke University
Modification No. 8

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 13th day of June, 1955, effective as of July 1, 1955, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for the performance by the Contractor of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1-7; and

WHEREAS, the parties hereto desire to extend the term of the contract in order to continue the research activities previously undertaken, as such extended program is described in Supplement No. 7 to Appendix "A", and to revise the form of the contract and appendices; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1954;

NOW, THEREFORE, the parties hereto do mutually agree that as of July 1, 1955, Contract No. AT-(40-1)-289 is amended to read (with Appendices "A", "B", and "C" attached) as follows:

ARTICLE I - PURPOSE AND SCOPE

1. The Commission, in furtherance of its policy of assisting and fostering private research, desires to support the Contractor's fundamental research in the field of atomic energy.
2. The work shall consist of performance of a research project involving metabolic studies with tracer techniques. The plan of approach to the problem and the agreed upon program and budget for the project are described in Appendix "A", which is hereby made a part of this contract. The Contractor shall be guided by, but not bound to conform to, the details of the budget described in Appendix "A".
3. The Contractor shall furnish all services, facilities, equipment, supplies and materials (except such services, equipment, supplies and materials as the Government has agreed to furnish herein) required for the performance of the research program described in Section 2. above.

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4. The work will be carried out by the Contractor under the direction of Dr. Philip Handler as Senior Investigator.

ARTICLE II - TERM OF CONTRACT

3. The seventh period of performance for the research project covered by this contract will commence on July 1, 1955, and will end on June 30, 1956. It is recognized that completion of the research work under this contract may involve a period of several years and that the term of this contract may be extended by mutual agreement.

ARTICLE III

1. Consideration

f. In consideration of the performance of the research activities described in Supplement No. 7 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Forty Thousand, Seven Hundred Forty-Three Dollars (\$40,743.00), the Government will pay to the Contractor for the seventh period of performance the sum of Fourteen Thousand Dollars (\$14,000.00).

2. Payment

a. On or before the date of commencement of the work on the project described in Appendix "A", the Government shall pay to the Contractor upon submission by the Contractor of a properly certified voucher, 45 per cent of the agreed consideration.

b. On or before the expiration of six months from the date of commencement of the project, the Government shall pay to the Contractor, upon submission by the Contractor of a properly certified voucher, 45 per cent of the agreed consideration.

c. Upon receipt and acceptance of a satisfactory progress report, in cases where the contract is to be renewed, or the final report if the contract is not to be renewed, the Government shall pay to the Contractor, upon submission by the Contractor of a properly certified voucher, the remaining 10 per cent of the agreed consideration. An extension of the contract term without additional funds shall not be considered a renewal of the contract and in such cases the retained 10 per cent of the agreed consideration will be paid upon submission and acceptance of a satisfactory final report.

d. In the event the contract is renewed, payments to the Contractor of any additional amount to be paid by the Government shall be made for the extended term in accordance with the schedule outlined in Paragraphs a., b. and c. above.

3. Program and Budget for Subsequent Periods

When renewal of the contract is desired, the Contractor shall submit to the Commission's Oak Ridge Operations Office a renewal proposal as outlined in Appendix "C", attached hereto. The Contractor and the Commission shall then negotiate as to the amounts each will contribute for the services to be performed during the ensuing period, taking into consideration the actual costs incurred during the current period in comparison with the cost estimates in the contract, and, upon agreement, shall execute a formal modification of the contract.

ARTICLE IV - REPORTS, RECORDS AND INSPECTION

1. The Commission shall have the right to inspect in such manner and at such times as it deems appropriate all activities of the Contractor arising in the course of the work under this contract.

2. The Commission shall at all times be afforded access to the premises and to all technical records, correspondence, instructions, drawings and memoranda of record value of the Contractor pertaining to said work.

3. The Contractor shall make progress and other reports in such manner and at such times as specified in Appendix "C" which is attached and hereby made a part of this contract.

4. Examination of Records

a. The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any directly pertinent books, documents, papers and records of the Contractor involving transactions related to this contract.

b. The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract with the Government, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor involving transactions related to the subcontract. The term "subcontract" as used herein means any purchase order or agreement to perform all or any part of the

work or to make or furnish any materials required for the performance of this contract, but does not include (1) purchase orders not exceeding \$1,000, (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public, or (3) subcontracts or purchase orders for general inventory items not specifically identifiable with the work under this contract.

c. Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

ARTICLE V - TITLE TO PROPERTY PURCHASED BY CONTRACTOR

In consideration of the Contractor's contribution to the research project described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies, acquired from any source including the Government, or manufactured by the Contractor under this contract shall vest in the Contractor, except that title to items of property described in Section 2. b. of Appendix "A" shall vest in the Government.

ARTICLE VI - PURCHASE OF RADIOISOTOPES

The Contractor shall purchase, to the extent available in appropriate form, all radioisotopes, irradiation services and cyclotron time required in the performance of the work hereunder, through the Commission's Isotopes Division, Post Office Box E, Oak Ridge, Tennessee.

ARTICLE VII - GENERAL PROVISIONS

The provisions of Appendix "B" attached hereto, are hereby made a part of this contract.

ARTICLE VIII - ALTERATIONS

The following alterations to this contract were made by mutual agreement of the parties prior to its execution: None.

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: Herman M. Roth
HERMAN M. ROTH
DIRECTOR
RESEARCH AND MEDICINE DIVISION
(Contracting Officer)

WITNESSES:

A. S. Brower
A. S. Brower
Durham, N. C.
(Address)

Patricia Silver
Patricia Silver
Durham, N. C.
(Address)

DUKE UNIVERSITY

BY: A. Hollis Eoens
A. Hollis Eoens
TITLE: President

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement with Appendices attached hereto and made a part hereof and agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

APPENDIX "A"

SUPPLEMENT NO. 7

July 1, 1955 - June 30, 1956

This Supplement No. 7 describes the research program and cost estimates agreed upon between the Commission and the Contractor for the seventh period of performance.

1. PROGRAM

a. Scope and Plan of Approach

The program of research by the Contractor will continue with studies on the mechanism of enzyme action by glutaminase, the role of lactate in aerobic metabolism, studies of the incorporation of Carbon-14 labeled tyrosine into proteins of the liver and effects of compounds like DNP. Studies will be made of the metabolic role of glutamine, and certain aspects of sulfur metabolism will be studied. If local conditions permit, attempts will be made to purify the hormone of the parathyroid gland.

2. BUDGET

a. Outline of cost estimates for the seventh period:

(1) <u>Salaries and Wages:</u>		\$34,900.00
Dr. Philip Handler (50% of time)	\$ 5,750.00	
Research Associates	14,475.00	
Research Assistants, Technician, Etc.	14,675.00	
(2) <u>Equipment and Shop Time:</u>		1,750.00
(3) <u>Supplies:</u>		4,800.00
(4) <u>Travel and Communications:</u>		600.00
(5) <u>Overhead and Indirect Costs</u> (36.37% of Salaries and Wages):		<u>12,693.00</u>
	TOTAL	\$54,743.00*

*It is recognized that additional support may be received from other sources.

- b. Items of Property to be procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article V):
None.

APPENDIX "B"

GENERAL PROVISIONS

(FOR DIRECT AEC RESEARCH CONTRACTS)

1. Patents

- a. Whenever any patentable invention or discovery is made or conceived by the Contractor or its employees in the course of any of the work under this contract, the Contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and rights under any application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.
- b. No claim for pecuniary award under the provisions of the Atomic Energy Act of 1946 or the Atomic Energy Act of 1954 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of any of the work under this contract.
- c. Except as otherwise authorized in writing by the Commission, the Contractor will obtain patent agreements to effectuate the purposes of paragraphs a. and b. of this Article from all persons who perform any part of the work under this contract, except clerical and manual labor personnel who will not have access to technical data.
- d. Except as otherwise authorized in writing by the Commission, the Contractor will insert in all subcontracts provisions making paragraphs a., b., and c. of this Article applicable to the subcontractor and its employees.

2. Publications

The Contractor shall have full freedom of publication of the results of the research under this contract and the Contractor is urged to disseminate the results of the work through customary scientific publication channels, except that "restricted data" as defined in the Atomic Energy Act of 1954 shall be governed by the provisions of Paragraph 3 of this Appendix "B". All publications shall include a reference that the results were developed under a Commission sponsored project.

3. Security

a. It is understood that the work under this contract will not involve restricted data or other classified matter and that the Contractor will perform such work as unclassified work. However, if in the course of such work any discoveries are made or any data used or developed that constitute restricted data or other classified matter, the Contractor shall promptly inform the Commission and will be bound by the following:

- (1) Contractor's Duty to Safeguard Restricted Data and Other Classified Information. In the performance of the work under this contract the Contractor shall, in accordance with the Commission's security regulations and requirements, be responsible for safeguarding restricted data and other classified matter and protecting against sabotage, espionage, loss and theft, the classified documents, materials, equipment, processes, etc., as well as such other material of high intrinsic or strategic value as may be in the Contractor's possession in connection with performance of work under this contract. Except as otherwise expressly provided in the specifications the Contractor shall upon completion or termination of this contract transmit to the Commission any classified matter in the possession of the Contractor or any person under the Contractor's control in connection with performance of this contract.
- (2) Regulations. The Contractor agrees to conform to all security regulations and requirements of the Commission.
- (3) Definition of Restricted Data. The term "Restricted Data", as used in this article, means all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category pursuant to Section 142 of the Atomic Energy Act of 1954.
- (4) Security Clearance of Personnel. Except as the Commission may authorize, in accordance with the Atomic Energy Act of 1954, the Contractor shall not permit any individual to have access to Restricted Data until the designated investigating agency shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual and the Commission shall have determined that permitting such person to have access to Restricted Data will not endanger the common defense and security. As used in this paragraph, the

term "designated investigating agency" means the United States Civil Service Commission or the Federal Bureau of Investigation, or both, as determined pursuant to the provisions of the Atomic Energy Act of 1954.

- (5) Criminal Liability. It is understood that disclosure of information relating to the work or services ordered hereunder to any person not entitled to receive it, or failure to safeguard any Restricted Data or any top secret, secret, or confidential matter that may come to the Contractor or any person under the Contractor's control in connection with work under this contract, may subject the Contractor, his agents, employees, and subcontractors to criminal liability under the laws of the United States. (See the Atomic Energy Act of 1954, 68 Stat. 919), (See also Executive Order 10104 of February 1, 1950, 15 F. R. 597.)
- (6) Subcontracts and Purchase Orders. Except as otherwise authorized in writing by the Contracting Officer, the Contractor shall insert provisions similar to the foregoing in all subcontracts and purchase orders under this contract.

- b. The continuation by the Contractor of work found to involve restricted data will be subject to mutual agreement of the Commission and the Contractor and shall be covered by a modification of this agreement.

4. Disputes

Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. Within 30 days from the date of receipt of such copy, the Contractor may appeal by mailing or otherwise furnishing to the Contracting Officer a written appeal addressed to the Commission, and the decision of the Commission shall, unless determined by a court of competent jurisdiction to have been fraudulent, arbitrary, capricious, or so grossly erroneous as necessarily to imply bad faith, or is not supported by substantial evidence, be final and conclusive: Provided, That if no such appeal to the Commission is taken, the decision of the Contracting Officer shall be final and conclusive. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal.

Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

5. Safety, Health and Fire Protection

The Contractor shall take all reasonable precautions in the performance of the work under this contract to protect the health and safety of employees and of members of the public and to minimize danger from all hazards to life and property, and shall comply with all health, safety, and fire protection regulations and requirements (including reporting requirements) of the Commission. In the event that the Contractor fails to comply with said regulations or requirements of the Commission, the Contracting Officer may without prejudice to any other legal or contractual rights of the Commission, issue an order stopping all or any part of the work; thereafter a start order for resumption of work may be issued at the discretion of the Contracting Officer. The Contractor shall make no claim for an extension of time or for compensation or damages by reason of or in connection with such work stoppage.

6. Officials Not to Benefit

No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

7. Nondiscrimination in Employment

In connection with the performance of work under this contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post hereafter in conspicuous places, available for employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of the nondiscrimination clause. The Contractor further agrees to insert the foregoing provision in all subcontracts hereunder, except subcontracts for standard commercial supplies or raw materials.

8. Convict Labor

In connection with the performance of work under this contract the Contractor shall not employ any person undergoing sentence of imprisonment at hard labor.

9. Termination

- a. The Commission may at any time upon 120 days written notice terminate this contract in whole or in part.
- b. In the event of termination pursuant to subsection a., the Contractor shall submit a statement of costs incurred in performance of the work under the contract prior to such termination, and the Government shall pay to the Contractor that portion of the costs incurred which bears the same relationship to the total as the agreed Government support for the full term bears to the total of cost estimates for the full term, less the amount of all payments theretofore made. If the total payments theretofore made to the Contractor exceed the amount to which it is entitled hereunder, the Contractor shall promptly remit the amount of any such excess to the Government.

10. Eight-Hour Law

- a. No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day upon such work, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this article. The wages of every laborer and mechanic employed by the Contractor or any subcontractor engaged in the performance of this contract shall be computed on a basic day rate of eight hours per day and work in excess of eight hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight hours per day at not less than one and one-half times the basic rate of pay. For each violation of the requirements of this article a penalty of five dollars shall be imposed upon the Contractor for each laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight hours upon said work without receiving compensation computed in accordance with this article, and all penalties thus imposed shall be withheld for the use and benefit of the Government: Provided, that this stipulation shall be subject in all respects to the exceptions and provisions of the Eight-Hour Laws as set forth in 40 U.S.C. 321, 324, 325, 325a and 326, which relate to hours of labor and compensation for overtime.
- b. This provision does not apply to work performed by employees of the Contractor if this contract is with a state or a state institution.

11. Covenant Against Contingent Fees

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration the full amount of such commission, percentage, brokerage or contingent fee.

12. Definitions

As used in this contract:

- a. the term "Contracting Officer" means the person executing this contract on behalf of the Government and includes his successor or any duly authorized representative of such person.
- b. the term "Commission" means the United States Atomic Energy Commission or any duly authorized representative thereof, including the Contracting Officer except for deciding an appeal under the article entitled "Disputes".

13. Fellowships

It is understood by the Contractor that none of the funds supplied by the Commission under this contract shall be used in any way to pay the stipend of any appointment for which commensurate services are not rendered under this contract; nor shall any of the funds be used to confer a fellowship, or to pay any part of the stipend of a fellowship, of any kind.

14. Foreign Travel

It is agreed that none of the funds supplied by the Commission under this contract shall be used to pay the expenses of foreign travel, except where such foreign travel is made with the prior approval of the Commission. "Foreign travel" as used herein means travel outside the continental United States, excepting, however, travel to Canada.

APPENDIX "C"

REPORTS AND PROPOSALS
(FOR DIRECT AEC RESEARCH CONTRACTS)

	Date Due	Copies
1. Progress Report	April 1	Six
2. Renewal Proposal	April 1	Six
3. 200-word summary of purpose and scope	Following completion of negotiation of contract and any renewal	Three
4. Complete Scientific Report	On contract termination	Six
5. Brief reports or manuscripts may be submitted as desired by investigator		

NOTES:

All of the above should be addressed to:

Research and Medicine Division
Oak Ridge Operations Office
U. S. Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

The progress report should briefly describe the scope of investigations undertaken and the significant results obtained. It should also explain any significant differences between the actual level of activity (expressed in the various categories of man-months, facilities procured, travel performed, etc.) and that contemplated in the contract. Technical reports and articles prepared for publication during the period covered should be listed with bibliographic references. Reprints or preprints of all such material should be appended and material contained therein need not be duplicated in the report.

Renewal proposals, if any, should accompany the progress report and should contain the type of information outlined below unless the information is already contained in earlier proposals or in the accompanying progress report. Any contemplated change in program or scope for the renewal period should be clearly explained and the cost estimated should be based upon past experience.

1. Title of the project.
2. The institution and department in which the work will be done.
3. Scientific background including literature relevant to the proposal, the significance, and the motivation. If the proposal is for continuation of work already in progress the extent of present support should be stated identifying amounts received from federal agencies.
4. Scientific scope of the proposed research, its objectives, its relation to present knowledge and to comparable work in progress elsewhere, and a plan of accomplishments for the first year's work.
5. Scientific Personnel. Give the name, highest academic degree, position in the institution, scientific experience, publications and accomplishments of the senior investigator (the individual who will actively direct the research program) and of each regular staff scientist who it is proposed will engage in the work. Indicate the approximate fraction of the time of each to be devoted to the project during each period of the year. Scientific personnel to be newly employed for the project should be so designated, and professional records given if possible.
6. Other personnel. The number of persons of each sub-professional grade and the fraction of the time of each to be devoted to the project should be listed. Graduate student employees should be identified as such if their thesis is to be related to the project.
7. Other Financial Assistance. If assistance for this or other activities involving the same personnel or facilities is to be proposed to, or received from other federal or non-university sources the extent of that assistance should be clearly stated, and the interplay of the arrangements should be fully explained.
8. Materials, Equipment and Facilities. List those already available for the work and justify the need for major items to be procured.
9. Travel and other items. Explain the purpose of the proposed travel, and of any other major items in the budget. Travel rates and the use of contract funds for attendance at regular scientific meetings should conform with the policy of the institution in the use of its own funds for these purposes.
10. Budget. This should list in detail all items of cost necessary to carry the project for one year or for the duration of the project if less than a year. It should include: a list of the individual salaries attributable to the project, supplies and services, equipment (defined as things individually costing more than \$500 which will retain their utility for more than a year), travel, communication and publication, and the

indirect costs allocable to the project. The basis for computing the indirect costs should be briefly explained. The budget should not include the stipend of fellows. All salaries chargeable to the project should be in accord with the established policies of the institution, or, if not, an explanation should be submitted.

11. Amount requested. A statement of the part of the total amount listed in the budget which the institution is prepared to bear, and the amount requested from the AEC, and a statement of any other sponsors of the project with the amounts contributed by each. The proposal should be signed by the Senior Investigator and endorsed by a responsible administrative officer of the institution.
12. Statement of current expenditures. A current statement of its expenditures for the project, and an estimate of expenses to be incurred during the remainder of the current period.
13. Residual funds. Any difference in the scope of the work during the current contract period from that contemplated in the contract, as brought out in the report, may be reflected in the amount requested for the ensuing year. If no new funds are required the contract may be renewed without funds. A proposal for such renewal should state the scope of the work proposed for use of residual funds.

Contract No. AT-(40-1)-289
Duke University
Modification No. 7

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 23rd day of June, 1954, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for the performance by the Contractor of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 6; and

WHEREAS, the parties hereto desire to extend the term of the contract in order to continue the research activities described in Supplement No. 6 to Appendix "A", and to revise the form of the contract and appendices; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto do mutually agree that as of July 1, 1954, Contract No. AT-(40-1)-289 is amended to read (with Appendices "A", "B" and "C" attached) as follows:

ARTICLE I - PURPOSE AND SCOPE

1. The Commission, in furtherance of its policy of assisting and fostering private research, desires to support the Contractor's fundamental research in the field of atomic energy.
2. The work shall consist of metabolic studies with tracer techniques. The plan of approach to the problem and the agreed upon program and budget for the project are described in Appendix "A", which is hereby made a part of this contract. The Contractor shall be guided by, but not bound to conform to, the details of the budget described in Appendix "A".
3. The Contractor shall furnish all services, facilities, equipment, supplies and materials (except such services, equipment, supplies and

materials as the Government has agreed to furnish herein) required for the performance of the research program described in Section 2 above.

4. The work will be carried out by the Contractor under the direction of Dr. Philip Handler as Senior Investigator.

ARTICLE II - TERM OF CONTRACT

2. The sixth period of performance for the research project covered by this contract will commence on July 1, 1954, and will end on June 30, 1955. It is recognized that completion of the research work under this contract may involve a period of several years and that the term of this contract may be extended by mutual agreement.

ARTICLE III

1. Consideration

e. In consideration of the performance of the research activities described in Supplement No. 6 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Thirty-Three Thousand, Six Hundred Ninety Dollars (\$33,690.00), the Government will pay to the Contractor for the sixth period of performance the sum of Fourteen Thousand Dollars (\$14,000.00).

2. Payment

a. On or before the date of commencement of work on the project described in Appendix "A", the Government shall pay to the Contractor upon submission by the Contractor of a properly certified voucher, 45 per cent of the agreed consideration.

b. On or before the expiration of six months from the date of commencement of the project, the Government shall pay to the Contractor, upon submission by the Contractor of a properly certified voucher, 45 per cent of the agreed consideration.

c. Upon receipt and acceptance of a satisfactory progress report, in cases where the contract is to be renewed, or the final report if the contract is not to be renewed, the Government shall pay to the Contractor, upon submission by the Contractor of a properly certified voucher, the remaining 10 per cent of the agreed consideration. An extension of the contract term without additional funds shall not be considered a renewal of the contract and in such cases the retained 10 per cent of the agreed consideration will be paid upon submission and acceptance of a satisfactory final report.

d. In the event the contract is renewed, payments to the Contractor of any additional amount to be paid by the Government shall be made for the extended term in accordance with the schedule outlined in Paragraphs a., b. and c. above.

3. Program and Budget for Subsequent Periods

When renewal of the contract is desired, the Contractor shall submit to the Commission's Oak Ridge Operations Office a renewal proposal as outlined in Appendix "C", attached hereto. The Contractor and the Commission shall then negotiate as to the amounts each will contribute for the services to be performed during the ensuing period, taking into consideration the actual costs incurred during the current period in comparison with the cost estimates in the contract, and, upon agreement, shall execute a formal modification of the contract.

ARTICLE IV - REPORTS, RECORDS AND INSPECTION

1. The Commission shall have the right to inspect in such manner and at such times as it deems appropriate all activities of the Contractor arising in the course of the work under this contract.

2. The Commission shall at all times be afforded access to the premises and to all technical records, correspondence, instructions, drawings and memoranda of record value of the Contractor pertaining to said work.

3. The Contractor shall make progress and other reports in such manner and at such times as specified in Appendix "C" which is attached and hereby made a part of this contract.

4. Examination of Records

a. The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any directly pertinent books, documents, papers and records of the Contractor involving transactions related to this contract, unless the Commission authorizes their prior disposition.

b. The Contractor further agrees to include in all his sub-contracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract with the Government, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor involving transactions related to the subcontract, unless the Commission authorizes their prior disposition. The term "subcontract" as used herein means any purchase order or agreement to perform all or any part of the work or to make or furnish any materials required for the performance of this

contract, but does not include (i) purchase orders not exceeding \$1,000, (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public, or (iii) subcontracts or purchase orders for general inventory items not specifically identifiable with the work under this contract.

c. Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract.

ARTICLE V - TITLE TO PROPERTY PURCHASED BY CONTRACTOR

In consideration of the Contractor's contribution to the research project described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies, acquired from any source including the Government, or manufactured by the Contractor under this contract shall vest in the Contractor, except that title to items of property described in Section 2. b. of Appendix "A" shall vest in the Government.

ARTICLE VI - PURCHASE OF RADIOISOTOPES

The Contractor shall purchase, to the extent available in appropriate form, all radioisotopes, irradiation services and cyclotron time required in the performance of the work hereunder, through the Commission's Isotope Division, Post Office Box E, Oak Ridge, Tennessee.

ARTICLE VII - GENERAL PROVISIONS

The provisions of Appendix "B", attached hereto, are hereby made a part of this contract.

ARTICLE VIII - ALTERATIONS

The following alterations to this contract were made by mutual agreement of the parties prior to its execution:

In Appendix "B", General Provisions, Paragraph 3, Disclosure of Information, the third sentence of subparagraph a. was deleted.

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *Kasschau*

Kenneth Kasschau
Director

~~RESEARCH AND MEDICAL DIVISION~~

WITNESSES:

G. C. Henricksen
G. C. Henricksen
Durham, North Carolina
(Address)

Patricia Silver
Patricia Silver
Durham, North Carolina
(Address)

DUKE UNIVERSITY

BY: *A. S. Brower*

A. S. Brower
TITLE: Business Manager & Comptroller

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and the Appendices attached hereto and made a part hereof, and I agree to be bound by the provisions of this document.

Philip Handler
Senior Investigator

APPENDIX "A"

SUPPLEMENT NO. 6

July 1, 1954 - June 30, 1955

This Supplement No. 6 describes the research program and cost estimates agreed upon between the Commission and the Contractor for the sixth period of performance.

1. PROGRAM

a. Scope and Plan of Approach

During this period of performance, investigation will be made of the following:

- (1) Mechanism of enzyme action. Present studies are to be continued. Several hydrolytic enzymes which have not previously been studied in this manner will be examined by an established general procedure to determine the conditions under which they may serve as "transferring" enzymes. After these have been examined by the isotopic procedure, the kinetics of the hydrolytic and transfer reactions (if any) will be studied. It is hoped that from these a general picture of the mode of action of hydrolytic enzymes may emerge.
- (2) Methods were established for fractionation of glucose-1- PO_4 and glucose-6- PO_4 in the quantities found in rat tissues. These are now to be employed in a study of (1) glucose absorption by renal tubules and (2) the initial steps in muscle glucose metabolism using glucose-C-14.
- (3) Methods were established for estimating the specific activity of lactic acid, pyruvic acid, glucose and glycogen. These are to be employed in a study designed to determine whether lactic acid is an obligatory intermediate in both the aerobic and anaerobic metabolism of glucose in muscle, liver, kidney and brain slices.
- (4) The nature of the mechanism whereby tyrosine-C-14 is "incorporated" into the insoluble proteins of liver and kidney under the influence of dinitrophenol, homogentisic acid and dihydroxyphenylalanine will be further investigated and the attempts to determine the actual nature of the "incorporated" material will continue.
- (5) Present studies of the role of glutamine in metabolism will be continued. Included will be: (1) Distribution and turnover of glutamine in the pigeon. (2) Turnover of the amide position of

glutamine as well as that of NH_3 , urea, glutamic acid and aspartic acid and aspartic acid and glycine in the non-protein fraction of rat liver after administration of glutamine, NH_3 and leucine labeled with N^{15} . (3) Mechanism of renal ammonia production as determined by turnover studies as in (2) in isolated perfused dog kidneys.

- (6) Attempts to establish the pathway of $\text{SO}_4 =$ fixation in bacteria which can utilize $\text{SO}_4 =$ for cystine synthesis will be continued.
- (7) If a suitable person is available, previous attempts to purify the hormone of the parathyroid will be reinitiated.

2. BUDGET

a. Outline of cost estimates for the sixth period:

(1) Salaries and Wages:*		\$30,525.00
Dr. Philip Handler (40% of time)	\$ 4,600.00	
Other faculty	6,375.00	
Research Assistants & Technicians	19,550.00	
(2) Equipment and Shop Time:		1,750.00
(3) Supplies:		3,900.00
(4) Travel and Communications:		450.00
(5) Indirect Costs:		<u>11,065.00</u>
		\$47,690.00

*It is recognized that additional support may be received from other sources as outlined in the Contractor's proposal to the Commission, particularly with respect to other personnel who may be engaged in the program.

- b. Items of property to be procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article V): None.

APPENDIX "B"

GENERAL PROVISIONS

(FOR DIRECT AEC RESEARCH CONTRACTS)

1. Patents

- a. Whenever any patentable invention or discovery is made or conceived by the Contractor or its employees in the course of any of the work under this contract, the Contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and rights under any application or patent that may result. The judgement of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.
- b. No claim for pecuniary award under the provisions of the Atomic Energy Act of 1946 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of any of the work under this contract.
- c. Except as otherwise authorized in writing by the Commission, the Contractor will obtain patent agreements to effectuate the purposes of paragraphs a. and b. of this Article from all persons who perform any part of the work under this contract, except clerical and manual labor personnel who will not have access to technical data.
- d. Except as otherwise authorized in writing by the Commission, the Contractor will insert in all subcontracts provisions making paragraphs a., b., and c. of this Article applicable to the subcontractor and its employees.

2. Publications

The Contractor shall have full freedom of publication of the results of the research under this contract and the Contractor is urged to disseminate the results of the work through customary scientific publication channels, except that "restricted data" as defined in the Atomic Energy Act of 1946 shall be governed by the provisions of Paragraph 3 of this Appendix "B". All publications shall include a reference that the results were developed under a Commission sponsored project.

3. Disclosure of Information

- a. It is understood that the work under this contract will not involve restricted data and the Contractor will perform such work as unclassified work. However, if in the course of such work any discoveries are made or any data used or developed that constitute restricted data, the Contractor shall promptly inform the Commission and shall classify and safeguard all discoveries and data in accordance with the requirements of the Commission. ~~It is understood that the person directing research work under this contract shall have been cleared by the Commission for access to restricted data.~~ Except as the Commission may authorize, in accordance with the Atomic Energy Act of 1946, as amended, the Contractor shall not permit any individual to have access to restricted data until the designated investigating agency shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense or security. As used in this paragraph the term "designated investigating agency" means the United States Civil Service Commission or the Federal Bureau of Investigation, or both, as determined pursuant to the provisions of the Atomic Energy Act of 1946, as amended. If doubt exists as to whether any discovery or data developed constitute restricted data, prior to the release of these data and before permitting any individual who has not received clearance from the Commission to have access to such data, the Contractor shall seek guidance from the Commission. Furthermore, the Commission reserves the right to require the classification of work whenever in its opinion restricted data are involved.
- b. The continuation by the Contractor of work found to involve restricted data will be subject to mutual agreement of the Commission and the Contractor and shall be covered by a modification of this agreement. The phrase "restricted data" as defined in the Atomic Energy Act of 1946 and employed in this section shall mean "all data concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power, but shall not include any data which the Commission from time to time determines may be published without adversely affecting the common defense and security".

4. Disputes

Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. Within 30 days from the date of receipt of such copy,

the Contractor may appeal by mailing or otherwise furnishing to the Contracting Officer a written appeal addressed to the Commission, and the decision of the Commission shall be final and conclusive, unless determined by a court of competent jurisdiction to have been fraudulent or arbitrary or capricious or so grossly erroneous as necessarily to imply bad faith or not to be supported by substantial evidence: Provided, That, if no such appeal to the Commission is taken, the decision of the Contracting Officer shall be final and conclusive. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

5. Safety and Accident Prevention - Inspections

The Contractor will comply with health and safety regulations of the Commission required for work of this nature, and permit the Commission and its designees to inspect the work conducted under this agreement.

6. Officials Not to Benefit

No member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

7. Anti-Discrimination

The Contractor, in performing the work required by this contract, shall not discriminate against any employee or applicant for employment because of race, creed, color, or national origin.

8. Convict Labor

The Contractor shall not, in the performance of this contract, employ any person undergoing sentence or imprisonment at hard labor.

9. Termination

- a. The Commission may at any time upon 120 days written notice terminate this contract in whole or in part.
- b. In the event of termination pursuant to subsection a., the Contractor shall submit a statement of costs incurred in performance of the work under the contract prior to such termination, and the Government shall pay to the Contractor that portion of the costs incurred which bears the same relationship to the total as the agreed Government support

for the full term bears to the total of cost estimates for the full term, less the amount of all payments theretofore made. If the total payments theretofore made to the Contractor exceed the amount to which it is entitled hereunder, the Contractor shall promptly remit the amount of any such excess to the Government.

10. Eight-Hour Law

- a. No laborer or mechanic doing any part of the work contemplated by this contract in the employ of the Contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight (8) hours in any one calendar day upon such work at the site thereof, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this Article. The wages of every laborer and mechanic employed by the Contractor or any subcontractor engaged in the performance of this contract shall be computed on a basic day rate of eight (8) hours per day and work in excess of eight (8) hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight (8) hours per day at not less than one and one-half ($1\frac{1}{2}$) times the basic rate of pay. For each violation of the requirements of this Article a penalty of Five Dollars (\$5.00) shall be imposed upon the Contractor for each laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight (8) hours upon said work without receiving compensation computed in accordance with this Article, and all penalties thus imposed shall be withheld for the use and benefit of the Government; provided, that this stipulation shall be subject in all respects to the exceptions and provisions of U. S. Code, Title 40, Sections 321, 324, 325, and 326, relating to hours of labor, as modified by the provisions of Section 303 of Public Act No. 781, 76th Congress, approved September 9, 1940, relating to compensation for overtime.
- b. This provision does not apply to work performed by employees of the Contractor if this contract is with a state or a state institution.

11. Definitions

As used in this contract the terms "United States Atomic Energy Commission" "Atomic Energy Commission" and "Commission" shall mean the United States Atomic Energy Commission or its duly authorized representative or representatives.

12. Fellowships

It is understood by the Contractor that none of the funds supplied by the Commission under this contract shall be used in any way to pay the

stipend of any appointment for which commensurate services are not rendered under this contract; nor shall any of the funds be used to confer a fellowship, or to pay any part of the stipend of a fellowship, of any kind.

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It is agreed that none of the funds supplied by the Commission under this contract shall be used to pay the expenses of foreign travel, except where such foreign travel is made with the prior approval of the Commission. "Foreign travel" as used herein means travel outside the continental United States, excepting, however, travel to Canada.

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(FOR DIRECT AEC RESEARCH CONTRACTS)

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2. The institution and department in which the work will be done.
3. Scientific background including literature relevant to the proposal, the significance, and the motivation. If the proposal is for continuation of work already in progress the extent of present support should be stated identifying amounts received from federal agencies.
4. Scientific scope of the proposed research, its objectives, its relation to present knowledge and to comparable work in progress elsewhere, and a plan of accomplishments for the first year's work.
5. Scientific Personnel. Give the name, highest academic degree, position in the institution, scientific experience, publications and accomplishments of the senior investigator (the individual who will actively direct the research program) and of each regular staff scientist who it is proposed will engage in the work. Indicate the approximate fraction of the time of each to be devoted to the project during each period of the year. Scientific personnel to be newly employed for the project should be so designated, and professional records given if possible.
6. Other personnel. The number of persons of each sub-professional grade and the fraction of the time of each to be devoted to the project should be listed. Graduate student employees should be identified as such if their thesis is to be related to the project.
7. Other Financial Assistance. If assistance for this or other activities involving the same personnel or facilities is to be proposed to, or received from other federal or non-university sources the extent of that assistance should be clearly stated, and the interplay of the arrangements should be fully explained.
8. Materials, Equipment and Facilities. List those already available for the work and justify the need for major items to be procured.
9. Travel and other items. Explain the purpose of the proposed travel, and of any other major items in the budget. Travel rates and the use of contract funds for attendance at regular scientific meetings should conform with the policy of the institution in the use of its own funds for these purposes.
10. Budget. This should list in detail all items of cost necessary to carry the project for one year or for the duration of the project if less than a year. It should include a list of the individual salaries attributable to the project, supplies and services, equipment (defined as things individually costing more than \$500 which will retain their utility for more than a year), travel, communication and publication, and the indirect costs allocable to the project. The basis for computing the indirect costs should be briefly explained. The budget should not

include the stipend of fellows. All salaries chargeable to the project should be in accord with the established policies of the institution, or, if not, an explanation should be submitted.

11. Amount requested. A statement of the part of the total amount listed in the budget which the institution is prepared to bear, and the amount requested from the AEC, and a statement of any other sponsors of the project with the amounts contributed by each. The proposal should be signed by the Senior Investigator, endorsed by a responsible administrative officer of the institution.
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Contract No. AT-(40-1)-289
Duke University
Modification No. 6

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 29th day of June, 1953, effective as of July 1, 1953, by and between the UNITED STATES OF AMERICA (hereinafter referred to as the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter referred to as the "Commission"), and DUKE UNIVERSITY (hereinafter referred to as the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, providing for the performance by the Contractor of five separate training or research projects, which contract was subsequently amended by Modifications Nos. 1 - 5, inclusive, thereto; and

WHEREAS, the parties desire to further extend the term of the contract in order to continue one of the said research projects (Title II); and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto do mutually agree that Contract No. AT-(40-1)-289 is modified in the following particulars, but in no others:

1. In ARTICLE III, section 1, Consideration, add the following new subsection d:

"d. In consideration of the Contractor's performance of the research activities described in Supplement No. 5 to Appendix 'A' and the Contractor's other contributions to the project, the Government will pay to the Contractor the sum of Thirteen Thousand Seven Hundred and Five Dollars (\$13,705.00) for the fifth period of performance."

2. In ARTICLE V - REPORTS, RECORDS AND INSPECTION, add the following new section 4:

"4. Examination of Records

"a. The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract have access to and the right to

examine any directly pertinent books, documents papers and records of the Contractor involving transactions related to this contract.

"b. The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract with the Government, have access to and the right to examine any directly pertinent books, documents, papers and records of such subcontractor involving transactions related to the subcontract. The term 'subcontract' as used herein means any purchase order or agreement to perform all or any part of the work or to make or furnish any materials required for the performance of this contract, but does not include (1) purchase orders not exceeding \$1,000, (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public, or (3) subcontracts or purchase orders for general inventory items not specifically identifiable with the work under this contract.

"c. Nothing in this contract shall be deemed to preclude an audit by the General Accounting Office of any transaction under this contract."

3. Add the following new Supplement No. 5 to Appendix "A":

"Supplement No. 5

"July 1, 1953 - June 30, 1954

"1. PROJECT

"a. Project Leader: Dr. Philip Handler.

"b. Title: (a) Localization of Brain Tumors Using Positron-emitting Isotopes and
(b) Renal Function and Metabolism.

"c. Term: The fifth period of performance will commence on July 1, 1953, and will end on June 30, 1954.

"d. Scope and Plan of Approach: The work will be a continuation of that project heretofore undertaken as Title II. During this period experiments will be continued in the study of:

- (1) The mechanism of glucose absorption and the first step in carbohydrate metabolism in vivo.
- (2) Lactic acid turnover in kidney slices.
- (3) Mode of enzyme action, particularly the action of esterases and their transferring activity and the action of chymotrypsin.
- (4) Purification of the active principle of the parathyroid gland.

"2. BUDGET - Fifth Period - July 1, 1953 - June 30, 1954

"a. The Contractor shall furnish as its contribution to the project:

- (1) Salaries of staff members, including the Project Leader, and other personnel engaged in the work in excess of the Government's payment under b. (1) below.
- (2) Use of laboratory work space; and equipment, materials, and facilities needed for the project in excess of the Government's contribution under b. below.
- (3) All clerical, administrative and overhead costs in excess of the Government's payment under b. below.

"b. The Government's payment as set out in ARTICLE III, section 1, subsection d., shall be applied generally in accordance with the following operating estimates:

(1) Salaries and Wages		\$9,040.00
3 Research Assistants	\$5,400.00	
Electronics Technician	1,000.00	
Technician	2,640.00	

(2) Equipment and Shop Time	\$ 1,000.00
(3) Supplies	2,400.00
Radioisotopes, chemicals, glass- ware, animals, illustrations	
(4) Travel and Communications	250.00
(5) Overhead	1,015.00
	<hr/>
GRAND TOTAL	\$13,705.00

"c. Items of property procured or manufactured by the Contractor, title to which shall vest in the Government (see ARTICLE VI):
None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this contract to:

Medical Branch
Division of Biology and Medicine
United States Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C."

4. In Appendix "B", GENERAL PROVISIONS, section 3, Disclosure of Information, subsection a., delete the third and fourth sentences thereof, and substitute therefor the following:

"Except as the Commission may authorize, in accordance with the Atomic Energy Act of 1946, as amended, the Contractor shall not permit any individual to have access to restricted data until the designated investigating agency shall have made an investigation and report to the Commission on the character, associations, and loyalty of such individual and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense or security. As used in this paragraph the term 'designated investigating agency' means the United States Civil Service Commission of the Federal Bureau of Investigation, or both, as determined pursuant to the provisions of the Atomic Energy Act of 1946, as amended by the Act of April 5, 1952, Public Law 298, 82nd Congress, 66 Stat. 43."

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: U. S. ATOMIC ENERGY COMMISSION

BY: Herman M. Roth
Contracting Officer

Herman M. Roth
~~Acting~~ Director

RESEARCH AND MEDICINE DIVISION
DUKE UNIVERSITY

BY: A. Hollis Edens

TITLE: President

WITNESSES:

W. Brown

Durham, N. C.

(Address)

Patricia Silver

Durham, N. C.

(Address)

Acceptance By Project Leader

I have read the foregoing Supplemental Agreement and agree to be bound by its provisions.

Philip Handler
Project Leader

G.A.O.	
Rec'd	7.11.52
Ind.	500
Rev.	

Contract No. AT-(40-1)-289
(Duke University)
Modification No. 5

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 27th day of June, 1952, effective as of July 1, 1952, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, for the performance by the Contractor, commencing on July 1, 1949, of five separate training or research projects; and

WHEREAS, the Contract has been amended heretofore by Modifications Nos. 1 through 4; and

WHEREAS, the parties desire to extend the term of the Contract in order to continue and expand three of the projects, as such extended program is described in Supplement No. 4 to Appendix "A"; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto do mutually agree that Contract No. AT-(40-1)-289 is modified in the following particulars, but in no others:

1. Add the following new Subsection c. to Section 1 of Article III - PROGRAM DEVELOPMENT AND FINANCING:

"c. In consideration of the performance of the work under the three titles described in Supplement No. 4 to Appendix 'A', the Government will pay to the Contractor the total sum of Twenty-Five Thousand Six Hundred Twelve Dollars and Sixty-Cents (\$25,612.60) for the period July 1, 1952 - June 30, 1953, the funds to be applied to the three titles according to the budget provisions of Supplement No. 4 to Appendix 'A'. It is expressly agreed that the sum of Seven Thousand Four Hundred Ninety-One Dollars (\$7,491.00) shall be deemed to represent the amount by which the total of payments made by the Government for previous contract periods exceeds total expenditures for the same periods."

2. Add the following new Supplement No. 4 to Appendix "A":

"SUPPLEMENT NO. 4

"July 1, 1952 - June 30, 1953

"This Supplement No. 4 describes the research programs and budgets under three separate titles as agreed upon between the Commission and the Contractor for the fourth period of performance.

"TITLE II

"1. PROJECT

"a. Project Leader

"The work under this Title II will be carried on by the Contractor under the direction of Dr. Philip Handler.

"b. Term

"The fourth period of performance for this Title II will commence on July 1, 1952, and will end on June 30, 1953.

"c. Program

"(1) Scope and Plan of Approach

"The objective of the project under this Title II will continue to be investigations into (a) the use of positron-emitting isotopes for extracranial localization of brain tumors; (b) renal function and metabolism; (c) parathyroid function.

(a) Localization of Brain Tumors

Using paper electrophoresis of cerebrospinal fluid from normal subjects and patients with brain lesions, the mode of passage of potentially useful copper and iodine labeled dyes across the 'Blood-brain barrier' will be studied as a screening procedure to obtain information necessary to develop more suitable carriers for copper and iodine which will permit more effective localization. Dyes with suitable characteristics will then be studied.

(b) Renal Function and Metabolism

The reabsorption of glucose by renal tubules will be studied with C^{14} -glucose in a manner analogous to previous studies with P^{32} .

In order better to interpret previously obtained data with P^{32} in cat kidneys, similar studies will be made with yeast cells and yeast extracts.

One-sixth of all the energy available from glucose combustion in the kidney is potentially made available by oxidation of 3-phosphoglyceraldehyde. Yet since this occurs in the cytoplasm and the system for generating ATP is in mitochondria, this cannot happen unless the pyruvate formed is reduced to lactate and then delivered to the mitochondria. If this is the case then all glucose oxidation proceeds through lactic acid. The Contractor will test this theory with C^{14} -labeled glucose and lactate.

(c) Parathyroid Function

Attempts to purify this hormone will be continued and the mode of action appraised using previously developed procedure with P^{32} .

"2. BUDGET - Fourth Period: July 1, 1952 - June 30, 1953

"a. The Contractor will furnish as its contribution to the Title II project:

- (1) Salaries of staff members including the Project Leader, and other personnel engaged in the work in excess of the Government's payment under b(1) below.
- (2) Use of laboratory work space; and materials, equipment and facilities required for the work in excess of the Government's contribution under b. below.
- (3) Clerical, administrative and overhead costs in excess of the Government's payment under b. below.

"b. The Government will pay to the Contractor the sum of Twelve Thousand Eight Hundred Forty-Seven Dollars and Twenty Cents (\$12,847.20) which, together with the sum of Three Thousand Nine Hundred Fifty Dollars (\$3,950.00) (which amount the parties hereby agree shall be deemed to represent the amount by which the total of payments made by the Government under Titles I and II for previous contract periods exceeds total expenditures for Titles I and II for the same periods) is to cover generally the following operating estimates:

(1) <u>Salaries</u>	
Three Research Assistants	\$5,400.00
Electronics technician (Foster)	900.00
Technician (Block)	<u>2,640.00</u>
Total Salaries	\$8,940.00
(2) <u>Equipment and Shop Time</u>	4,200.00
(Including \$3,200.00 for air-conditioning equipment)	
(3) <u>Supplies</u> (includes radioisotopes)	2,400.00
(4) <u>Travel and Communications</u>	250.00
	<u>\$15,790.00</u>
(5) <u>Overhead</u>	1,007.00
	<u>\$16,797.00</u>
Subtotal	\$16,797.00
Balance from previous payments under Titles I and II	<u>3,950.00</u>
TOTAL	\$12,847.00

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title to:

Medical Branch
Division of Biology and Medicine
United States Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C.

"TITLE III

"1. PROJECT

"a. Project Leader

"The work under this Title III will be carried out by the Contractor under the direction of Dr. J. S. Harris as Project Leader.

"b. Term

"The fourth period of performance for this Title will commence on July 1, 1952, and will end on June 30, 1953.

"c. Program

"(1) Scope and Plan of Approach

"The objective of this Title III will continue to be studies of electrolyte and fluid balance in health and disease. The studies contemplated for this period are:

- (a) The study of potassium metabolism by isolated tissues will be continued and expanded. These will include the effect of changes in donor animals, medium, substrates, drugs and metabolic inhibitors.
- (b) The exchange of potassium between isolated tissues and the external fluid will be investigated by means of radioactive potassium. The rates of reaction under different conditions will be determined and the nature of the intracellular potassium will be studied.

"2. BUDGET - Fourth Period: July 1, 1952 - June 30, 1953

"a. The Contractor will furnish as its contribution to the project:

- (1) Salaries of staff members, including the Project Leader, and other personnel engaged in the work in excess of the Government's payment under b(1) below.
- (2) Use of laboratory work space; and materials, equipment and facilities required for the work in excess of the Government's contribution under b. below.
- (3) Clerical, administrative and overhead costs in excess of the Government's payment under b. below.

"b. The Government will pay to the Contractor the sum of Two Thousand Five Hundred Eighty-One Dollars and Forty Cents (\$2,581.40) which, together with the sum of Two Thousand Forty-One Dollars (\$2,041.00)(which amount the parties hereby agree shall be deemed to represent the amount by which the total of payments made by the Government under this Title III for previous contract periods exceeds total expenditures for the same periods) is to cover generally the following operating estimates:

(1) Salaries

Mrs. Holloway	\$3,000.00
Mrs. Forrester	<u>480.00</u>
Total Salaries	\$3,480.00

(2) Equipment 100.00

(3) Consumable Supplies 500.00

(4) Travel and Communications 150.00

(5) Contingent Fund 50.00

\$4,280.00

(6) Overhead @ 8% 342.40

Subtotal \$4,622.40

Balance from Previous payments 2,041.00

TOTAL \$2,581.40

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title III to:

Medical Branch
Division of Biology and Medicine
United States Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C.

"TITLE V

"1. PROJECT

"a. Project Leader

"The work under this Title V will be carried out by the Contractor under the direction of Dr. I. E. Gray as Project Leader.

"b. Term

"The fourth period of performance for this Title will commence on July 1, 1952, and will end on June 30, 1953.

"c. Program

"(1) Scope and Plan of Approach

The work under this Title V will be carried out as two separate projects during this period:

"Project 'A'

The investigation under this Project 'A' during this period will be concerned with an examination of the capacity of the nucleus to synthesize DNA and histone in vitro as indicated by the incorporation of P^{32} into Dn A and H18 into both compounds.

Naturally occurring precursors will be provided by injecting rats with P^{32} or H^{15} -glycine which will be built into the liver compounds. The liver of such animals will then be homogenized and the nuclei removed from the homogenate. Nuclei separated from livers of rats which have received

no isotope will be introduced into the labeled homogenate. After suitable incubation the nucleotides and histones will be isolated and their isotope content measured.

Possible interrelations between various cell components will be investigated by determining synthetic capacities of nuclei placed in various homogenate fractions.

"Project 'B'

The objective of Project 'B' of Title V will continue to be the study by radioisotopes of shell formation in mollusks.

"2. BUDGET - Fourth Period: July 1, 1952 - June 30, 1953

"a. The Contractor will furnish as its contribution to the Title V project:

- (1) Salaries of staff members, including the Project Leader, and other personnel engaged in the work in excess of the Government's payment under b.(1) below.
- (2) Use of laboratory work space; and materials, equipment and facilities required for the work in excess of the Government's contribution under b. below.
- (3) Clerical, administrative and overhead costs in excess of the Government's payment under b. below.

"b. The Government will pay to the Contractor the sum of Ten Thousand One Hundred Eighty-Four Dollars (\$10,184.00) which is to cover generally the following operating estimates for Project 'A' under Title V:

"Project 'A'

(1) Salaries

Dr. Anderson (3 months full-time, 6 months half-time)	\$2,500.00
Dr. Szafarz (10 months half-time)	2,100.00
1 Research Assistant (10 months)	<u>2,500.00</u>
Total Salaries	\$7,100.00

(2) <u>Consumable Supplies</u>		1,100.00
(3) <u>Isotopes</u>		300.00
(4) <u>Equipment and Maintenance</u>		
Stroboscope	250.00	
High speed centrifuge head	80.00	
Maintenance and Repair	<u>250.00</u>	
Total Equipment and Maintenance		580.00
(5) <u>Contingent Fund</u>		
(Includes travel)		<u>350.00</u>
(6) <u>Overhead @ 8%</u>		<u>754.00</u>
	TOTAL	<u>\$10,184.00</u>

"Project 'B'

It is expressly agreed that the Government will make no additional payments under this Project 'B' of Title V and that the Contractor will fund this project with the sum of One Thousand Five Hundred Dollars (\$1,500.00) which amount the parties agree shall represent the amount by which total Government payments under Title V for the third period of performance exceeds total expenditures under Title V for the same period.

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title to:

Medical Branch
Division of Biology and Medicine
United States Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C."

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

WITNESSES:

as Brower
Durham, N. C.
(Address)

Pat Silver
Durham, N. C.
(Address)

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *John R. Moore*
John R. Moore
TITLE: Director, Contract Division, ORO

DUKE UNIVERSITY

BY: *A. H. Evans*
TITLE: President

ACCEPTANCE BY PROJECT LEADERS

I have read the foregoing Supplemental Agreement and agree to be bound by its provisions to the extent that they are applicable to the project for which I am responsible.

Philip Handler
Project Leader
James S. Harris
Project Leader
J. E. Gray
Project Leader

Contract No. AT-(40-1)-289
(Duke University)
Modification No. 4

G.A.O.	
Rec'd	9/1/51
Ind.	9/2/51

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 4th day of September, 1951, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, for the performance by the Contractor, commencing on July 1, 1949, of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 through 3; and

WHEREAS, the parties desire to correct an error in the budget of the Title V project appearing in Modification No. 3; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto do mutually agree that Contract No. AT-(40-1)-289 is modified in the following particulars, but in no others:

1. In Supplement No. 3 to Appendix "A", Title V, Section 2 b, lines 2 and 3, delete the sum "Ten Thousand One Hundred Forty-Three and 60/100 Dollars (\$10,143.60)" and substitute therefor the sum of "Ten Thousand Five Hundred Forty-Three and 60/100 Dollars (\$10,543.60)".

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *C. Vanden Bulck*
C. Vanden Bulck, Assistant Manager, ORO
TITLE: Contracting Officer

WITNESSES:

A. S. Brower
A. S. Brower,
Durham, N. C.
(Address)

June Johnson
June Johnson,
Durham, N. C.
(Address)

DUKE UNIVERSITY

BY: *A. Hollis Edens*
A. Hollis Edens,
TITLE: President

ACCEPTANCE BY PROJECT LEADER:

I have read the foregoing Supplemental Agreement and agree to be bound by the provision of this document.

Karl W. DeLoren
Project Leader, Title V

Rec'd	7/26/51	
Ind.	7/26/51	
Rev.		

Contract No. AT-(40-1)-289
(Duke University)
Modification No. 3

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 29th day of June, 1951, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-289, dated June 15, 1949, for the performance by the Contractor, commencing on July 1, 1949, of five separate training or research projects; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 and 2; and

WHEREAS, the parties desire to extend the term of the contract in order to continue and expand four of the projects, as described in Supplement No. 3 to Appendix "A"; and

WHEREAS, this Supplemental Agreement is authorized by and executed under the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto do mutually agree that Contract No. AT-(40-1)-289 is modified in the following particulars, but in no others:

1. Insert the sub-section letter "a." between the words "Consideration." and "In" in Section 1 of ARTICLE III - PROGRAM DEVELOPMENT AND FINANCING, and add the following new sub-section b to Section 1 of ARTICLE III:

"b. In consideration of the performance of the work under the four Titles described in Supplement No. 3 to Appendix 'A', the Government will pay to the Contractor the total sum

of Forty-Four Thousand Eight Hundred Nineteen and 73/100 Dollars (\$44,819.73) for the period July 1, 1951 - June 30, 1952, the funds to be applied to the four Titles according to the budget provisions of Supplement No. 3 to Appendix 'A'. It is expressly agreed that the total sum of Four Thousand Eight Hundred Sixty-One and 27/100 Dollars (\$4,861.27) which had been previously paid to the Contractor by the Government under this contract but which will remain unexpended on June 30, 1951, will be applied to the costs during the period of performance July 1, 1951 - June 30, 1952."

2. Add the following new Supplement No. 3 to Appendix "A":

"SUPPLEMENT NO. 3

"This supplement describes the research program under four separate titles for the period of performance, July 1, 1951 - June 30, 1952.

"TITLE I

"1. PROJECT

"a. Project Leader

"The work under this Title will be carried out by the Contractor under the direction of Dr. Philip Handler as Project Leader.

"b. Term

"The third period of performance for this Title will commence on July 1, 1951, and end on June 30, 1952.

"c. Program

"(1) Scope and Plan of Approach

"The objective of this Title will continue to be the conducting of an AEC fellowship training program along the lines set forth in the original Title I, the details of the curriculum, teaching staff, number and nature of students, and programs as stated in the Contractor's annual progress report dated March 15, 1951.

"2. BUDGET - Third Period: July 1, 1951 - June 30, 1952

"a. The Contractor will furnish as its contribution to the Title I project:

- (1) Salaries of staff members, including the Project Leader, and other personnel engaged in the work in excess of the Government's payments under b (1) below.
- (2) Use of laboratory and classroom work space, and equipment, materials and facilities on hand as needed for the work.
- (3) Clerical, administrative and overhead costs in excess of the Government's payment under b (5) below.

"b. The Government will pay to the Contractor the sum of Twelve Thousand Eight Hundred Forty-Eight and 33/100 Dollars (\$12,848.33) - which, together with the unexpended amount of Eight Hundred Fifty-One and 67/100 Dollars (\$851.67), remaining from the Government's payments under the second period of performance, will cover the Contractor's other expenses, estimated as follows, in the performance of the contract during the third period:

(1) Salaries

Project Leader at \$150.00 a month	\$1,800.00
Laboratory instructor at \$200.00 a month	2,400.00
Lecturers at rate of \$15.00 per hour	4,300.00
(2) Permanent equipment	750.00
(3) Supplies and shop time	1,600.00
(4) Travel and communi- cations	300.00
(5) Overhead at 30% of (i)	2,550.00
Total	<u>\$13,700.00</u>

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C.

"TITLE II

"1. PROJECT

"a. Project Leader

"The work under this Title will be carried on by the Contractor under the direction of Dr. Philip Handler.

"b. Term

"The third period of performance for this Title will commence on July 1, 1951, and will end on June 30, 1952.

"c. Program

"(1) Scope and Plan of Approach

"The objective of this Title will continue to be investigations into (a) the use of positron-emitting isotopes for localization of brain tumors; (b) renal function and metabolism; and (c) parathyroid function.

"During this period, the Contractor's work will follow these lines of endeavor:

(a) Localization of brain tumors

It is contemplated that at least two patients a week will be carefully studied. It is thought that success of the project will depend on the biological properties of the positron-emitting dye employed.

(b) Renal function and metabolism

The previous studies will be extended in cats receiving phlorizin

and insulin. Also, previous studies will be repeated in part so that the specific activity of each of the phosphorus atoms of adenosine triphosphate can be measured as a function of time. In addition, the glycolytic scheme established by non-tracer techniques in yeast and muscle will be re-examined.

(c) Physiology of the parathyroid

An effort will be made to purify and isolate the physiologically active principle of the parathyroid gland using a combination of electrophoresis and counter current distribution for purifications and the new activity assay using P³².

"2. BUDGET - Third Period: July 1, 1951 - June 30, 1952

"a. The Contractor will furnish as its contribution to the Title II project:

- (1) Salaries of staff members, including the Project Leader, and other personnel engaged in the work in excess of the Government's payments under b (1) below.
- (2) Use of laboratory work space, and equipment, materials and facilities on hand as needed for the work.
- (3) Clerical, administrative and overhead costs in excess of the Government's payment under b (5) below.

"b. The Government will pay to the Contractor the sum of Seventeen Thousand Four Hundred Ninety-Three and 99/100 Dollars (\$17,493.99) which,

together with the unexpended amount of One Hundred Seventy-Five and 1/100 Dollars (\$175.01) remaining from the Government's payments under the second period of performance, will cover the Contractor's other expenses, estimated as follows, in the performance of the contract during the third period:

(1)	<u>Salaries</u>	
	Two research assistants	\$4,320.00
	M. H. Good (partial)	1,200.00
	A. Foster	840.00
	E. Wallace	2,400.00
(2)	Equipment and shop time	3,300.00
(3)	Supplies	4,100.00
(4)	Travel and communications	200.00
(5)	Overhead at 8%	1,309.00
		<hr/>
	Total	\$17,669.00

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C.

"TITLE III

"1. PROJECT

"a. Project Leader

"The work under this Title will be carried out by the Contractor under the direction of Dr. J. S. Harris as Project Leader.

"b. Term

"The third period of performance for this Title will commence on July 1, 1951, and will end on June 30, 1952.

"c. Program

"(1) Scope and Plan of Approach

"The objective of this Title will continue to be studies of electrolyte and fluid balance in health and disease. During this period, the Contractor will continue studies in progress. Among the specific studies contemplated are:

- (a) An intensive study of the salt and fluid exchanges of the isolated rat diaphragm with the surrounding medium.
- (b) Investigations of uptake of radio-potassium in the liver of the anesthetized dog.

"2. BUDGET - Third Period: July 1, 1951 - June 30, 1952

"a. The Contractor will furnish as its contribution to the Title III project:

- (1) Salaries of staff members, including the Project Leader, and other personnel

engaged in the work in excess of the Government's payments under b (1) below.

- (2) Use of laboratory work space, and equipment, materials and facilities on hand needed for the work.
- (3) Clerical, administrative and overhead costs in excess of the Government's payment under b (5) below.

"b. The Government will pay to the Contractor the sum of Three Thousand Nine Hundred Thirty-Three and 81/100 Dollars (\$3,933.81) which, together with the unexpended amount of Three Thousand Three Hundred Thirteen and 19/100 Dollars (\$3,313.19) remaining from the Government's payments under the second period of performance, will cover the Contractor's other expenses, estimated as follows, in the performance of the contract during the third period:

(1) Salaries

V. Holloway (technician)	\$2,400.00
C. Mockler (technician)	2,260.00
(2) Equipment	900.00
(3) Supplies	1,000.00
(4) Travel and communications	150.00
(5) Overhead at 8%	537.00

Total \$7,247.00

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C.

TITLE V

"1. PROJECT

"a. Project Leader

"The work under this Title will be carried out by the Contractor under the direction of Dr. Karl Wilbur as Project Leader.

"b. Term

"The third period of performance for this Title will commence on July 1, 1951, and will end on June 30, 1952.

"c. Program

"(1) Scope and Plan of Approach

"The objective of this Title will continue to be a two-phased project involving:

- (a) studies on synthetic potentialities and the effects of ionising radiation on isolated rat liver nuclei, and

- (b) shell formation in mollusks as studied by radioisotopes.

"During this period, the Contractor, as to (a) above, will conduct studies on the synthetic potentialities of isolated nuclei and studies on the effects of ionizing radiations on isolated cell components with special reference to the nucleus; and, as to (b) above, will give primary consideration to the formation of shell by the isolated mantle tissue and the possibility of crystal growth by shell in the absence of living tissue.

*2. BUDGET - Third Period: July 1, 1951 - June 30, 1952

"a. The Contractor will furnish as its contribution to the Title V project:

- (1) Salaries of staff members, including the Project Leader, and other personnel engaged in the work in excess of the Government's payments under b (1) below.
- (2) Use of laboratory work space, and equipment, materials and facilities on hand needed for the work.
- (3) Clerical, administrative and overhead costs in excess of the Government's payments under b (5) below.

"b. The Government will pay to the Contractor the sum of Ten Thousand One Hundred Forty-Three and 60/100 Dollars (\$10,143.60) which, together with the unexpended amount of Five Hundred Twenty-One and 40/100 Dollars (\$521.40) remaining from the Government's payments under

the second period of performance, will cover the Contractor's other expenses, estimated as follows, in the performance of the contract during the third period:

(1)	<u>Salaries</u>	
	C. Bunn (12 months)	\$3,400.00
	L. Jodrey (8 months)	2,400.00
	N. Anderson (2 months)	625.00
	Research assistant (6 months)	1,200.00
(2)	Permanent equipment and maintenance	1,350.00
(3)	Supplies	1,100.00
(4)	Travel	200.00
(5)	Overhead at 8%	790.00
	Total	<hr/> \$11,065.00

"c. Items of property procured or manufactured by the Contractor during this period, title to which will vest in the Government (see Article VI): None.

"3. TECHNICAL ADMINISTRATION BY COMMISSION

"The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue
Washington 25, D. C."

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement on the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

WITNESSES:

Jane Johnson
Durham, N. C.
(Address)

BY: C. Vanden Bulck
C. Vanden Bulck, Assistant Manager, ORO
TITLE: Contracting Officer

A. S. Brower
A. S. Brower,
Durham, N. C.
(Address)

DUKE UNIVERSITY

BY: A. Hollis Edens
TITLE: A. Hollis Edens, President

ACCEPTANCE BY PROJECT LEADERS:

We have read the foregoing Supplemental Agreement and agree to be bound by its provisions to the extent they are applicable to the project for which each of us is responsible.

Philip Handler
Project Leader, Title I

Philip Handler
Project Leader, Title II

James S. Harris
Project Leader, Title III

Karl M. Wilbur
Project Leader, Title IV

Rec'd	<i>M/KC</i>
Ind.	<i>12/2/50</i>
Rev.	<i>12/2/50</i>

Contract No. AT-(40-1)-289
Modification No. 2.

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 10th day of October 1950, effective as of the 1st day of July, 1950, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into a contract, No. AT-(40-1)-289, dated June 15, 1949, for the performance of research work by the Contractor, and

WHEREAS, said Contract has previously been amended by Modification No. 1, dated June 28, 1950, and

WHEREAS, the parties desire to revise the scope of the research project under Title II of Appendix "A" as hereinafter set forth, and

WHEREAS, this Supplemental Agreement is authorized by and executed pursuant to the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto mutually agree that said Contract No. AT-(40-1)-289, as heretofore modified, is hereby further modified in the following particulars, but in no others:

1. Supplement No. 2 to Appendix "A" which contains a description of the new work under Title II is attached hereto and hereby made a part of this Contract.

2. It is understood and agreed that no additional consideration shall be paid to the Contractor on account of this addition to the research project.

1062486

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement on the day and year first above written.

UNITED STATES OF AMERICA

BY: U. S. ATOMIC ENERGY COMMISSION

BY: *C. Vanden Bulck*
C. Vanden Bulck

TITLE: Contracting Officer

DUKE UNIVERSITY

BY: *J. Hester Easley*

CV/R

TITLE: President

WITNESSES FOR CONTRACTOR'S SIGNATURE:

1. Name *As Brainerd*
Address *Durham NC*
2. Name *Christine Kimball*
Address *Durham NC*

SUPPLEMENT NO. 2 TO APPENDIX "A"

This Supplement No. 2 describes the revision of the scope of the research project covered by Title II of this Appendix.

TITLE II

2. Research Program

Add the following new subsections under 1. c. Program:

- 1. c. (6) Use of a positron emitter in the precise localization of tumors by coincidence counting.
- 1. c. (7) Study of the metabolism of C^{14} labeled cholesterol.

ACCEPTANCE BY PROJECT LEADER

I have read the foregoing revision of Title II and the Modification to which it relates and I agree to be bound by the provisions of said documents.

Philip Handler
Project Leader
Oct. 3, 1950
Date

G.A.U.		
Rec'd	7/12/50	
Ind.	7-17-50	AK
Rev.		

Contract No. AT-(40-1)-289
Modification No. 1

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 28th day of June, 1950, effective as of the 1st day of July, 1950, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and DUKE UNIVERSITY (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into a contract No. AT-(40-1)-289, dated June 15, 1949, for the performance of research work by the Contractor, and the parties desire to extend the term of the contract under the revised terms and conditions hereinafter set forth; and

WHEREAS, this Supplemental Agreement is authorized by and executed pursuant to the Atomic Energy Act of 1946;

NOW, THEREFORE, the parties hereto mutually agree that said Contract No. AT-(40-1)-289 is hereby modified in the following particulars, but in no others:

1. The following Section 4 is added to Article I - Purpose and Scope:

"4. The Contractor shall furnish all services, facilities, equipment, supplies and materials (except such services, equipment, supplies and materials as the Government has agreed to furnish herein) required for the performance of the research program described in Section 2 above."

2. Delete Article III - Financing and Program Development, and substitute therefor the following Article III:

"Article III - Program Development and Financing

"1. Consideration. In consideration of the performance of the research activities described in Appendix "A", the Government shall pay to the Contractor the sum of Eighty-Four Thousand Fourteen Dollars and Ninety Cents (\$84,014.90) for the period July 1, 1949, to June 30, 1951.

"2. Payment.

a. Prior to June 1, 1950, the Government has paid to the Contractor the sum of Thirty Thousand Seven hundred Seven Dollars and Forty-Eight Cents (\$30,707.48), which represents the initial payment of the lump-sum consideration stated in Section 1 above.

b. As soon as practicable after July 1, 1950, the Government shall pay to the Contractor, upon submission by the Contractor of a properly certified voucher, the sum of Twenty-Six Thousand Six Hundred Fifty-Three Dollars and Seventy-One Cents (\$26,653.71); and, on or before January 1, 1951, the Government shall pay to the Contractor, upon submission by the Contractor of a properly certified voucher, the sum of Twenty-Six Thousand Six Hundred Fifty-Three Dollars and Seventy-One Cents (\$26,653.71).

c. In the event that the term of the contract is further extended, the Government shall pay to the Contractor, upon submission of properly certified vouchers, each six months in advance, an amount equal to one-half the annual agreed consideration for the projects as mutually agreed upon by the parties hereto.

"3. Program and Budget for Subsequent Periods. On or before April 1, 1951, and April 1 of each year thereafter, the Contractor will submit to the Commission a current statement of its expenditures for the projects, an estimate of expenses to be incurred during the remainder of the then current term of the contract, and a proposed program and budget for the succeeding year, showing the proposed work to be financed by the Commission and the Contractor. The Contractor and the Commission shall then negotiate as to the amount to be paid by the Commission to the Contractor for the services to be performed during the ensuing period, taking into consideration any portion of payments theretofore made which will remain unexpended at the end of the preceding period. The extended programs, budget and the additional amount to be paid to the Contractor shall be incorporated into a formal modification of this contract."

3. Delete Sections 2 to 6 inclusive of Article V - Reports, Records and Inspections, and substitute therefor the following Sections 2 and 3:

"2. The Contractor shall make progress and other reports in such manner and at such times as specified in Appendix "C" which is attached hereto and hereby made a part of this contract. Progress reports shall include a list of personnel working on the project. Names appearing for the first time should be accompanied by a brief statement of the individual's background, training, and experience.

"3. The Commission shall at all times be afforded access to the premises and to all technical records, correspondence, instructions, drawings, and memoranda of record value of the Contractor pertaining to said work."

4. Delete Article VI - Property Furnished to Contractor - Liability, and substitute therefor the following Article VI:

"Article VI - Title to Property Acquired by Contractor

In consideration of the Contractor's contribution to the research projects described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies, acquired from any source including the Commission, or manufactured by the Contractor under this contract, and specifically including all of that property itemized in Invoice No. 000116, INM Atlanta, Georgia, dated February 20, 1950, Record No. C-455 (Duke University), a copy of which may be found in the files of the General Accounts Branch, Office of Oak Ridge Operations, Atomic Energy Commission, Oak Ridge, Tennessee, and being the same property transferred to the Commission from the Supervising Inspector of Naval Material, USN, Atlanta, Georgia, per said invoice, shall vest in the Contractor, except that title to items of property described in Section 2, c, of Appendix "A" shall vest in the Government. The Contractor relinquishes any and all rights it may have under any other contract with the Government to restoration at Government expense of any and all premises wherein said Navy property may have been installed or used to the same condition as existed prior to alteration or construction of said premises incident to the performance of any such contract or contracts with the Government."

5. Delete Article X - Alterations.

6. The attached Supplement to Appendix "A" is made a part of Appendix "A" of this contract.

7. The following new Section 12 is added to Appendix "B".

"12. Fellowships. It is understood by the Contractor that none of the funds supplied by the Commission under this contract shall be used in any way to pay the stipend of any appointment for which commensurate services are not rendered under this contract; nor shall any of the funds be used to confer a fellowship, or to pay any part of the stipend of a fellowship, of any kind."

IN WITNESS WHEREOF, the parties hereto have executed this Supplemental Agreement on the day and year first above written.

UNITED STATES OF AMERICA

BY: U. S. ATOMIC ENERGY COMMISSION

BY: *C. Vanden Bulck*
C. Vanden Bulck
Contracting Officer
(Title)

DUKE UNIVERSITY

BY: *A. Hollis Edens*
A. HOLLIS EDENS, PRESIDENT
(Title)

SUPPLEMENT NO. 1 TO APPENDIX A

This Supplement No. 1 describes the research program and budget for Contract No. AT-(40-1)-289 for the period indicated under each respective title.

TITLE I

1. Research Program. Continues unchanged.
2. Delete the date "June 30, 1950" under 1. Project, b. Term, and substitute therefor the date "June 30, 1951."
3. Delete 3, Progress Reports.
4. Budget
 - A. Contractor will furnish:
 - (1) Use of laboratory and classroom work space.
 - (2) Overhead costs over and above that part borne by Commission.
 - B. Commission will furnish:
 - (1) The sum of \$13,550.00 to cover the following approximate requirements:
 - a. Capital equipment
Equipment for scintillation counting ----- \$300.00
Equipment for gas flow counter ----- 300.00

Total ----- \$600.00
 - b. Salaries of personnel (including director, laboratory instructors and lecturers) ----- \$8500.00
 - c. Consumable supplies and shop time ----- 1600.00
 - d. Travel ----- 300.00
 - e. Overhead (50%) ----- 2550.00

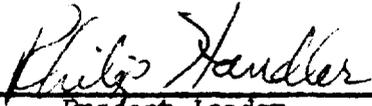
Grand Total ----- \$13,550.00

It is understood and agreed that the Contractor, in expending the funds provided by the Government, shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

- C. Items of property acquired or manufactured by the Contractor under this contract, title to which will vest in the Government (See Article VI of this Supplementary Agreement): None.

5. Acceptance by Project Leader

I have read the foregoing Title I of this supplement to Appendix "A" and the modification to which it relates and I agree to be bound by the provisions of said documents.



Project Leader
PHILIP HANDLER

TITLE II

1. Research Program. Continues unchanged.
2. Delete the date "June 30, 1950" under 1. Project, b. Term, and substitute therefor the date "June 30, 1951."
3. Delete 3, Progress Reports.
4. Budget

A. Contractor will furnish:

- (1) Salary of Project Leader.
- (2) Use of laboratory work space.
- (3) Overhead costs over and above that part borne by Commission.

B. Commission will furnish:

- (1) The sum of \$14,170.00 to cover the following approximate requirements:

a. Personnel

Mr. A. F. Dratz -----	\$1,200.00
Miss F. Armstrong -----	1,200.00
Mr. A. Foster -----	720.00
2 technicians -----	4,800.00

Total ----- \$7,920.00

b. Equipment

Gas flow counter -----	300.00
Monitor -----	300.00

Total ----- \$ 600.00

c. Consumable supplies (including Geiger tubes, chemicals, glass ware, animals, etc.) ----- 2,500.00

d. Radioisotopes (for 3 projects included in this contract) ----- 1,600.00

e. Travel ----- 300.00

f. Contingent Fund ----- 200.00

g. Overhead (8%) ----- 1,050.00

Grand Total ----- \$14,170.00

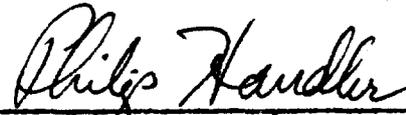
It is understood and agreed that the Contractor, in expending the funds provided by the Government, shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

C. Items of property acquired or manufactured by the Contractor under this contract, title to which will vest in the Government (See Article VI of this Supplementary Agreement):

None

5. Acceptance by Project Leader

I have read the foregoing Title II of this Supplement to Appendix "A" and the modification to which it relates and I agree to be bound by the provisions of said documents.



Project Leader
PHILIP HANDLER

TITLE III

1. Research Program. Continues unchanged.
2. Delete the date "June 30, 1950" under 1. Project, b. Term, and substitute therefor the date "June 30, 1951."
3. Delete 3, Progress Reports.
4. Budget

A. Contractor will furnish:

- (1) Salary of Project Leader.
- (2) Use of laboratory space.
- (3) Overhead costs over and above that part borne by Commission.

B. Commission will furnish:

- (1) The sum of \$6,631.00 to cover the following approximate requirements:

a. Personnel

Miss Ines Greene, technician -----	\$2,400.00
Miss Virginia Hudson, technician -----	2,160.00
Laboratory assistant -----	<u>480.00</u>

Total ----- \$5,040.00

b. Consumable supplies

Animals -----	300.00
Reagents, glassware, etc. -----	<u>600.00</u>

Total ----- 900.00

c. Travel to other laboratories ----- 150.00

d. Contingent fund ----- 50.00

e. Overhead (8%) ----- 491.00

Grand Total ----- \$6,631.00

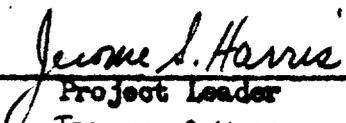
It is understood and agreed that the Contractor, in expending the funds provided by the Government, shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

- C. Items of property acquired or manufactured by the Contractor under this contract, title to which will vest in the Government (See Article VI of this Supplementary Agreement):

None

5. Acceptance by Project Leader

I have read the foregoing Title III of this Supplement to Appendix "A" and the modification to which it relates and I agree to be bound by the provisions of said documents.


Project Leader
JEROME S. HARRIS

TITLE V

1. Research Program. Continues unchanged.
2. Delete the date "June 30, 1950" under 1. Project, b. Term, and substitute therefor the date "June 30, 1951".
3. Delete 3, Progress Reports.
4. Budget

A. Contractor will furnish:

- (1) Salary of project leader.
- (2) Laboratory space as follows: Two animal rooms, three research laboratories, one low-temperature room, two dark rooms (all of the foregoing are in the Duke University Zoology Department); Isotopes laboratory (Duke Medical School); Research laboratory and dark room (Duke Marine Laboratory, Beaufort, N. C.).
- (3) Equipment (including scaler and monitoring device; refrigerated centrifuge, spectrophotometer; balances; pH meter, etc.).
- (4) Overhead costs over and above that part borne by Commission.

B. Commission will furnish:

- (1) The sum of \$7,614.00 to cover the following approximate requirements:

a. Personnel

Research assistant (Miss L. H. Jodrey 9 months part-time and 2 months full-time) -----	\$1,800.00
Research assistant (10 months full-time) -----	2,000.00
Research assistant (10 months full-time) -----	2,000.00

Total ----- \$5,800.00

b. Consumable supplies	
Animals, feed, chemicals, glass-	
ware -----	\$ 800.00
Photographic supplies -----	250.00
	<hr/>
Total -----	\$1,050.00
c. Contingent fund -----	200.00
d. Overhead (8%) -----	564.00
	<hr/>
Grand Total -----	\$7,614.00

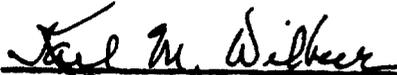
It is understood and agreed that the Contractor, in expending the funds provided by the Government, shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

C. Items of property acquired or manufactured by the Contractor under this contract, title to which will vest in the Government (See Article VI of this Supplementary Agreement):

None

5 . Acceptance by Project Leader

I have read the foregoing Title V of this Supplement to Appendix "A" and the modification to which it relates and I agree to be bound by the provisions of said documents.



 Project Leader
 KARL M. WILBUR

APPENDIX "C"

DISTRIBUTION AND SCHEDULING OF REPORTS
FOR DIRECT AEC RESEARCH CONTRACTS

	Date	Copies and Distribution	Remarks
CONTRACTOR REPORTS			
1. Progress	On one of following: March 15 June 15 Sept. 15 Dec. 15	(2) Appropriate Washington Division (See note) (2) Oak Ridge Operations Office (See note)	To be received on date listed which is nearest to end of nine month period from effective date of contract and annually thereafter on the same date
2. Summary 200 words on scope and purpose	1. On completion of contract negotiation 2. With progress reports	Prepared as a part of contract negotiations (2) Same as Progress Reports	1. Distribution by Oak Ridge Operations Office with Contract copies 2. Revised Summary to be included as part of Progress Report
3. Manuscripts	As available	(1) Patent Branch, Washington (1) Technical Library, Washington (1) Appropriate Washington Division (1) Oak Ridge Operations Office	
4. Reprints	As available	(2) Appropriate Washington Division (2) Technical Information Branch, Washington (1) Oak Ridge Operations Office	
5. Complete Scientific Report	On Contract Termination	(1) Same (1) as (1) for (1) manuscripts	Manuscripts prepared for publication may in some cases take the place of this report
6. Brief Reports	As desired by investigator	(1) Appropriate Washington Office (1) Oak Ridge Operations Office	Covering significant results or developments.

**STATEMENT AND CERTIFICATE
 OF AWARD**

No. AT-(40-1)-289
 (Contract)
 Date June 15, 1949

U. S. Atomic Energy Commission
 (Department or establishment)

Oak Ridge, Tennessee
 (Location)

METHOD OF OR ABSENCE OF ADVERTISING
 (Section 3709 of the Revised Statutes)

FOR USE BY G. A. O. ONLY		
Indexed	Card	Reviewed
225-49 BC		12/5/49 HLL

- After advertising in newspapers.
- (a) After advertising by circular letters sent to _____ dealers.
 (b) And by notices posted in public places.
 (If notices were not posted in addition to advertising by circular letters sent to dealers, explanation of such omission must be made. The notation on the certificate below must be "2 (a) (b)" or "2 (a)," depending on whether or not notices were posted.)
- Without advertising, under an exigency of the service which existed prior to the order and would not admit of the delay incident to advertising.
- Without advertising in accordance with the Atomic Energy Act of 1946
- Without advertising, it being impracticable to secure competition because of _____

(Here state circumstances under which the securing of competition was impracticable)

AWARD OF CONTRACT

- To lowest bidder as to price (Expenditures).
- To other than the lowest bidder as to price (Expenditures).
- To highest bidder as to price (Receipts).
- To other than the highest bidder as to price (Receipts).

G. A. O.	
Rec'd	7-21-49
Ind.	
Rev.	

CERTIFICATE

I CERTIFY that the foregoing statement is true and correct; that the agreement was made in consequence of No. 4 of the method of or absence of advertising and in accordance with award of contract lettered _____, as shown above; that the total number of bids received is _____, and that where lower bids (expenditure contracts) or higher bids (receipt contracts) as to price were received a statement of reasons for their rejection, together with an abstract of bids received, including all lower than that accepted in case of expenditure contracts and all higher in case of receipt contracts, is given below or on the reverse hereof or on a separate sheet attached hereto; that the articles or services covered by the agreement (expenditure) are necessary for the public service, and that the prices charged are just and reasonable.



C. Vanden Bulok
 (Signature of contracting officer) C. Vanden Bulok
 (Title) Acting Deputy Manager

NOTE.—This statement and certificate will be used to support all agreements, both formal contracts and less formal agreements of whatever character, involving expenditure or receipt of public funds. It must be executed and signed by the contracting officer (unless the award is made by or is subject to approval by another than the contracting officer, when execution and signature may be made by such officer).

UNITED STATES ATOMIC ENERGY COMMISSION
OAK RIDGE OPERATIONS
POST OFFICE BOX E
OAK RIDGE, TENNESSEE

R E S E A R C H C O N T R A C T

CONTRACT NO.: AT-(40-1)-289
CONTRACTOR: DUKE UNIVERSITY
ADDRESS: DURHAM, NORTH CAROLINA

AMOUNT OF CONTRACT: \$49,146.00

CONTRACT ASSIGNED TO:

FOR TECHNICAL ADMINISTRATION
(ORGANIZATIONAL UNIT NAMED IN APPENDIX "A")

Atomic Energy Commission
1901 Constitution Avenue, N. W.
Washington 25, D. C.

FOR BUSINESS ADMINISTRATION

Office of Research and Medicine
U. S. Atomic Energy Commission
Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee

THIS CONTRACT, entered into this 15th day of June, 1949, by the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and DUKE UNIVERSITY (hereinafter called the "Contractor");

ARTICLE I - PURPOSE AND SCOPE

1. The Commission, in furtherance of its policy of assisting and fostering private research, desires to support the Contractor's fundamental research in the field of atomic energy.

2. The work under this contract will involve one or more research problems. A description of the problem, plan of approach, agreed upon program and budget for each project is described in Appendix "A" which is hereby made a part of this contract.

3. The work will be carried out by the Contractor under the direction of the Project Leader(s) named in Appendix "A".

ARTICLE II - TERM OF CONTRACT

The period of performance for each research project covered by this contract is set forth in Appendix "A". It is recognized that completion of the research work under this contract may involve a period of several years and that the term or terms of this contract may be extended by mutual agreement.

ARTICLE III - FINANCING AND PROGRAM DEVELOPMENT

1. Payment

a. The combined total of the agreed upon budgets for the projects described in Appendix "A" is in the amount of \$49,146.00 and the Commission has obligated funds in this amount for this contract. However, payments to the Contractor by the Government under this contract with respect to each project described in Appendix "A" shall not exceed the amount of the agreed upon budget for each such project.

b. On or shortly after the effective date of this contract the Commission shall pay to the Contractor a sum which shall represent

the combined total of a mutually agreed upon estimate of the Contractor's cost of operations during the first two quarters under each project described in Appendix "A". As soon as practicable after the end of the first quarter, and after the end of each succeeding quarter during the term of this contract, the Contractor shall submit to the Commission a certified voucher supported by a certified schedule of the Contractor's expenditures under each project described in Appendix "A", and the Commission shall promptly pay all such vouchers. However, the initial payment relating to any one project together with all quarterly payments relating to the same project shall not exceed the agreed upon budget for such projects as set forth in Appendix "A", hereto.

2. Program and Budget for Subsequent Periods

At least three months before the end of the term established in Appendix "A" the Contractor will submit to the Commission a proposed program and budget for the succeeding year showing the proposed work to be financed by the Commission and the Contractor. The Contractor and the Commission shall negotiate as to the amount to be paid by the Commission for the services to be rendered by the Contractor during the next period. Such additional programs and agreed upon budgets shall be incorporated in a formal modification to this contract. In negotiating the new budget for said period the unobligated balance of funds paid to the Contractor covering the budget(s) for the preceding period shall be applied in reduction of funds required to cover the new budget(s). Upon completion of the contract work or upon earlier termination of this contract, the Contractor shall return to the Commission the unobligated portion of all payments made by the Commission to the Contractor under this contract.

3. New Problems

It is contemplated that the parties hereto may, from time to time, agree upon new research problems to be included in the work under this contract. The parties will thereupon prepare a description of the problem, plan of approach, agreed upon program and budget for the new project, which will be incorporated in Appendix "A" hereto, by means of a formal modification of this contract. All such new projects hereafter incorporated in Appendix "A" shall be subject to all the terms and conditions of this contract.

ARTICLE IV - ADMINISTRATION OF CONTRACT BY COMMISSION

The Commission has assigned the responsibility for administering the technical and scientific aspects for each project to the Washington organizational unit set forth in Appendix "A" hereto, to be addressed as follows:

U. S. Atomic Energy Commission
1901 Constitution Avenue, N. W.
Washington 25, D. C.

Responsibility for administering the business aspects of this contract, including contract negotiations, budget, payment, audit, etc., has been assigned by the Commission to:

Office of Research & Medicine
Oak Ridge Operations Office
U. S. Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

The Contractor may, as necessary, communicate directly with the appropriate office, as indicated above. The Contractor shall furnish information copies of communications, memoranda of telephone conversations, or other contacts to Oak Ridge Operations Office on all direct dealings with the Washington Office.

ARTICLE V - REPORTS, RECORDS AND INSPECTION

1. The Commission shall have the right to inspect in such manner and at such times as it deems appropriate all activities of the Contractor arising in the course of the work under this contract.

2. The Contractor shall make progress reports quarterly (unless a different reporting period is specified in Appendix "A") to the Commission on all its activities under this contract, including a list of personnel working on the project. Names appearing for the first time should be accompanied by a brief statement of the individual's background, training and experience. As soon as practicable after the end of the term of this contract and any renewal thereof the Contractor shall make a technical report to the Commission of all its activities under this contract. In the interest of reducing the effort required in preparing these reports the Contractor may include as a part of such reports copies of pertinent technical papers prepared for publication in customary scientific publication channels. At the time technical papers prepared by the Contractor relating to the work hereunder are submitted for publication in customary scientific publication channels the Contractor shall furnish the Commission with information copies of such papers.

3. If, during the course of the Contractor's activities under this contract, any technical findings are made which, in the opinion of the Contractor, would be of special interest to the Commission, the Contractor shall immediately make a report of such technical findings to the Commission.

4. The Commission will require five (5) copies of all reports and papers. Two (2) copies shall be sent to Washington and three (3) copies to Oak Ridge, addressed as shown in Article IV of this contract. The Commission shall have the right to reproduce and distribute at its discretion all such reports and technical papers. Appropriate credit lines will be included in all such reproductions.

5. The Contractor agrees to keep records and books of account showing the manner of expenditures of all funds received by it pursuant to this contract.

6. The Commission shall at all times be afforded access to the premises and to all books, records, correspondence, instructions, drawings, receipts, vouchers, and memoranda of record value of the Contractor pertaining to said work.

ARTICLE VI - PROPERTY FURNISHED TO CONTRACTOR - LIABILITY

1. RESERVATION BY GOVERNMENT

The Government reserves the right to furnish any materials, equipment or supplies which may be required in the performance of this contract. Except as provided in paragraph 3 of this Article, all property so furnished shall be and remain the property of the Government. The Contractor shall, to the extent practicable, cause all capital items of Government property so furnished to be suitably marked with an identifying symbol indicating Government ownership and the uses and disposition of such items shall be made a matter of record.

2. LIABILITY FOR GOVERNMENT-OWNED PROPERTY

Except as otherwise specifically provided, the Contractor shall not be liable for loss or destruction of or damage to property of the Government in the possession or control of the Contractor in connection with this contract (hereinafter called "Government property") unless such loss, destruction or damage results from wilful misconduct or failure to exercise good faith on the part of the Contractor's corporate officers, Executive Director, or Director of any program administered by the Contractor in the performance of this contract.

3. TITLE TO PROPERTY PURCHASED BY CONTRACTOR

Notwithstanding any other provisions of this Article VI and in consideration of the Contractor's contribution to the research project described in Appendix "A" of this contract, title to all materials, tools, machinery, equipment and supplies, acquired from sources other than the Government, or manufactured by the Contractor under this contract (including items manufactured in whole or in part from property furnished by the Government but only to the extent the Government has not designated such property as capital), shall vest in the Contractor, except that title to items of property described in Section 2.c. of each Title of Appendix "A" shall vest in the Government.

ARTICLE VII - PURCHASE OF RADIOISOTOPES

The Contractor shall purchase, to the extent available in appropriate form, all radioisotopes irradiation services and cyclotron time required in the performance of the work hereunder, through the Commission's Isotope Division, Post Office Box E, Oak Ridge, Tennessee.

ARTICLE VIII - GENERAL PROVISIONS

The provisions of Appendix "B", attached hereto, are hereby made a part of this contract.

ARTICLE IX - AUTHORIZATION

This contract is authorized by and has been executed under the Atomic Energy Act of 1946.

ARTICLE X - ALTERATIONS

The following alterations to this contract were made by mutual agreement of the parties prior to its execution:

Section 4 of Article V is amended to provide that six (6) copies of all reports and papers will be required, of which three (3) copies shall be sent to both Washington and Oak Ridge.

IN WITNESS WHEREOF, the parties hereto have executed this contract the day and year first above written.

UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: *C. Vanden Bulck*
C. Vanden Bulck
Acting Deputy Manager
DUKE UNIVERSITY
(Contractor)

WITNESSES:

BY: *A. H. ...*
TITLE: *President*

APPENDIX "A"

Contract No. W-40-1-209
(Duke University)

TITLE I

1. PROJECT

a. Project Leader

The work under this Title I of Appendix "A" will be carried out by the Contractor under the general direction of Dr. Philip Handler as Project Leader.

b. Term

The performance of work under this Title I of Appendix "A" shall commence on July 1, 1949 and will continue through June 30, 1950. It is understood, however, that completion of the work hereunder may involve a period of several years. Accordingly, the term under this Title I of Appendix "A" may be extended by mutual agreement.

c. AEC Fellowship Training Program - Description of Project and Program

The program and facilities planned are of sufficient order of magnitude to accommodate 12-25 fellows this year. The curriculum has been developed on the assumption that most or all of the post-doctoral fellows involved will be post-M.D.s. However, this curriculum will also fit the needs of a one-year predoctoral fellowship for graduate students in biochemistry, physiology, etc., and for medical students desirous of interrupting their medical training for one year, preferably between the second and third years of the medical curriculum. The nucleus of this training program is the laboratory course in techniques, procedures, monitoring, etc. This laboratory is located in the physics building and is entirely independent of the equipment to be employed in the research laboratory located within the medical school building.

Outlined below, and subject to some revision based on experience, is the curriculum for the AEC Fellowship training program. This outline describes an intensive course of 20 weeks duration. The laboratory course would consist of two sessions per week of 4 hours each. All other courses are conducted in one-hour sessions.

<u>Course</u>	<u>No. of Sessions</u>
Laboratory Course in Technic.....	40
Nuclear Physics & Special Chemistry.....	20
Mathematics.....	10
Statistics.....	20
Genetics.....	10
Biological Effects of Radiation.....	20
Biophysics.....	10
Health Physics.....	5
Tracer Seminar.....	20

Available at all times, according to individual needs, will be background courses in general physics, chemistry, biochemistry, zoology, hematology, etc. For all students, this program will be supplemented by a course in Health Physics at an AEC installation.

2. BUDGET - TERM: JULY 1, 1949 to JUNE 30, 1950, INCLUSIVE

a. The Contractor will furnish as its contribution to the project described in this Title I, the following:

- (1) That portion of the overhead costs allocable to the work which represents the difference between the Contractor's normal overhead rate and the much lower overhead rate of 30% which has been negotiated and included in Section 2 b. of this Title I.
- (2) Use of laboratory and classroom work space.

b. The Commission will furnish a sum not to exceed \$16,485.00 in connection with the work under this Title I of Appendix "A", to be spent roughly as follows:

- (1) Personnel (including director, laboratory instructors and lecturers).....\$9,200.00
- (2) Overhead at the rate of 30% of salaries under (1) above..... 2,760.00

NOTE: This rate (which is substantially lower than the Contractor's normal overhead rate) has been negotiated as a pre-determined, fixed allowance and not by way of reimbursement of actual cost during the term July 1, 1949 through June 30, 1950

- (3) Capital Equipment (1 Synchroscope, 2 Registers, 2 GM Tubes, 1 Megavac Pump, 2 Stopwatches, 3 Volt Meters, 1 Oscillator, 1 Test Sect, 1 Vacuum system). 1,425.00
- (4) Consumable Supplies..... 1,200.00
- (5) Services performed by Contractor's Shop..... 1,500.00
- (6) Travel (Teachers from Raleigh, Chapel Hill, Winston-Salem to Durham)..... 400.00

\$16,485.00

It is understood and agreed, by and between the parties hereto, that the Contractor in expending the funds provided by the Government shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

- c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article VI, Section 3.

QUANTITYDESCRIPTION

None

3. PROGRESS REPORTS

The Contractor shall make progress reports at six months intervals in the manner described in Article V of this contract.

4. TECHNICAL ADMINISTRATION BY COMMISSION

The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title I to Appendix "A" to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue, N.W.
Washington 25, D. C.

5. ACCEPTANCE BY PROJECT LEADER

I have read the foregoing Title I of Appendix "A" and the basic contract to which it relates and I agree to be bound by the provisions of said documents.

SIGNED: Philip Handler
Project Leader

DATE: July 2, 1949

TITLE II1. PROJECTa. Project Leader

The work under this Title II of Appendix "A" will be carried out by the Contractor under the direction of Dr. Philip Handler as Project Leader.

b. Term

The performance of work under this Title II of Appendix "A" shall commence on August 1, 1949, and continue until June 30, 1950. It is understood, however, that completion of the research project described herein may involve a period of several years. Accordingly, the work under this Title II may be extended by mutual agreement.

c. Program

- (1) Study of turnover of organic phosphates in the kidney under various conditions of renal function. This problem is now well underway. Since, according to all present concepts the energy of carbohydrate oxidations must be converted to high energy phosphate bonds in order to perform useful work, the actual work performed in the kidney may be compared with its useful work in elaborating urine by measuring phosphate turnover. By making such observations in intact animals whose kidneys are required to make concentrated urine, dilute urine, etc., it should be possible to determine the relationship between the metabolism of the kidney and its organic function. This in turn may answer the long-standing debate regarding the therapeutic benefits of "resting the kidney" in renal disease.
- (2) P^{32} as a tracer in devising technics for estimation and separation of organic phosphates using ion exchange resins. Present day research with organic phosphates as in program (1) above is seriously hampered by the cumbersome and tedious technics necessary. Work is now in progress in which P^{32} labeled organic phosphates are being fractionated by ion exchange resins.
- (3) P^{32} and Ca^{45} as tracers in the study of the mode of action of parathyroid in bone. Work done in this laboratory under our present contract seems to have established that the prime locus of action of parathormone is not the kidney, as frequently stated, but bone. Using tracer technic we hope to obtain a picture of this process and, eventually, some knowledge of the mechanism involved.

- (4) Studies of Hypervitaminosis A. Using Ca^{45} and P^{32} in studies like those in (3) above we are attempting to get some picture of the accelerated remodeling process which results in fractures of the long bones in rats overdosed with Vitamin A. This should be of considerable help in understanding normal osteogenesis and, perhaps, bone tumors.
- (5) Organic phosphate turnover during amino acid metabolism. This is part of a large program devoted to a study of amino acid metabolism. While the obligatory coupling of carbohydrate and phosphate metabolism is well recognized, it is not yet clear whether such coupling also exists between amino acid and phosphate metabolism. Turnover of ATP, glucose-6-phosphate, and triose phosphate, with the help of P^{32} , will be measured in intestinal mucosa, liver and kidney after oral and intravenous administration of amino acids.

2. BUDGET - PERIOD AUGUST 1, 1949 - JUNE 30, 1950

- a. Duke University will furnish as its contribution to the project described in this Title II, the following:

- (1) Salary of Project Leader
- (2) That portion of the overhead costs allocable to the work which represents the difference between the Contractor's normal overhead rate and the much lower overhead rate of 30% which has been negotiated and included in Section 2 b. of this Title II.
- (3) Use of laboratory work space.

- b. The Commission will furnish a sum not to exceed \$14,854.00 in connection with the work under this Title II of Appendix "A" to be spent roughly as follows:

- (1) Personnel

2 Technicians.....	\$3,960.00
2 Graduate students @ \$120. per month.....	2,640.00
1 Secretary - 1/2 time.....	880.00
1 Electronics technician, 1/5 time.....	550.00
1 Laboratory aide, 1/2 time.....	550.00
	\$8,580.00
- (2) Overhead at the rate of 30% of salaries under (1) above..... 2,574.00

NOTE: This rate (which is substantially lower than the Contractor's normal overhead rate) has been negotiated as a pre-determined, fixed allowance and not by way of reimbursement of actual cost during the term August 1, 1949 - June 30, 1950.

(3) <u>Consumable Supplies</u> (Includes glassware, films, chemicals, parts, radioisotopes, animal food and care, etc.).....	\$3,200.00
(4) Travel.....	300.00
(5) Contingent fund.....	<u>200.00</u>
TOTAL.....	\$14,854.00

It is understood and agreed, by and between the parties hereto, that the Contractor in expending the funds provided by the Government shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article VI, Section 3.

QUANTITY

DESCRIPTION

None

3. PROGRESS REPORTS

The Contractor shall make progress reports at six months intervals in the manner described in Article V of this contract.

4. TECHNICAL ADMINISTRATION BY COMMISSION

The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title II of Appendix "A" to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue, N.W.
Washington 25, D. C.

5. ACCEPTANCE BY PROJECT LEADER

I have read the foregoing Title II of Appendix "A" and the basic contract to which it relates and I agree to be bound by the provisions of said documents.

DATE: July 2, 1949

SIGNED: *Paulis H. ...*
Project Leader

APPENDIX "A"

TITLE III

Contract No. AT-(40-1)-289
Duke University

1. PROJECT

a. Project Leader

The work under this Title III of Appendix "A" will be carried out by the Contractor under the direction of Dr. J. S. Harris as Project Leader.

b. Term

The performance of work under this Title III of Appendix "A" shall commence on July 1, 1949, and continue until June 30, 1950. It is understood, however, that completion of the research project described herein may involve a period of several years. Accordingly, the work under this Title III may be extended by mutual agreement.

c. Program

Studies of Electrolyte and Fluid Balance in Health and Disease. Recent data has indicated that, in diarrhea and diabetic acidosis cell membrane loses its normal capacity to retain potassium and keep out sodium. Using radioisotopes of sodium and potassium, it is planned to study the movement of these two elements across muscle cell membranes in experimental acidosis, alkalosis and dehydration. Technics for these studies have been established during the past year. Such studies will not only increase our knowledge of this fundamental problem but will be of considerable aid in formulating proper therapy for these disease states.

2. BUDGET - PERIOD JULY 1, 1949 - JUNE 30, 1950

a. Duke University will furnish as its contribution to the project described in this Title III, the following:

(1) Salary of Project Leader.

(2) That portion of the overhead costs allocable to the work which represents the difference between the Contractor's normal overhead rate and the much lower overhead rate of 30% which has been negotiated and included in Section 2 b. of this Title III.

(3) Use of laboratory work space.

b. The Commission will furnish a sum not to exceed \$7,201.00 in connection with the work under this Title III of Appendix "A" to be spent roughly as follows:

1062515

(1) <u>Personnel</u>	
2 Technicians.....	\$4320.00
1 Laboratory Aide (1/2 time).....	450.00
	\$4,770.00

(2) Overhead at the rate of 30% of salaries under (1) above.....	1,431.00
---	----------

NOTE: This rate (which is substantially lower than the Contractor's normal overhead rate) has been negotiated as a pre-determined, fixed allowance and not by way of reimbursement of actual cost during the term July 1, 1949 - June 30, 1950

(3) Consumable Supplies.....	800.00
(4) Travel.....	150.00
(5) Contingent fund.....	50.00

TOTAL..... \$7,201.00

It is understood and agreed, by and between the parties hereto, that the Contractor in expending the funds provided by the Government shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article VI, Section 3.

QUANTITY

DESCRIPTION

None

3. PROGRESS REPORTS

The Contractor shall make progress reports at six months intervals in the manner described in Article V of this contract.

4. TECHNICAL ADMINISTRATION BY COMMISSION

The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title III of Appendix "A" to:

Appendix "A" (Cont'd)

TITLE III

Contract No. AT-(40-1)-289

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue, N.W.
Washington 25, D. C.

5. ACCEPTANCE BY PROJECT LEADER

I have read the foregoing Title III of Appendix "A" and the basic contract to which it relates and I agree to be bound by the provisions of said documents.

SIGNED:

Arnone S. Harris
Project Leader

DATE:

July 2, 1949.

TITLE IV1. PROJECTa. Project Leader

The work under this Title IV of Appendix "A" will be carried out by the Contractor under the direction of Dr. Paul J. Kramer, as Project Leader.

b. Term

The performance of work under this Title IV of Appendix "A" shall commence on July 1, 1949 and continue until June 30, 1950. It is understood, however, that completion of the research project described herein may involve a period of several years. Accordingly, the work under this Title IV may be extended by mutual agreement.

c. Program

A study of the absorption of radioactive phosphorus by pine seedlings.

(1) Scope and Present Status of Problem:

During the past year a study has been made of the absorption of P^{32} by mycorrhizal roots of pine. Evidence has been obtained indicating that mycorrhizal roots accumulate relatively large quantities of P^{32} and that low concentrations of azide which inhibit respiration inhibit accumulation of P^{32} to a greater extent in non-mycorrhizal roots than in mycorrhizal roots.

It is now proposed to more carefully investigate the relation between root anatomy and absorption and to determine the effects of transpiration, aeration, and temperature on rate of absorption of P^{32} by pine seedlings. This will give some understanding of the factors affecting the absorption of minerals by trees in the forest.

(2) Scientific Motivation and Significance.

In general this study will give more information concerning the factors affecting the absorption of water by forest trees. Most of the research on absorption of mineral nutrients has been done on roots of herbaceous plants. Root systems of trees are longer lived, differ somewhat in structure and are particularly distinguished by the possession of mycorrhizae. Conclusions based on herbaceous roots are therefore not

applicable to woody plants. It is particularly desirable to know more about the role of mycorrhizae in absorption of mineral nutrients by forest tree seedlings. It has not yet been established whether the increased absorption of minerals by seedlings bearing mycorrhizae in the roots is the result of increased absorbing surface or of increased metabolic activity.

2. BUDGET - PERIOD JULY 1, 1949 - JUNE 30, 1950

a. The Contractor will furnish as its contribution to the project described in this Title IV, the following:

- (1) Salary of Project Leader.
- (2) That portion of the overhead costs allocable to the work which represents the difference between the Contractor's normal overhead rate and the much lower overhead rate of 30% which has been negotiated and included in Section 2 b. of this Title IV.
- (3) Use of laboratory space and equipment already on hand.

b. The Commission will furnish a sum not to exceed \$1,180.00 in connection with the work under this Title IV of Appendix "A", to be spent roughly as follows:

- (1) Salaries
Part-time research assistant for 10 months
(Sept. 1949 - June 1950).....\$ 600.00
- (2) Overhead at the rate of 30% of salaries under
(1) above..... 180.00

NOTE: This rate (which is substantially lower than the Contractor's normal overhead rate) has been negotiated as a pre-determined, fixed allowance and not by way of reimbursement of actual cost during the term July 1, 1949 - June 30, 1950.

(3) Purchase of isotopes and accessory equipment..... 400.00

TOTAL.....\$1,180.00

It is understood and agreed, by and between the parties hereto, that the Contractor in expending the funds provided by the Government shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

- c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article IV, Section 3.

QUANTITY

DESCRIPTION

None

3. PROGRESS REPORTS

The Contractor shall make progress reports at six months intervals in the manner described in Article V of this contract.

4. TECHNICAL ADMINISTRATION BY COMMISSION

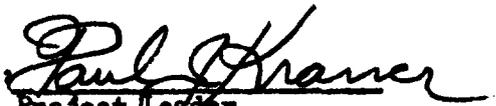
The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title IV of Appendix "A" to:

Medical Branch
 Division of Biology and Medicine
 U. S. Atomic Energy Commission
 1901 Constitution Avenue, N.W.
 Washington 25, D. C.

5. ACCEPTANCE BY PROJECT LEADER

I have read the foregoing Title IV of Appendix "A" of the basic contract to which it relates and I agree to be bound by the provisions of said documents.

SIGNED:



Project Leader

DATE:

7-1-49

APPENDIX "A"

Contract No. AT-(40-1)-289
(Duke University)

TITLE V

1. PROJECT

a. Project Leader

The work under this Title V of Appendix "A" will be carried out by the Contractor under the direction of Dr. Karl M. Wilbur as Project Leader.

b. Term

The performance of work under this Title V of Appendix "A" shall commence on July 1, 1949 and will continue through June 30, 1950. It is understood, however, that completion of the work hereunder may involve a period of several years. Accordingly, the term under this Title V of Appendix "A" may be extended by mutual agreement.

c. Shell Formation in Molluscs and Barnacles as studied by Radioisotopes.

(1) Background

While the detailed mechanism of shell deposition by molluscs is not known, certain facts have been established concerning shell formation. The shell is composed of calcium carbonate in a protein matrix, and is laid down through the activity of the mantle tissue. The inorganic portion of the shell is thought to appear first as a phosphate and then to change to carbonate. It is of interest and perhaps of some significance that the enzymes carbonic anhydrase and phosphatase which catalyze the formation of carbonate and phosphate are present in the shell-forming tissues.

Investigations by the Contractor relative to the problem of shell formation include methods for the measurement of carbonic anhydrase activity; a study of the carbonic anhydrase content of shell forming tissues in 20 species of molluscs; and an investigation of the carbonic anhydrase activity at the time shell formation begins and during growth of the oyster.

Electrometric and colorimetric determination of carbonic anhydrase. (With N.G. Anderson), J. Biol. Chem., 176, 147, 1948. Carbonic anhydrase in molluscs, (With J. A. Freeman), Biol. Bull., 94, 55, 1948.

(2) Program

The purpose of the investigation here proposed is threefold, and is a continuation of a program already under way. First, as a preliminary step, better technics for the isolation of rat liver nuclei free from other cell components must be evolved which do not involve distinctly unphysiological procedures. (Citric acid, distilled water, high temperatures, pepsin digestion, ultrasonic vibration, freezing, hemolysin treatment, etc., have been used heretofore.)

Secondly, it is proposed that the permeability of the isolated nucleus be studied by utilizing radioactive tracers to follow the entrance of sodium, potassium and calcium. This will permit the study of permeability without appreciable changes in osmotic pressure and constitution of the medium. The results may be checked by following volume changes. As the permeability characteristics of the nucleus are elucidated they may be used as criteria for the evaluation of extraction media and as a measure of the effect of other factors on nuclear permeability.

Thirdly, as a second method of evaluating extraction technics, the protein and nucleic acid content of the nuclei will be determined and the oxygen consumption measured.

(3) Methods

Nuclei will be isolated by differential centrifugation at low temperatures. Permeability to inorganic ions will be studied by conventional Geiger-Muller counting technics. Isolation media and technics will be evaluated according to their effects on vital staining, oxygen consumption, protein-nucleic acid ratio and permeability.

2. BUDGET - TERM: JULY 1, 1949 - JUNE 30, 1950

a. The Contractor will furnish as its contribution to the projects described in this Title V, the following:

(1) Salary of Project Leader.

(2) That portion of the overhead costs allocable to the work which represents the difference between the Contractor's normal over-

head rate and the much lower overhead rate of 30% which has been negotiated and included in Section 2 b. of this Title V.

(3) Laboratory work space.

b. The Commission will furnish a sum not to exceed \$9,426.00 in connection with the work under this Title V of Appendix "A" to be spent roughly as follows:

- (1) Personnel (2 research assistants).....\$ 4,320.00
- (2) Overhead at the rate of 30% of salaries
under (1) above..... 1,296.00

NOTE: This rate (which is substantially lower than the Contractor's normal overhead rate) has been negotiated as a predetermined, fixed allowance and not by way of reimbursement of actual cost during the term July 1, 1949 - June 30, 1950.

(3). Capital Equipment

1 Scaling Unit.....	\$ 650.00	
1 Monitoring Device.....	250.00	
1 Refrigerated high speed centrifuge.	2110.00	
	\$ 3010.00	\$3,010.00

(4) Consumable Supplies

(Includes animals and feed, chemicals and reagents, glasswares).....\$ 600.00

(5) Contingent fund..... 200.00

TOTAL.. 200.00 \$9,426.00

It is understood and agreed, by and between the parties hereto, that the Contractor in expending the funds provided by the Government shall be guided by, but not bound to conform to, the details of the program and budget set forth above.

c. Items of property procured or manufactured by the Contractor under this contract, title to which will vest in the Government. See Article VI, Section 3.

QUANTITY
None

DESCRIPTION

3. PROGRESS REPORTS

The Contractor shall make progress reports at six months intervals in the manner described in Article V of this contract.

4. TECHNICAL ADMINISTRATION BY COMMISSION

The Commission has assigned the responsibility for administering the technical and scientific aspects of this Title V to Appendix "A" to:

Medical Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue, N.W.
Washington 25, D. C.

5. ACCEPTANCE BY PROJECT LEADER

I have read the foregoing Title V of Appendix "A" and the basic contract to which it relates and I agree to be bound by the provisions of said documents.

SIGNED:

Karl M. Wilbur
Project Leader

DATE:

July 1, 1949

APPENDIX "B"

GENERAL PROVISIONS

1. PATENTS

a. Whenever any patentable invention or discovery is made or conceived by the Contractor or its employees in the course of any of the work under this contract, the Contractor shall furnish the Commission with complete information thereon; and the Commission shall have the sole power to determine whether or not and where a patent application shall be filed, and to determine the disposition of the title to and rights under any application or patent that may result. The judgment of the Commission on these matters shall be accepted as final; and the Contractor, for itself and for its employees, agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Commission.

b. No claim for pecuniary award under the provisions of the Atomic Energy Act of 1946 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of any of the work under this contract.

c. Except as otherwise authorized in writing by the Commission, the Contractor will obtain patent agreements to effectuate the purposes of paragraphs a. and b. of this Article from all persons who perform any part of the work under this contract, except clerical and manual labor personnel who will not have access to technical data.

d. Except as otherwise authorized in writing by the Commission, the Contractor will insert in all subcontracts provisions making paragraphs a., b., and c. of this Article applicable to the subcontractor and its employees.

2. PUBLICATIONS

The Contractor shall have full freedom of publication of the results of the research under this contract and the Contractor is urged to disseminate the results of the work through customary scientific publication channels, except that "restricted data" as defined in the Atomic Energy Act of 1946 shall be governed by the provisions of Paragraph 3 of this Appendix "B". All publications shall include a reference that the results were developed under a Commission sponsored project.

3. DISCLOSURE OF INFORMATION

a. It is understood that the work under this contract will not involve restricted data and the Contractor will perform such work as unclassified work. However, if in the course of such work any discoveries are made or any data used or developed that constitute restricted data, the Contractor shall promptly inform the Commission and shall classify and safeguard all

discoveries and data in accordance with the requirements of the Commission. It is understood that the person directing research work under this contract shall have been cleared by the Commission for access to restricted data. The Contractor agrees that it will not permit any individual to have access to restricted data until the Federal Bureau of Investigation shall have made an investigation and report to the Commission of the character, associations and loyalty of such individual and the Commission shall have determined that permitting such person to have access to restricted data will not endanger the common defense or security. If doubt exists as to whether any discovery or data developed constitute restricted data, prior to the release of these data and before permitting any individual who has not received clearance from the Commission to have access to such data, the Contractor shall seek guidance from the Commission. Furthermore, the Commission reserves the right to require the classification of work whenever in its opinion restricted data are involved.

b. The continuation by the Contractor of work found to involve restricted data will be subject to mutual agreement of the Commission and the Contractor and shall be covered by a modification of this agreement. The phrase "restricted data" as defined in the Atomic Energy Act of 1946 and employed in this section shall mean "all data concerning the manufacture or utilization of atomic weapons, the production of fissionable material, or the use of fissionable material in the production of power, but shall not include any data which the Commission from time to time determines may be published without adversely affecting the common defense and security".

4. DISPUTES

Except as otherwise specifically provided in this contract, all disputes which may arise under this contract and which are not disposed of by mutual agreement shall be decided by a representative of the Commission duly authorized to supervise and administer performance under this contract, who shall reduce his decision to writing and cause a copy thereof to be mailed to the Contractor, said decision shall be final and conclusive, subject to the provisions of the sentence next following. Within thirty (30) days from the date of such mailing, the Contractor may appeal in writing to the Commission, whose written decision thereon, or that of its duly authorized representative, representatives, or board not including the representative mentioned in the preceding sentence, shall be final and conclusive. Pending decision of a dispute hereunder, the Contractor shall proceed with the performance of its undertakings under this contract.

5. SAFETY AND ACCIDENT PREVENTION - INSPECTIONS

The Contractor will comply with health and safety regulations of the Commission required for work of this nature, and permit the Commission and its designees to inspect the work conducted under this agreement.

6. OFFICIALS NOT TO BENEFIT

No member of or Delegate to Congress, or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

7. ANTI-DISCRIMINATION

The Contractor, in performing the work required by this contract, shall not discriminate against any employee or applicant for employment because of race, creed, color, or national origin.

8. CONVICT LABOR

The Contractor shall not, in the performance of this contract, employ any person undergoing sentence of imprisonment at hard labor.

9. TERMINATION

a. The Commission may at any time upon 120 days written notice terminate this contract in whole or in part.

b. In the event of termination pursuant to subsection a., the Contractor will be paid for the portion of the contract work already performed, together with reasonable costs of termination.

10. EIGHT-HOUR LAW

No laborer or mechanic doing any part of the work contemplated by this contract, in the employ of the Contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight (8) hours in any one calendar day upon such work at the site thereof, except upon the condition that compensation is paid to such laborer or mechanic in accordance with the provisions of this Article. The wages of every laborer and mechanic employed by the Contractor or any subcontractor engaged in the performance of this contract shall be computed on a basic day rate of eight (8) hours per day and work in excess of eight (8) hours per day is permitted only upon the condition that every such laborer and mechanic shall be compensated for all hours worked in excess of eight (8) hours per day at not less than one and one-half ($1\frac{1}{2}$) times the basic rate of pay. For each violation of the requirements of this Article a penalty of Five Dollars (\$5.00) shall be imposed upon the Contractor for each laborer or mechanic for every calendar day in which such employee is required or permitted to labor more than eight (8) hours upon said work without receiving compensation computed in accordance with this Article, and all penalties thus imposed shall be withheld for the use and benefit of the Government; provided, that this stipulation shall be subject in all respects to the exceptions and provisions of U.S. Code, Title 40, Sections 321, 324, 325, and 326, relating to hours of labor, as modified by the provisions of Section 303 of Public Act No. 781, 76th Congress, approved September 9, 1940, relating to compensation for overtime.

11. DEFINITIONS

As used in this contract the terms "United States Atomic Energy Commission", "Atomic Energy Commission" and "Commission" shall mean the United States Atomic Energy Commission or its duly authorized representative or representatives.