

Typed *led*  
Prepared *[Signature]*  
Approved *[Signature]*  
Date *12/20/60*

Contract No. AT-(40-1)-263  
University of Virginia  
Modification No. 12

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 20th day of December, 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 THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

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

WHEREAS, the Commission desires to provide additional time for completion of the research described in Supplement No. 11 to Appendix "A", without additional funds, 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 "12." is added to Article II:

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

2. 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."

REPOSITORY Oak Ridge Operations  
COLLECTION Records Holding Area  
Documents 1944-94  
BOX No. Contracts AT-(40-1)-Gen 253-  
1 of 2 Bldg. 2714-H 265  
FOLDER AT-(40-1)-263 Rector & Visitors  
of the Univ. of Virginia

*[Handwritten signature]*

3. Paragraph 16. of Appendix "B" is revised to read as follows:

"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."

4. 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."

5. In Appendix "C", delete the date "September 1" wherever it appears and substitute therefor in each instance the date "April 1".

6. In Appendix "C", delete the date "December 1", and substitute therefor the date "July 1".

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: /s/ Herbert M. Roth  
Herbert M. Roth, Director  
Atomic Energy Commission  
(Contracting Officer)

WITNESSES:

THE RECTOR AND VISITORS OF THE  
UNIVERSITY OF VIRGINIA

/s/ Donald Grant  
Donald Grant, Vice Rector  
(Address)

BY: /s/ Vincent Stoe

TITLE: Vice Rector

/s/ Lucille E. Ellis  
Lucille E. Ellis, Vice Rector  
(Address)

ACCEPTANCE BY SENIOR INVESTIGATOR

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

/s/ [Signature]  
Senior Investigator

PREPARED BY  
REVIEWED BY  
DATE  
PERIOD

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 4th day of January, 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 THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle; 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 "11." is added to Article II:

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

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. 11 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Ten Thousand, Six Hundred Ninety Dollars (\$10,690.00), the Government will pay to the Contractor Eight Thousand, Eighty-nine Dollars (\$8,089.00)."

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".

CERTIFIED A TRUE COPY

BY Glenn Dawson

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 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 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 h. is revised to read as follows:

"h. 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 or 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 following new paragraph "16." is added in Appendix "B":

"16. Placing Orders and Subcontracts with Firms Located in Areas of Substantial Labor Surplus

"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 and purchase orders in accordance with this policy to the extent consistent with the efficient performance of this contract."

11. The Supplement No. 11 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: /s/ Herman M. Roth  
HERMAN M. ROTH, DIRECTOR  
RESEARCH AND DEVELOPMENT DIVISION  
(Contracting Officer)

WITNESSES:

/s/ Mary P. Heidenreich  
Charlottesville, Va.  
(Address)

/s/ Lucille W. Willis  
Charlottesville, Va.  
(Address)

THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA

BY: /s/ Vincent Shea  
TITLE: Comptroller

ACCEPTANCE BY SENIOR INVESTIGATOR

I have read the foregoing Supplemental Agreement and the Supplement No. 11 attached hereto and made a part hereof and agreed to be bound by the provisions of this document.

/s/ Chalmers L. Gemmill  
Senior Investigator

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 of the metabolic exchange in isolated cell systems of radioisotopes to include work on inorganic phosphate transfer into erythrocytes, using radioactive phosphorus, to follow the lead that arsenate is a competitive inhibitor carried by the same means of transport as phosphate, new studies of erythrocyte ghost preparation, site of action of insulin and the cardiac glycosides, using I-131 and C-14 labeling, effects of insulin on the glucose oxidation in mammalian erythrocytes, and related experiments. Effects of insulin on potassium transfer in muscle will be studied with respect to ion transfer and using K-42, particularly to lead to a better understanding of the action of digoxin, deslanoside and ouabain, etc. In some of this work autoradiographic methods will be used.

2. BUDGET

a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>		\$10,900.00
Dr. C. L. Gemmill (1/10 of time)	\$1,500.00	
Dr. D.R.H. Gourley (1/2 of time)	4,800.00	
Research Technician	3,600.00	
Secretarial and Janitorial Aid	1,000.00	
(2) <u>Equipment:</u>		3,300.00
(3) <u>Travel:</u>		400.00
(4) <u>Overhead</u> (38.34% of Salaries and Wages):		<u>4,179.00</u>
		Total \$18,779.00

- 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)-263  
University of Virginia  
Modification No. 10

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SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 13th day of January, 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 THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1 - 5; 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 "10." is added to Article II:  
"10. The period during which the work under this contract may be conducted is hereby extended to November 30, 1959."
2. The following new subsection "1. b." is added in Article III:  
"b. 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 Ten Thousand, Three Hundred Sixty-eight and 34/100 Dollars (\$10,368.34), the Government will pay to the Contractor Eight Thousand, Eighty-nine Dollars (\$8,089.00)."
3. Subsection 2. a. of Article III is revised to read as follows:

*Glice L. Brown*

"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. 10" is added to 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 studies of metabolic exchange in isolated cell systems to include completion of earlier experiments in this area of study, particularly metabolic interchanges at cell membranes, transport of arsenate and Phosphorus-32 labeled phosphates, concentration effects, the phosphorus carrier, effects of pH, role of APT, presence of APT in ghosts of erythrocytes, role and movement of potassium, utilizing Potassium-42 if possible, gain and loss of muscle potassium, effects of ouabain to separate effects of insulin on lactate oxidation and potassium uptake, and possibly the potassium turnover rates in muscle.

"2. BUDGET

"a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>		\$10,550.00
C. L. Gemmill (1/10 of time)	\$1,500.00	
Dr. D. R. H. Gourley (1/2 of time)	4,750.00	
Research Technician	3,300.00	
Secretarial and Janitorial Aid	1,000.00	
(2) <u>Equipment:</u>		3,300.00

(3) <u>Travel:</u>	400.00
(4) <u>Overhead</u> (39.88% of Salaries & Wages):	<u>4,207.34</u>
TOTAL	\$18,457.34

"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: U. S. ATOMIC ENERGY COMMISSION

BY: /s/ Herman H. Roth  
HERMAN H. ROTH, DIRECTOR  
TECHNOLOGY AND DEVELOPMENT DIVISION  
 (Contracting Officer)

WITNESSES:

/s/ Dorothy Troutman  
Charlottesville, Virginia  
 (Address)

/s/ Lucille L. Willis  
Charlottesville, Virginia  
 (Address)

THE RECTOR AND VISITORS OF THE  
 UNIVERSITY OF VIRGINIA

BY: /s/ Vincent Shea  
 TITLE: Controller

ACCEPTANCE BY SENIOR INVESTIGATOR

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

/s/ Chalmers L. Gemmill  
 Senior Investigator

TYPED  
PREPARED  
APPROVED

Contract No. AT-(40-1)-263  
University of Virginia  
Modification No. 9

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 15th day of January 1958, effective as of December 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 THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

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

WHEREAS, the Commission desires to provide for additional research as more particularly described in Supplement No. 9 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 "9." is added to Article II:

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

3. The following new subsection "l.g." is added in Article III:

"g. In consideration of the performance of the additional work described in Supplement No. 9 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Nine Thousand, Three Hundred Forty-three and 25/100 Dollars (\$9,343.25), the Government will pay to the Contractor Eight Thousand, Eighty-nine Dollars (\$8,089.00) (\$8,028.00 in new funds and \$61.00 agreed to be the

*[Handwritten signature]*

balance remaining unexpended from previous work under this contract.

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 previous work under this contract."

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

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.9" is added to Appendix "A":

"SUPPLEMENT NO. 9

"This SUPPLEMENT NO. 9 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 involving radioactive isotopes in isolated cell systems, with emphasis on (1) the effect of various ions, pH-control, etc., including ATP and ATPase in causing effects or controlling the phosphate transfer into erythrocytes, and (2) a study of the action of drugs on ion transport into the erythrocyte cell system and across the cell membrane. In this work the radioisotopes Phosphorus-32 and Potassium-42 will be utilized. Attention will be paid to the effects of cardiac glucosides on potassium uptake and transfer in skeletal muscle, in addition to the red cell studies. Action of appropriate other materials, such as insulin, will be included.

"2. BUDGET

"a. Outline of Cost Estimates:

(1) <u>Salaries and Wages:</u>		\$10,325.00
Dr. C. L. Gemmill (1/10 of time)	\$1,275.00	
Dr. D. R. H. Gourley (1/2 of time)	4,750.00	
Research Technician	3,300.00	
Secretary and Janatorial Aid	1,000.00	
(2) <u>Equipment:</u>		3,300.00
(3) <u>Travel:</u>		400.00
(4) <u>Overhead (33% of Salaries):</u>		<u>3,407.25</u>
	<b>TOTAL</b>	<b>\$17,432.25 ✓</b>

"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: /s/ David F. Cope  
Acting Director  
Research and Development Division  
(Contracting Officer)

WITNESSES:

/s/ Lucille M. Willis  
Charlottesville, Virginia  
(Address)

/s/ D. B. Troutman  
Charlottesville, Virginia  
(Address)

THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA

BY: /s/ Vincent Shea  
TITLE: Comptroller

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.

/s/ Chalmers L. Gemmill  
Senior Investigator

APPENDIX "C"

REPORTS AND PROPOSALS  
(FOR DIRECT AEC RESEARCH CONTRACTS)

	Date Due	Copies
1. Progress Report	<b>September 1</b>	Six
2. Renewal Proposal	<b>September 1</b>	Six
3. 200-word summary of purpose and scope with submittal date indicated thereon	Within 30 days after <b>December 1</b>	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.

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.

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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.

TYPED  
PREPARED *[initials]*  
APPROVED *[initials]*  
RECEIVED *[initials]*  
CONTRACT *[initials]*

Contract No. AT-(40-1)-263  
University of Virginia  
Modification No. 8

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 17th day of June, 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 THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

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

WHEREAS, the parties hereto desire to provide for additional contributions by the parties to the research activities previously undertaken, and to revise the Outline of Cost Estimates for the ninth period of performance; 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. Subsection 1. f. of Article III is revised to read as follows:

"f. 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 Eight Thousand, Seven Hundred Seventy-eight Dollars (\$8,778.00), the Government will pay to the Contractor for the ninth period of performance the sum of Eight Thousand, Eight Hundred Twenty Dollars (\$8,820.00). 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."

2. Subsection 2. a. of SUPPLEMENT NO. 8 of Appendix "A" is revised to read as follows:

*[Handwritten signature]*

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

(1) <u>Salaries and Wages:</u>		\$10,600.00
Dr. C. L. Gemmill (1/10 of time)	\$1,200.00	
Research Associates	5,400.00	
Technician	3,000.00	
Secretarial and Janitorial Aid	1,000.00	
(2) <u>Equipment:</u>		3,100.00
(3) <u>Travel:</u>		400.00
(4) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u>		<u>3,498.00</u>
	TOTAL	\$17,598.00" ✓

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

WITNESSES:

THE RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA

/s/ David B. Moyer  
Charlottesville, Virginia  
(Address)

BY: /s/ Colgate W. Darden, Jr.  
TITLE: President

/s/ Lucille W. Willis  
Charlottesville, Virginia  
(Address)

ACCEPTANCE BY SENIOR INVESTIGATOR

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

/s/ Chalmers L. Gemmill  
Senior Investigator

UNITED STATES  
ATOMIC ENERGY COMMISSION

*Handwritten initials and scribbles*

Letter Supplement to  
Contract No. AT-(40-1)-263  
October 9, 1956

University of Virginia  
Charlottesville  
Virginia

Attention: Mr. Vincent Shea, Comptroller

Gentlemen:

Reference is made to Modification No. 7 of your Contract No.  
AT-(40-1)-263.

Pursuant to Paragraph 13. of said modification, you are hereby  
notified that your contract is extended through November 30,  
1957, and that the modifications provided for in said Paragraph  
13. are effective as of December 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: /s/ Herman M. Roth  
Contracting Officer  
Herman M. Roth  
Director  
Research and Development Division

RECEIVED:

University of Virginia

BY: /s/ Vincent Shea

TITLE: Comptroller

DATE: October 11, 1956

ORIGINAL COPY  
BY [Signature]

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SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 20th 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 the RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle; 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 previously undertaken, as such extended program is described in Supplement No. 7 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 "7." is added to Article II:

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

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

"e. 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 Three Thousand, Four Hundred Eleven and 44/100 Dollars (\$3,411.44), the Government will pay to the Contractor for the eighth period of performance the sum of Two Thousand, Nine Hundred Twenty-five Dollars (\$2,925.00)."

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."

*Jenks Nicholson*

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. 7" is added to Appendix "A":

"SUPPLEMENT NO. 7

"July 1, 1956 - November 30, 1956

"This SUPPLEMENT NO. 7 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 work using radioactive isotopes on cells: (1) to study the effect of concentration of phosphate, utilizing radioactive phosphorus-32, and concentration of magnesium on the phosphate transfer in red blood cells, (2) to study the mechanisms of adenosine and related compounds in red cells, utilizing chromatographic methods, and (3) to study the action of insulin on the uptake of various isotopes, particularly the insulin effect on potassium transfer.

"2. BUDGET

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

(1) <u>Salaries and Wages:</u>		\$ 3,668.00
	Dr. C. L. Gemmill (1/10 of time)	\$ 500.00
	Research Associate	1,501.00
	Technician	1,250.00
	Secretarial and Janitorial Aid	417.00
(2) <u>Equipment:</u>		1,290.00
(3) <u>Travel:</u>		168.00
(4) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u>		<u>1,210.44</u>
	TOTAL:	\$6,336.44

"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 insert the date "September 1" in lieu thereof in each instance.

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

a. The following new section "8." will be added in Article II:

"8. The ninth period of performance for the research project covered by this contract will commence on December 1, 1956, and will end on November 30, 1957."

b. The following new subsection "1. f." will be added in Article III:

"f. 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 Eight Thousand, One Hundred Eighty-four Dollars (\$8,184.00), the Government will pay to the Contractor for the ninth period of performance the sum of Seven Thousand, Twenty Dollars (\$7,020.00). 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. 8" will be added to Appendix "A":

"SUPPLEMENT NO. 8

"December 1, 1956 - November 30, 1957

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

"1. PROGRAM

"a. Scope and Plan of Approach:

The Contractor shall continue the research program outlined in SUPPLEMENT NO. 7.

"2. BUDGET

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

(1) <u>Salaries and Wages:</u>		\$ 8,800.00
	Dr. C. L. Gemmill (1/10 of time)	\$1,200.00
	Research Associate	3,600.00
	Technician	3,000.00
	Secretarial and Janitorial Aid	1,000.00
(2) <u>Equipment:</u>		3,100.00
(3) <u>Travels:</u>		400.00
(4) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u>		<u>2,904.00</u>
	TOTAL:	\$15,204.00

"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: s/ Herman M. Roth  
Director  
Research and Development Division  
(Contracting Officer)

THE RECTOR AND VISITORS OF THE  
CONTRACTOR UNIVERSITY OF VIRGINIA

WITNESSES:

s/ Lucille W. Willis  
Charlottesville, Virginia  
(Address)

BY: s/ Vincent Shea

TITLE: Comptroller

s/ Dorothy Troutman  
Charlottesville, Virginia  
(Address)

ACCEPTANCE BY SENIOR INVESTIGATOR

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

s/ Chalmers L. Merrill  
Senior Investigator

Contract No. AT-(40-1)-263  
University of Virginia  
Modification No. 6

*Handwritten notes:*  
8/26/55  
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SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 7th 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 the RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of Beta Radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

WHEREAS, the Contract has been amended heretofore by Modifications Nos. 1 - 5; 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. 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 1954;

NOW, THEREFORE, the parties hereto do mutually agree that as of July 1, 1955, Contract No. AT-(40-1)-263 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 the metabolic exchange of radioactive isotopes in isolated cell systems. 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.

CERTIFIED A TRUE COPY

BY W. H. Harrison

1. The work will be carried out by the Contractor under the direction of Dr. Chalmers L. Gemmill as Senior Investigator.

ARTICLE II - TERM OF CONTRACT

6. 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

d. 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 Seven Thousand, Five Hundred Nineteen Dollars (\$7,519.00), the Government will pay to the Contractor for the seventh period of performance the sum of Seven Thousand, Twenty Dollars (\$7,020.00).

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.

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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: s/ Herman M. Roth

Director, Research & Medicine Division  
(Contracting Officer)

WITNESSES:

s/ Lucille W. Willis

Charlottesville, Va.  
(Address)

s/ Dorothy Troutman

Charlottesville, Va.  
(Address)

RECTOR AND VISITORS OF THE  
UNIVERSITY OF VIRGINIA

BY: s/ Vincent Shea

TITLE: Comptroller

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.

s/ Chalmers L. Gemmill  
Senior Investigator

APPENDIX "A"

Supplement No. 6

July 1, 1955 - June 30, 1956

This Supplement No. 6 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:

Work will continue by the Contractor on phosphate uptake by the chick nucleated erythrocytes, to include a study of the change of specific activity of labile phosphate groups of ATP (adenosine triphosphate) with time. The work has suggested that on the basis of preliminary experiments, these labile phosphate groups may be involved in active phosphate ion uptake by the human red cells. Work will also be carried out on the metabolism of glucose by chicken blood washed cells. In addition, the role of the red cell membrane will be further studied with respect to phosphate transport and cholinesterase activity, possibly using washed human cells. Iodination studies related to thyroxine mechanisms will continue.

2. BUDGET

a. Outline of cost estimates for the seventh period:

(1) <u>Salaries and Wages:</u>		\$ 8,300.00
Dr. C. L. Gemmill (10% of time)	\$1,200.00	
Research Associate	3,600.00	
Technician	3,000.00	
Secretarial Assistance	500.00	
(2) <u>Equipment:</u>		3,100.00
(3) <u>Travel:</u>		100.00
(4) <u>Overhead and Indirect Costs (33% of Salaries and Wages):</u>		<u>2,739.00</u>
	<b>TOTAL</b>	<b>\$14,539.00</b>

- 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.

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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.

TYPED \_\_\_\_\_  
PREPARED *[Signature]*  
APPROVED *[Signature]*  
*[Signature]*  
*[Signature]*  
RETURN *[Signature]*

Contract No. AT-(40-1)-263  
University of Virginia  
Modification No. 5

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 15th 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 the RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1949, providing for research and study of the effect of Beta Radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

WHEREAS, the contract has been amended heretofore by Modification Nos. 1 - 4; 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. 5 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)-263 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 research and study of the metabolic exchange of radioactive phosphorus and potassium in labeled cell systems. 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

*[Signature]*

EXHIBIT - THREE COPIES

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. C. L. Gemmill as senior investigator.

#### ARTICLE II - TERM OF CONTRACT

5. 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

c. In consideration of the performance of the research activities described in Supplement No. 5 to Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Ten Thousand, Two Hundred and 16/100 Dollars (\$10,200.16), the Government will pay to the Contractor for the sixth period of performance the sum of Eight Thousand, Nine Hundred Sixty-Six Dollars (\$8,966.00).

##### 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: s/ K. Kasschau

Director, Research & Medicine Division  
(Contracting Officer)

WITNESSES:

s/ Dorothy Troutman

Charlottesville, Va.  
(Address)

s/ Lucille W. Willis

Charlottesville, Va.  
(Address)

RECTOR AND VISITORS OF THE UNIVERSITY  
OF VIRGINIA

BY: s/ Vincent Shea

TITLE: 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.

s/ Chalmers L. Gemill  
Senior Investigator

APPENDIX "A"

Supplement No. 5

July 1, 1954 - June 30, 1955

This Supplement No. 5 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

Attention will be directed towards a detailed study of the phosphate uptake by erythrocytes of the chicken which, in contrast to mammalian erythrocytes, have an oxidative system. The importance of this system will be that a distinction can be made between the previous work on red blood cells not containing an oxidative system and those which do have a complete system for oxidizing substrates to carbon dioxide and water. Newer methods for fractionating phosphates will be used employing ion exchange columns. It will be possible to study changes in phosphate uptake by chicken erythrocytes under both aerobic and anerobic conditions. Also, the work on radioautographs of the red blood cells labelled with  $P^{32}$  will be continued.

The study of potassium turnover in skeletal muscle will be continued. Different concentrations of insulin will be employed. The work will be extended by using epinephrine which may influence potassium movement across cell boundaries.

The general program of thyroxine activity carried out in this department will be continued. The findings of last summer on the effect of light on thyroxine will be extended by the use of monochromatic light. A Bausch and Lomb monochromatic source of light has been purchased and will be used in this study in order to define more closely the wave lengths of light responsible for this effect. Other radiant energy will be employed. It may be that in thyroxine there is a resonating system that is very sensitive to radiant energy of various types. Work on the effect of thyroxine on succinate oxidation by heart homogenates will be continued, by using labelled C-14 succinate in order to determine more closely the mechanisms involved in this effect.

2. BUDGET

a. Outline of cost estimates for the sixth period:

(1) Salaries and Wages:		\$10,802.00
Dr. C. L. Gemmill		
(10% of time for 9 months -		
Full time 2 summer months)	\$3,384.00	
Other Faculty	4,018.00	
Technician	3,000.00	
Secretarial Services	200.00	
Janitor Service	200.00	
(2) Equipment:		4,000.00
(3) Supplies:		1,400.00
(4) Travel		300.00
(5) Overhead and Operating Expenses:		2,664.16
	<b>Total</b>	<b>\$19,166.16</b>

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.

13. 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"

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(FOR DIRECT AEC RESEARCH CONTRACTS)

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All of the above should be addressed to:

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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.

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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, 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 remained 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.

TYPED \_\_\_\_\_  
PREPARED HT  
APPROVED [Signature]

Contract No. AT-(40-1)-263  
(University of Virginia)  
Modification No. 4

RETURN TO  
CONTRACT SECTION

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 30th day of June, 1953, 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 the RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-263, dated April 1, 1953, for performance by the Contractor of research and study of the effect of Beta Radiation on the distribution of phosphate in red blood cells and in cardiac muscle; and

WHEREAS, the contract has been amended heretofore by Modifications Nos. 1, 2 and 3; and

WHEREAS, the parties hereto desire to extend the term of the contract in order to continue and extend the research activities previously undertaken, as such extended program is described in Supplement No. 4 to Appendix "A", and to effect certain other changes hereinafter set out; 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)-263 is hereby modified in the following particulars, but in no others:

1. Add the following new subsection d. to Section 2 of ARTICLE I - PURPOSE AND SCOPE:

"d. The work in the fifth period will consist of a study of uptake of potassium by the isolated rat skeletal muscle and related research activities more fully described in Supplement No. 4 to Appendix 'A'."

2. Add the following new Section 4 to ARTICLE II - TERM OF CONTRACT:

"4. The fifth period of performance for the project covered by this contract will commence on July 1, 1953 and will end on June 30, 1954."

CELESTINE BROWN  
Alice Brown

3. Add the following new subsection d. to Section 1 of ARTICLE III - PROGRAM DEVELOPMENT AND FINANCING:

"d. In consideration of the performance of the work described in Supplement No. 4 to Appendix 'A', the Government will pay to the Contractor the sum of Nine Thousand Eighteen Dollars (\$9,018.00) for the fifth period of performance."

4. Add the following new Section 4 to ARTICLE V - REPORTS, RECORDS AND INSPECTION:

"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 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 sub-contract. 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."

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

"SUPPLEMENT NO. 4

"July 1, 1953 - June 30, 1954

"This Supplement No. 4 describes the research program and budget agreed upon between the Commission and the Contractor for the fifth period of performance.

"1. PROGRAM

"a. Scope and Plan of Approach

During this period the Contractor will undertake an intensive study of the uptake of potassium by the isolated rat skeletal muscle under the influence of insulin. In order to get a balance sheet of potassium interchange into muscle, it is proposed that radioactive potassium be used to correlate exchange with glycogen deposition and oxygen consumption. The distribution of radiophosphorus will be studied in the same preparation, with and without insulin. The uptake of radiophosphorus by red blood cells will be continued with studies on localization of P-32 in or on the cells. Radioautography will be applied. The uptake of radioactive thyroxine may be studied in nucleated and non-nucleated red blood cells, and incorporation and liberation of Iodine-131 into red cells may also be studied with methods developed for the phosphorus work.

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

"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 contribution 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 payment 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 provided in Section 1. d. of ARTICLE III is to cover generally the following operating estimates:

(1) Salaries and Wages

Dr. C. L. Gemmill (one-month Summer)	\$1170.00
Dr. D. R. H. Gourley (two months)	1180.00
Research Assistant (full time)	<u>5000.00</u>

Total Salaries and Wages \$7,350.00

	Carried Forward	\$7,350.00
(2) <u>Supplies:</u>		
Chemicals	\$ 300.00	
Radioactive Isotopes	300.00	
Animals and Blood Donors	<u>200.00</u>	
Total Supplies		800.00
(3) <u>Travel</u>		<u>200.00</u>
	Subtotal	\$8,350.00
(4) <u>Overhead</u>		<u>668.00</u>
	Total	\$9,018.00

"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."

6. In Appendix "B" delete the third and fourth sentences of Section 3. a. and substitute therefor the following:

"The Contractor agrees that it will 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 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.

THE UNITED STATES OF AMERICA

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: /s/ Herman M. Roth

TITLE: Acting Director  
Research and Medicine Division

WITNESSES:

/s/ Vincent Shea

Charlottesville, Va.  
(Address)

/s/ Lucille W. Willis

Charlottesville, Va.  
(Address)

RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA

BY: /s/ Colgate W. Darden, Jr.

TITLE: President

ACCEPTANCE BY PROJECT LEADER

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

/s/ Chalmers I. Gemmill  
Project Leader



Work will also be done on the uptake of radioactive potassium in muscle under the influence of insulin. An additional phase of the program will consist of a study on the effect of throxine on enzyme systems."

2. Add the following new Section 3, to ARTICLE II - TERMS OF CONTRACT:

"3. The fourth period of performance for the project covered by this contract will commence on July 1, 1952, and will end on June 30, 1953."

3. 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 described in Supplement No. 3 to Appendix 'A', the Government will pay to the Contractor the sum of Eight Thousand Four Hundred Seventy-Six Dollars and Seventy-Nine Cents (\$8,476.79) for the fourth period of performance."

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

"SUPPLEMENT NO. 3

July 1, 1952 - June 30, 1953

1. PROJECT

"a. Scope and Plan of Approach.

During the fourth period the Contractor will undertake a study of and conduct scientific research into the metabolic exchange of radioactive phosphorus and potassium in isolated cell systems.

The Contractor will continue its study of the uptake of radioactive phosphate by chicken red blood cells and to measure this activity both under aerobic and anaerobic conditions. By comparing the activity of the nucleated red blood cell to the non-nucleated cell, information may be obtained concerning the role of the nucleus in these cells.

Work will also be undertaken by the Contractor on the uptake of radioactive potassium in muscle under the influence of insulin. This work should give considerable information concerning the relationship of potassium, carbohydrate metabolism and insulin action. Work will also be continued on the effect of threonine on enzyme systems.

"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 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 provided in Section 1.c. of ARTICLE III, together with the sum of Three Hundred Seventy-Three Dollars and Twenty-One Cents (\$373.21) (which amount the parties hereby agree shall be deemed to represent the amount by which the total of payments made by the Government for the third contract period exceeds total expenditures for the same period) is to cover generally the following operating estimates:

(1) Salaries

Dr. C. L. Gerrill (Principal Investigator)(one month)	\$ 970.00
Dr. D.R.H. Gourley (Research Assistant)(two months @ \$510.50 per month)	1,025.00
Research Assistant (full time)	<u>4,500.00</u>

Total Salaries

\$6,495.00

(2) Equipment and Supplies

Warburg manometer and flasks	300.00
Glassware	300.00
Chemicals	300.00
Radioactive phosphorus and potassium	300.00
Animals and blood donors	<u>300.00</u>
<b>Total Equipment and Supplies</b>	<b>\$1,500.00</b>

(3) Travel

	<u>200.00</u>
<b>Subtotal</b>	<b>\$8,195.00</b>

(4) Overhead (68%)

	<u>655.00</u>
<b>Balance from Third Period</b>	<u>8,550.00</u>
<b>Total</b>	<b>\$8,475.00</b>

"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."

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

UNITED STATES OF AMERICA

WITNESSES

BY: UNITED STATES ATOMIC ENERGY COMMISSION

BY: [Signature]

TITLE: Acting Director, Contract Division

\_\_\_\_\_  
\_\_\_\_\_  
(Address)

RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA

BY: [Signature]

TITLE: COLGATE W. DARDEN, JR., President

[Signature]  
Charlottesville, Va.  
(Address)

ACCEPTANCE BY PROJECT LEADER

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

[Signature] M.D.  
Project Leader

TYPED \_\_\_\_\_

PREPARED IZP

APPROVED [Signature]

Contract No. AT-(40-1)-263  
(Rector and Visitors of the University of Virginia)  
Modification No. 2

RETURN TO  
COMMITTEE SECTION

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 28th  
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 the RECTOR AND VISITORS OF THE  
UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into  
Contract No. AT-(40-1)-263 on April 1, 1949, for the performance  
by the Contractor of a research project involving a study of the  
effect of beta radiation on the distribution of phosphate in red  
blood cells and in cardiac muscle; and

WHEREAS, the contract has been amended heretofore by  
Modification No. 1; and

WHEREAS, the parties hereto desire to extend the term of  
the contract in order to continue and extend the research project  
by conducting a study of the metabolic exchange of radioactive  
phosphorus and potassium in isolated cell systems; 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)-263 is modified in the following  
particulars, but in no others:

1. Insert the sub section letter "a." between the  
number "2." and the word "The" in Section 2 of ARTICLE I - PURPOSE  
AND SCOPE, and add the following new sub-section b to Section 2 of  
ARTICLE I:

"b. The work in the third period shall consist of a  
study of the metabolic exchange of radioactive  
phosphorus and potassium in isolated cell systems,  
as described in Supplement No. 2 to Appendix 'A'."

2. Insert the section number "1," before the first word of ARTICLE II - TERM OF CONTRACT, and add the following new section:

"1. The stated period of performance for the project covered by this contract will commence on July 1, 1951, and will end on June 30, 1952."

3. 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 described in Supplement No. 2 to Appendix 'A', the Government will pay to the Contractor the sum of Nine Thousand One Hundred Fifty-Eight Dollars (\$9,158.00) for the third period of performance."

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

"SUPPLEMENT NO. 2

"July 1, 1951 - June 30, 1952

"1. PROJECT

"a. Background

"During the past two years, the Contractor has conducted a project on the effect of radiation on the distribution of phosphate in red blood cells and in cardiac muscle. Under this project a study was undertaken of the factors affecting the uptake of radioactive phosphate by human erythrocytes. It was found that this process was very sensitive to temperature changes and various inhibitory agents. In addition, studies were made on the effects of mercurial compounds on invertase. These were undertaken as part of the general program of the laboratory on enzyme reactions. Twelve publications resulted from this work: six abstracts, three AECU publications and three complete publications. There are several more publications in preparation.

"The current work concerns a fractionation of the several acid-soluble phosphorus-containing organic compounds in red blood cells after

several hours of contact with radioactive phosphate. The results of this work will be reported at scientific meetings in the spring of 1951 and a detailed publication will be prepared in the summer of 1951. In addition, a study has been made of the uptake of radioactive phosphate by red blood cells at various intervals of time after the blood has been removed from the body. It has been found that nine hours after removal from the body the phosphate uptake by these cells diminishes. It can be restored by the addition of glucose. These facts may be of interest to the blood bank program for it would give a measure of 'viability' of the red blood cells.

"b. Scope and Program

"This project will continue to study the effect of various factors on the uptake of radioactive phosphate by human red blood cells and to continue the fractionation of the phosphorus compounds in the cell. The chief factor under consideration will be time after removal from the body. The methods developed in the Contractor's laboratory may be very useful as a measure of 'viability' of the red blood cell. Blood will be preserved by the usual methods and stored. At various intervals of time, the uptake of radioactive phosphate will be determined. If it is diminished, attempts will be made to restore this activity. Experiments mentioned above have been carried out for nine-hour periods only. It is now planned to carry out such experiments over periods of days.

"In addition, a new departure from the former work will be an investigation of the uptake of radioactive potassium by skeletal muscle under the influence of insulin. There is no well developed theory of potassium behavior. Scattered references indicate an implication of K in carbohydrate metabolism. For example:

- (1) The fall in blood sugar following insulin administration is accompanied by a simultaneous fall of K.

- (2) Deposition of glycogen in liver is necessarily accompanied by deposition of K.
- (3) Infusion of glucose into blood of cats and rats lowers K as if glucose were being deposited in tissues in combination with K.
- (4) Adrenalin liberates both K and glucose from liver.
- (5) The work of Roberts et al. with bacteria indicates that K is bound as salts of hexose phosphates.
- (6) It has been demonstrated that insulin accelerates the uptake of K in rat diaphragm (Willebrands et al.) and in frog muscle (Manery et al.). Very small concentrations of insulin will produce this effect ( $10^{-7}$  units per ml. in rat diaphragm and  $10^{-3}$  units per ml. in frog muscle).

"Therefore, the Contractor will investigate the uptake of radioactive potassium by skeletal muscle under the influence of insulin. This method will avoid the errors in determining small amounts of potassium by previous methods and give exact information concerning the relationship of potassium and carbohydrate metabolism and insulin action. In 1940-41, Dr. Gemmill studied an insulin effect on rat diaphragm, and Dr. Jourley wrote his Ph. D. thesis on an oxidative effect of the hormone. Therefore, a background of knowledge is present which will be very useful in this work.

"c. Materials, Equipment and Facilities

"The Contractor's laboratory is well equipped for this proposed work. The equipment for radioactivity research is adequate. Therefore, permanent equipment needs will be minor for the continuation of this project. Space is limited; however, by next fall, space will be increased 50 per cent by the addition of a new building.

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

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

- (1) Salaries of staff members, including the Project Leader, engaged in the work, except as provided in b (1) below.

- (2) For all necessary laboratory work space and equipment on hand, including autoscaler, timer clock and monitoring devices
- (3) Clerical and administrative expenses and other general and administrative type costs, in excess of the overhead allowance provided in b (4) below.

"b. The Government will pay to the Contractor the sum of Nine Thousand One Hundred Fifty-Eight Dollars (\$9,158.00) which will cover the Contractor's other expenses, estimated as follows, in the performance of the contract during the third period:

(1) Salaries

Summer salary of Project Leader	\$2,880.00
Research assistant (full time)	4,500.00
(2) Supplies and miscels	900.00
(3) Travel	200.00
(4) Overhead	678.00
Total	<u>\$9,158.00</u>

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

<u>QUANTITY</u>	<u>DESCRIPTION</u>
None	-

It is hereby certified, and parties 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, Acting Manager, ORO  
TITLE: Contracting Officer

RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA

WITNESSES:

J. Vincent Shea

BY: Colgate W. Darden, Jr.  
Colgate W. Darden, Jr.  
TITLE: President

Charlottesville, Va.  
(Address)

Wayne M. Rule

Charlottesville, Va.  
(Address)

ACCEPTANCE BY PROJECT LEADER

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

E. Holmes S. Gammill  
Project Leader

SUPPLEMENTAL AGREEMENT

TYPED *[Signature]*  
PREPARED *[Signature]*  
APPROVED *[Signature]*  
RETURN TO  
CONTRACT SECTION

THIS SUPPLEMENTAL AGREEMENT, entered into this 25 day of June, 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 RECTOR AND VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into a Contract No. AT-(40-1)-263, dated April 1, 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)-263 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 the date "June 30, 1950," which appears in Article II - Term of Contract, and substitute the date "June 30, 1951."

3. Delete Article III - Program and Budget, and substitute therefor the following new Article III:

"Article III - Program Development and Financing

"1. Consideration. In consideration of the performance of the research activities described in Article I, the Government shall pay to the Contractor the sum of Twenty-One Thousand Four Hundred Thirty Dollars and No Cents (\$21,430.00) for the period from April 1, 1949, to June 30, 1951.

"2. Payment.

a. Prior to June 1, 1950, the Government has paid to the Contractor the sum of Four Thousand Five Hundred Dollars (\$4,500.00), which represents the initial payment of the lump-sum consideration stated in Section I 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 Eight Thousand Four Hundred Sixty-Five Dollars (\$8,465.00). 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 Eight Thousand Four Hundred Sixty-Five Dollars (\$8,465.00).

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 project 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 project, an estimate of the 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 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 program, budget and the additional amount to be paid to the Contractor shall be incorporated into a formal modification of this contract."

4. Delete Sections 2 to 3 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."

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

"Article VI - 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.c. of Appendix "A" shall vest in the Government."

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."

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

In witness whereof, the parties hereto have executed this Supplement 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  
Assistant to the Manager, ORO  
Title

RECTOR AND VISITORS OF THE  
UNIVERSITY OF VIRGINIA

BY: Colgate W. Darden, Jr.  
Colgate W. Darden, Jr.  
President  
Title

ACCEPTANCE BY PROJECT LEADER

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

Charles L. Gammell  
Project Leader  
June 26, 1950

STATEMENT NO. 1 TO APPENDIX "A"

This Supplement No. 1 describes the research program and budget for Contract No. AT-(40-1)-263, for the period July 1, 1950, to June 30, 1951.

1. Research Program Continues unchanged.

2. Budget.

A. Contractor will furnish:

- (1) Laboratory equipped with autoscaler, Geiger tubes and monitoring devices.
- (2) Services of Project Leader during regular school term.
- (3) Overhead - including administrative and clerical expenses.

B. Commission will furnish:

(1) The sum of \$10,000.00 to cover the following approximate requirements:

a. Personnel

Project Leader (3 months salary).....	\$2,100.00
Research assistant (12 months).....	4,200.00
Technician (12 months).....	<u>3,000.00</u>

TOTAL .....\$8,300.00

b. Equipment

4 stainless steel trays@ 25.00.....	100.00
Calorimeter.....	200.00
Perfusion apparatus for heart.....	140.00
Stand for apparatus.....	60.00
2 isolated tissue baths.....	50.00
Slides.....	25.00
Glassware.....	200.00
Other apparatus.....	<u>60.00</u>

TOTAL..... \$ 835.00

c. Chemicals..... 100.00

d. Radioactive Phosphorus..... 315.00

e. Animals and blood donors..... 300.00

f. Travel..... 150.00

GRAND TOTAL \$10,000.00

1110965

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.

3. 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 Supplemental Agreement).

None.

APPENDIX "C"

DISTRIBUTION AND SCHEDULING OF REPORTS  
FOR DIRECT AEC RESEARCH CONTRACTS

	Date	Copies and Distribution	Remarks
<b>CONTRACTOR REPORTS</b>			
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	
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.

1110967

NOTE: Full Addresses as follows:

Washington Offices:

Atomic Energy Commission  
(Add name of Division or Branch)  
1901 Constitution Avenue, N. W.  
Washington, D. C.

Oak Ridge Operations Office

Atomic Energy Commission  
Office of Research and Medicine  
Post Office Box E  
Oak Ridge, Tennessee

The appropriate Washington Divisions are:

Division of Biology and Medicine - for contracts in Biology and Medicine.

Division of Research - for contracts in physical research.

1110968

# STATEMENT AND CERTIFICATE OF AWARD

No. AT-(40-1)-263  
(Contract)

Date April 1, 1949

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

(Bureau or office)

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

- 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) (i)" 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).

## 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.

*[Handwritten Signature]*

(Signature of contracting officer)

R. H. Cook

Deputy Manager

(Title)

NOTE.—This statement and certificate will be used to support all agreements, both formal contracts and less formal agreements of whatever character, involving the 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 an officer other than the contracting officer, when execution and signature may be made by such officer).

1110969

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

TYPED \_\_\_\_\_  
PREPARED \_\_\_\_\_  
APPROVED \_\_\_\_\_  
RETURN TO \_\_\_\_\_  
CONTRACT SECTION

RESEARCH CONTRACT

CONTRACT NO.: AT-(40-1)-263

CONTRACTOR: Rector & Visitors of the University of Virginia

ADDRESS: Charlottesville, Virginia

PROJECT: Study of the Effect of Beta Radiation on  
the Distribution of Phosphate in Red Blood  
Cells and in Cardiac Muscle.

PROJECT LEADER: Dr. Chalmers L. Gemmill

AMOUNT OF CONTRACT: \$11,514.00

CONTRACT ASSIGNED TO:

FOR TECHNICAL ADMINISTRATION

Medical Branch  
Division of Biology and Medicine  
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 1st day of April, 1949, by the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and LECTOR & VISITORS OF THE UNIVERSITY OF VIRGINIA (hereinafter called the "Contractor");

ARTICLE I - PURPOSE AND SCOPE

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

2. The work shall consist of research and study of the effect of Beta Radiation on the distribution of phosphate in red blood cells and in cardiac muscle.

and submission of reports thereon. The plan of approach to the problem and the agreed upon program and budget for the project are described in Appendix "A" hereto.

3. The work will be carried out by the Contractor under the direction of Dr. Chalmers L. Gemmill.

ARTICLE II - TERM OF CONTRACT

The performance of work under this contract shall commence on April 1, 1949 and shall continue until June 30, 1950; provided, however, that the term of this contract may be extended by mutual agreement, it being recognized by the parties that completion of the research project described herein may involve a period of several years.

ARTICLE III - PROGRAM DEVELOPMENT AND FINANCING

1. PAYMENT

a. Payments to the Contractor by the Government under this contract during the period beginning April 1, 1949 and ending June 30, 1950, shall not exceed the sum of Eleven Thousand Five Hundred Fourteen (\$11,514.) and the Commission has obligated funds in this amount for such purposes. However, this sum may be revised at any time by mutual agreement of the parties with or without a formal modification of this contract.

b. On the effective date of this contract the Commission shall pay to the Contractor a sum which shall represent a mutually agreed upon estimate of the Contractor's cost of operations under this contract during the first two quarters. 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 this contract during the preceding quarter, and the Commission shall promptly pay all such vouchers. However, the initial advance payment, together with all quarterly payments, shall not exceed the total sum described in Section 1.a. of this Article, as such sum may be revised by mutual agreement.

2. PROGRAM AND BUDGET

Prior to April 1, 1950 the Contractor will submit to the Commission a proposed program and budget for the period July 1, 1950 through June 30, 1951, showing the proposed work to be financed by the Commission and the Contractor. Concurrently with the above program and budget submission the Contractor shall furnish the Commission with a financial statement showing the obligations incurred and the expenditures made in the preceding period. On or before June 1, 1950, or on such other date as may be agreed upon, 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 in carrying on the work for the period July 1, 1950 through June 30, 1951. Such amount 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 for the preceding period shall be applied in reduction of funds required to cover the new budget. 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.

ARTICLE IV - ADMINISTRATION OF CONTRACT 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  
 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 quarterly progress reports 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 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 required in the performance of the work hereunder, through the Commission's Isotope Division, Post Office Box E, Oak Ridge, Tennessee. (See

Article X) 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:

Add the words "stable isotopes, irradiation services and cyclotron time" after the word "radioisotopes" in the second line of Article VII.

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: R. W. Cook  
R. W. Cook, Deputy Manager *es*  
**RECTOR & VISITORS OF THE**  
**UNIVERSITY OF VIRGINIA**  
(Contractor)

WITNESSES:

Francis L. Shea

Wayne M. Rule

ACCEPTANCE BY PROJECT LEADER

BY: Walter W. Doster Jr.  
TITLE: PRESIDENT

I have read the foregoing contract and hereby agree to be bound by its provisions.

Chalmers L. Jewell  
Project Leader

Approved  
W. H. Lippard  
Dean

1. RESEARCH PROJECT

- a. Title of Investigation: The effect of beta radiation on the distribution of phosphate in red blood cells and in cardiac muscle.
- b. Responsible Investigator: Chalmers L. Gemmill, M.D., Professor of Pharmacology, University of Virginia, Charlottesville, Virginia.
- c. Plan Of Research: During the past year, a study has been made of the transfer of radioactive phosphorus from the plasma into the red blood cell under the influence of various anesthetics. Three facts came out of this work (1) the transfer of radioactive phosphorus is dependent on temperature and the concentration of glucose; (2) the rate of transfer varies in various samples of human blood; (3) certain anesthetics block this transfer. Factors (1) and (3) demonstrate that this transfer is dependent on metabolic activity of the red blood cell and that this transfer is not a simple process of diffusion. These results are being published in the Journal of Pharmacology and Experimental Therapeutics. It is now proposed to continue these experiments with a study of phosphate distribution between the various carbohydrate factors in the red blood cell and in the beating isolated heart. These experiments will give information concerning the metabolism of these two tissues. When a definite correlation is found for the distribution of phosphates, the concentration of radioactive phosphorus will be increased to a point where a change may be produced due to the primary effect of the beta radiation. If such an effect is obtained, a detailed analysis of the enzymes concerned in the uptake of phosphorus in the glycogen cycle will be undertaken.

The laboratory is equipped with an autoscaler, Geiger tubes and monitoring devices. It is also prepared and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycle. There is need, however, for additional scaler and Geiger tubes. There is also need for a high speed centrifuge and a refrigerator. There is need for a trained research assistant and for a technician.

2. BUDGET

- a. The Contractor will furnish:
  - (1) A laboratory equipped with an autoscaler, Geiger tubes and monitoring devices.
  - (2) The Contractor is also prepared and equipped to do the fractionation and analysis of the phosphate compounds in the glycogen cycle.
  - (3) Services of Dr. Chalmers L. Gemmill as project leader during regular school term.

(4) Administrative and clerical assistance and other overhead.

- b. The Commission will furnish funds not to exceed \$11,514 to be expended roughly as follows:

Personnel

Project Leader (3 months salary)	\$2,100.	
Research Assistant (10 months)	3,000.	
Technician (15 months)	<u>2,500.</u>	
Subtotal.....		\$7,600.

Equipment

SC-Sample Holder and Tube Mount	\$ 29.	
Washing Machine - Charlab	750.	
Equipment for Machine	100.	
Kanostat	95.	
SU-3 Beta-Gamma Monitor	310.	
One TGC Counter - 2 tubes	75.	
Two TGC Counters - 1 tube	100.	
2000 Aluminum plates	240.	
3 Thin Wall Beta Counters	75.	
Edge Service	25.	
Glassware	500.	
Other Apparatus	<u>500.</u>	
Subtotal.....		\$2,799.

Chemicals

150 m c P32	\$ 315.	
Liquid Air	100.	
Other Chemicals	<u>100.</u>	
Subtotal.....		\$ 515.

Animals and Blood Donors 300.

Travel

Travel	300.	
Total.....		<u>\$11,514.00</u>

The above equipment will implement the Contractor's laboratory.

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

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## 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 5 of this Appendix. 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. LEGGH-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 (1½) 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.

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