

SUPPLEMENTAL AGREEMENT

THIS SUPPLEMENTAL AGREEMENT, entered into this 6th day of June, 1958, effective as of June 1, 1958, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), represented herein by the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission"), and the UNIVERSITY OF TENNESSEE (hereinafter called the "Contractor");

WITNESSETH THAT:

WHEREAS, the Government and the Contractor entered into Contract No. AT-(40-1)-1829, dated June 6, 1957, providing for research into the metabolism of alkaline earth metals by bone; and

WHEREAS, the Commission desires to provide for additional research as more particularly described in TITLE II of 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 "2." is added to Article II:

"2. The period during which the work under this contract may be conducted is hereby extended to May 31, 1959."

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

"b. In consideration of the performance of the additional work described in TITLE II of Appendix "A", and the Contractor's agreement to support that work in the estimated amount of Seven Thousand, Seven Hundred Fifty-six Dollars (\$7,756.00), the Government will pay to the Contractor Eight Thousand, Five Hundred Eighty Dollars (\$8,580.00).

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REPOSITORY Oak Ridge Operations
COLLECTION Records Holding Area
BOX No. Doc. 1944-94
FOLDER Contracts AT-(40-1) 1815-2097
1061 Bldg. 2714-H
Univ. of Tenn.
cont. AT-(40-1)-1829 (1815-2097)

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

5. 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."

6. The following new TITLE "II" is added in Appendix "A":

"TITLE II

"This TITLE II 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 on and related to the metabolism of alkaline earth metals by bone, particularly with regard to strontium and calcium, utilizing radioactive isotopes such as Calcium-45 and Strontium-89, and where appropriate Beryllium-7. The program will include (a) the uptake of strontium by human bone utilizing bone cultures, (b) the effect of species upon strontium uptake in chick and human bone and in relation to the Sr/Ca ratio, (c) the effect of development and the degree of calcification upon the discrimination for strontium as compared with calcium, (d) continuation of the studies of the alkaline earth elements with regard to uptake and removal by bone, (e) the function of enzymes in the control of discrimination as affected by inhibitors, available strontium and calcium, etc., (f) action of the hormones, and (g) the action of temperature on the Sr/Ca ratio in bone. Additional appropriate experiments to elucidate the metabolism of the important alkaline earth elements in bone will be conducted as needed.

"2. BUDGET

"a. Outline of Cost Estimates:

| | | |
|---|--------------|---------------------|
| (1) <u>Salaries and Wages:</u> | | \$ 7,694.00 |
| Dr. F. W. Lengemann (30% of time) | \$1,800.00 | |
| Consultants | 1,100.00 | |
| Research Technicians | 4,294.00 | |
| Administrative and Secretarial Assistance | 500.00 | |
| (2) <u>Equipment:</u> | | 1,700.00 |
| (3) <u>Supplies:</u> | | 1,600.00 |
| (4) <u>Travel:</u> | | 400.00 |
| (5) <u>Publication and Communication:</u> | | 100.00 |
| (6) <u>Overhead and Indirect Costs:</u> | | <u>4,842.00</u> |
| | TOTAL | \$16,336.00* |

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

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

7. 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."

8. 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/ Norman M. Roth~~
HERMAN M. ROTH, DIRECTOR
~~RESEARCH AND DEVELOPMENT DIVISION~~
(Contracting Officer)

WITNESSES:

UNIVERSITY OF TENNESSEE

~~/s/ Evelyn Sims~~
~~Knoxville, Tenn.~~
(Address)

BY: ~~/s/ C. E. Brooks~~

TITLE: ~~President~~

~~/s/ Emily B. Smith~~
~~Knoxville, Tennessee~~
(Address)

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/ Frederick W. Longman~~
Senior Investigator

APPENDIX "C"

REPORTS AND PROPOSALS
(FOR DIRECT AEC RESEARCH CONTRACTS)

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

NOTES:

All of the above should be addressed to:

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

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

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

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.

UNITED STATES
ATOMIC ENERGY COMMISSION

LUMP SUM
RESEARCH CONTRACT

Contract No. AT-(40-1)-1829

THIS CONTRACT, entered into this 6th day of June, 1957, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government"), acting through the UNITED STATES ATOMIC ENERGY COMMISSION (hereinafter called the "Commission") and the UNIVERSITY OF TENNESSEE (hereinafter called the "Contractor"):

ARTICLE I - PURPOSE AND SCOPE

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

2. The work shall consist of research by the Contractor into the metabolism of alkaline earth metals by bone. The plan of approach to the problem and the agreed upon program and budget for the project are described in Appendix "A", which is hereby made a part of this contract. The Contractor shall be guided by, but not bound to conform to the details of, the budget described in Appendix "A".

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

4. The work will be carried out by the Contractor under the direction of Dr. Frederick W. Lengemann as Senior Investigator.

ARTICLE II - TERM OF CONTRACT

1. The initial period of performance for the research project covered by this contract will commence on June 1, 1957, and will end on May 31, 1958. 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

a. In consideration of the performance of the research activities described in Title I of Appendix "A", and the Contractor's agreement to support

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that work in the estimated amount of Seven Thousand, Five Hundred Ninety-six Dollars (\$7,596.00), the Government will pay to the Contractor for the first period of performance the sum of Eight Thousand, Six Hundred Forty Dollars (\$8,640.00).

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 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 until the expiration of three years after final payment under 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 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 until the expiration of three years after final payment under this 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 (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 - 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 byproduct 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.

ARTICLE VII - 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".

ARTICLE VIII - GENERAL PROVISIONS

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

ARTICLE IX - 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 contract 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)

~~ADDRESS~~ ATTEST:

/s/ J. P. Hess

Secretary
(Address)
(SEAL)

(Address)

UNIVERSITY OF TENNESSEE

BY: /s/ C. E. Brehm

TITLE: President

ACCEPTANCE BY SENIOR INVESTIGATOR

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

/s/ Frederick J. Lengenann
Senior Investigator

APPENDIX "A"

TITLE I

June 1, 1957 - May 31, 1958

This TITLE I describes the research program and cost estimates agreed upon between the Commission and the Contractor for the first period of performance.

1. PROGRAM

a. Scope and Plan of Approach:

The Contractor will undertake studies on the metabolism of alkaline earth metals in bone, comparing the metabolism of the various members of the alkaline earth group of elements, with reference to bone deposition, atomic structure, chemical properties of the minerals and bone materials, etc. Phases of the mineral metabolism will be investigated in growing bone to determine processes under enzyme influence, the rate of strontium calcium removal from bone and means to alter it, and the mechanism by which stable strontium inhibits calcification and increases discrimination against radioactive strontium by bone. Investigations will be made into initial stages of calcium-strontium uptake by bone, and into long-term uptake, turnover, and removal of strontium. Various associated work will involve further elucidation of the means by which strontium and calcium are mutually involved in the long-term metabolism of important animals.

2. BUDGET

a. Outline of Cost Estimates for the First Period:

| | | |
|--|------------|-----------------|
| (1) <u>Salaries and Wages:</u> | | \$6,390.00 |
| Dr. F. W. Lengemann (30% of time) | \$1,690.00 | |
| Consultants | 1,100.00 | |
| Research technician | 3,150.00 | |
| Administrative and Secretarial Assistance | 450.00 | |
| (2) <u>Equipment:</u> | | 2,100.00 |
| (3) <u>Supplies:</u> | | 2,500.00 |
| (4) <u>Publication and Communications:</u> | | 100.00 |
| (5) <u>Travel:</u> | | 300.00 |
| (6) <u>Overhead and Indirect Costs:</u> | | <u>4,816.00</u> |
| | TOTAL | \$16,236.00 |

Appendix "A" - Cont.

- 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 invention or discovery is made or conceived by the Contractor or its employees in the course of, in connection with, or under the terms of 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 or compensation under the provisions of the Atomic Energy Acts of 1946 and 1954 shall be asserted by the Contractor or its employees with respect to any invention or discovery made or conceived in the course of, in connection with, or under the terms of 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 such clerical and manual labor personnel as 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 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. 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.

8. Convict Labor

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

9. Termination

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

10. Eight-Hour Law

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

11. 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.

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.

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.

APPENDIX "C"

REPORTS AND PROPOSALS
(FOR DIRECT AEC RESEARCH CONTRACTS)

| | Date Due | Copies |
|--|---|--------|
| 1. Progress Report | March 1 | Six |
| 2. Renewal Proposal | March 1 | Six |
| 3. 200-word summary of purpose and scope with submittal date indicated thereon | Following completion of negotiation of contract and any renewal | Three |
| 4. Complete Scientific Report | On contract termination | Six |
| 5. Radioisotopes Purchase Report | With renewal proposal if proposal is submitted, otherwise on contract termination | Three |
| 6. Brief reports or manuscripts may be submitted as desired by 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 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.

1108561

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 specify 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 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 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.

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.



UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY, REFER TO

ORS:JDB

Oak Ridge, Tennessee
February 3, 1960

Dr. Frederick W. Lengemann
Laboratory of Radiation Biology
Department of Physiology
New York State Veterinary College
Cornell University
Ithaca, New York

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

Thank you for submitting a copy of the document entitled

"Studies on the Discrimination Against Tritium by Bone
Grown In Vitro"

The AEC's Patent Branch has reviewed the document submitted and has found no inventions disclosed which require patent action prior to its release for publication. Accordingly, no delay in release will be requested.

Your cooperation in this matter is appreciated.

Very truly yours,

Herman M. Roth

Herman M. Roth
Director
Research and Development Division

*OK
2-4-60*

CONTRACTS-1829
ORCB
C. J. ...
2/4/60

1108564

Office Memorandum • UNITED STATES GOVERNMENT

TO : S. W. Scott, Chief
Patent Branch

DATE: January 28, 1960

FROM : Herman M. Roth, Director
Research and Development Division

SUBJECT: PATENT REVIEW OF UNCLASSIFIED DOCUMENTS - CONTRACT NO. AT-(40-1)-1829
(UNIVERSITY OF TENNESSEE)

SYMBOL: ORS:JDB

In compliance with a memorandum dated August 19, 1957, symbol MCP:DSZ, subject "Patent Review of Documents Prior to Release", we are submitting, for your review and appropriate action, one copy of the following document prepared in connection with the work being performed under the above contract:

"Studies on the Discrimination Against Strontium by Bone
Grown In Vitro"

Herman M. Roth
Herman M. Roth

Enclosure:
Document

D. B. Zick
1-28-60

CONTRACTS

1108565

fi

Office Memorandum • UNITED STATES GOVERNMENT

TO : S. W. Scott, Chief
Patent Branch

DATE: January 28, 1958

FROM : Herman M. Roth, Director
Research and Development Division

SUBJECT: PATENT REVIEW OF UNCLASSIFIED DOCUMENTS - CONTRACT NO. AT-(40-1)-1829
(UNIVERSITY OF TENNESSEE)

SYMBOL: ORS:JDB

In compliance with a memorandum dated August 19, 1957, symbol MCP:DSZ, subject "Patent Review of Documents Prior to Release", we are submitting, for your review and appropriate action, one copy of the following document prepared in connection with the work being performed under the above contract:

"Studies on the Discrimination Against Strontium by Bone Grown In Vitro"

Herman M. Roth
Herman M. Roth

Enclosure:
Document

ORS
1-27-58
538

CONTRACTS-1829
(4 of 10)

1108566

NEW YORK STATE VETERINARY COLLEGE
A unit of the State University of New York
CORNELL UNIVERSITY
ITHACA, NEW YORK

LABORATORY OF RADIATION BIOLOGY
DEPARTMENT OF PHYSIOLOGY

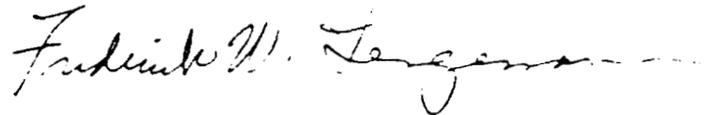
January 19, 1959

Dr. Herman M. Roth, Director
Research and Development Division
United States Atomic Energy Commission
Oak Ridge, Tennessee

Dear Dr. Roth:

Enclosed is a manuscript entitled "Studies on the Discrimination Against Strontium by Bone Grown In Vitro" by F. W. Lengemann. The major portion of this work was performed while I was the holder of an A.E.C. contract AT-40-1-1829. I would like your permission to submit this manuscript for publication. My intention is to publish it in the Journal of Biochemistry. If they should deem it outside their interests I shall then rearrange the data and text slightly to fit the format of the American Journal of Physiology.

Sincerely yours,



Frederick W. Lengemann
Associate Professor
of Radiation Biology

FWL:nj

FWL Enclosure

CONTRACTS - 182919
1823

1108567

JAN 21 1960

L. D. MacKay, Director
Finance Division

June 3, 1959

Herman M. Roth, Director
Research and Development Division

CONTRACT NO. AT-(40-1)-1829 - UNIVERSITY OF TENNESSEE

SYMBOL: ORS:JDB

This is to advise you that work under Contract No. AT-(40-1)-1829 with the University of Tennessee has been completed and that an acceptable final report has been submitted. Therefore, the obligations of the University have been concluded and the contract should be closed out.

ORIGINAL FILED
C. S. Shoup
Herman M. Roth

cc: J. R. Moore
F. E. McPherson

6-2-59 P 3226 *Copy 6/3/59*

| | | | | | |
|-----------|------------------|-----------|-----------|-----------|----------------|
| OFFICE ▶ | RES. & DEV. DIV. | FIN. DIV. | ADM. DIV. | CONTRACTS | AT-(40-1)-1829 |
| SURNAME ▶ | <i>Low</i> | | | | |
| DATE ▶ | <i>6/2/59</i> | | | | |

1108568

DATE: 6-3-59 R-3927

INDEX: Cont 1829, 1830

TO: Wood

FROM: Group PDB

SUMMARY: Cont. Nos. 1637 + 1839

FILED: Cont 1837, 1838

INDEXER:

REMARKS:

U. S. ATOMIC ENERGY COMMISSION
CORRESPONDENCE REFERENCE FORM

1108569

Type LS

Contract No. Institution Project Leader
AT-(10-1)-1829 University of Tennessee Dr. Frederick W. Lenger

Purpose Contracting Officer
Research into the metabolism of alkaline earth metals by bone. Chief, Biology Branch

Contract Period Amount of Funds
6-1-57 - 5-31-58 \$ 8,640.00
6-1-58 - 5-31-59 8,580.00

| Amount | Disposition | Vouchers Paid | | Disposition | Date |
|----------|------------------|---------------|--------|-------------|------|
| | | Date | Amount | | |
| 3,888.00 | Accounts Payable | 7-11-57 | | | |
| 3.00 | " | 12-4-57 | | | |
| 864.00 | " | 4-25-58 | | | |
| 3,561.00 | " | 12-4-57 | | | |
| 3,561.00 | " | 12-4-57 | | | |
| 858.00 | " | 6-1-59 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

closed out 6-1-59
(unexpended funds transferred to contract no 1637.
\$ 4,801. -

CONTRACTS - 1829 (40) Term

Office Memorandum • UNITED STATES GOVERNMENT

TO : Herman M. Roth, Director
Research and Development Division,
Oak Ridge Operations Office

DATE May 21, 1959

FROM : C. D. Van Cleave, Medical Research Branch
Division of Biology and Medicine, Washington

SUBJECT: FINAL REPORT - CONTRACT NO. AT(40-1)-1829 - UNIVERSITY OF TENNESSEE
(LENGEMANN)

SYMBOL: BMM:CDVC

The final report submitted by Dr. Lengemann on the subject contract is satisfactory to this office. The unexpended funds on this contract are being dealt with in a separate supplemental contract authorization (Contract No. AT-(40-1)-1637.)

MAY 27 1959

AT(40-1)-1829(40) Tenn

1108571

Those Listed Below

May 8, 1959

Herman M. Roth, Director
Research and Development Division, Oak Ridge

FINAL REPORT - CONTRACT NO. AT-(40-1)-1829 - UNIVERSITY OF TENNESSEE
(DR. F. W. LEHOFMANN)

SYD:OL: ORS:JDB

In accordance with the distribution established by a memorandum dated
December 1, 1954, from J. C. Hughes and T. E. Johnson, we are enclosing
the final report of the work performed under Contract No. AT-(40-1)-
1829 with University of Tennessee.

 Herman M. Roth

Enclosure:
Final Report

Addresses:

- C. L. Lushen, Director, Division of Biology and Medicine, Headquarters (2)
- R. A. Anderson, Chief, Patent Branch, Headquarters (1)
- C. L. Shannon, Chief, Technical Information Service Extension (1)

cc: S. W. Scott

CONTRACTS-1829
(40-1-1829)

Handwritten:
5-6-59

| | | | | | | |
|-----------|------------------|----------------------|---------------|--|--|--|
| OFFICE ▶ | Res. Ser. Br. | Biology Br. | Res. & Dev. | | | |
| SURNAME ▶ | <i>Lehofmann</i> | <i>C. L. Shannon</i> | | | | |
| DATE ▶ | <i>5/7/59</i> | <i>for HMR</i> | <i>5/7/59</i> | | | |

1108572

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

May 1, 1959

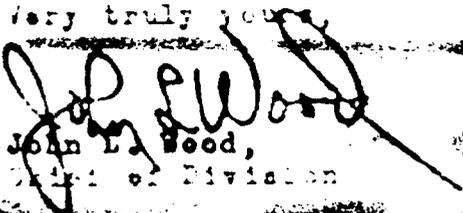
Dr. O. S. Sheup, Chief
Biology Branch
Research and Development Division
United States Atomic Energy Commission
Oak Ridge, Tennessee

Dear Dr. Sheup:

After some delay due to the Federation Meeting, I have prepared a supplementary proposal to contract number AT-(40-1)-1637 for transfer of unexpended funds from contract number AT-(40-1)-1829 between the Atomic Energy Commission and the University of Tennessee. Enclosed are six copies of the supplementary proposal endorsed by Vice-President O. W. Hyman, six copies of a final report for contract AT-(40-1)-1829 including a Status of the Total Cost Budget to March 1, 1959 and six copies of the Final Status Total Cost Budget which has been prepared by our business office.

It is hoped that these documents will be adequate for the Atomic Energy Commission's consideration of our proposal.

Very truly yours,


John L. Wood,
Chief of Division

JLW:blh

Enclosures
C. H. ...

1108573

CONTRACTS 1829/40-1

612:JUN

Oak Ridge, Tennessee
April 8, 1959

Dr. John L. Wood
Chief, Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Wood:

Reference is made to your letter of March 31, 1959, regarding Contract No. AT-(40-1)-1829 which the University desires to terminate prior to its present expiration date, May 31, 1959, in view of Dr. F. W. Lenzmann's departure from the University. We note that the University desires to transfer the funds remaining under this contract (approximately \$3920) to another existing AEC contract with the university in order to purchase a spectrophotometer in connection with the research under that project.

The transfer of the unexpended funds as indicated above would require prior approval from AEC Headquarters. Therefore, it would be necessary that you prepare a supplemental proposal under the contract which you propose to use these funds. The proposal should indicate the additional research to be performed by utilizing these funds, item or items to be purchased, and any additional support the University will contribute to the project.

Upon receipt of the proposal in sextuplicate, endorsed by an administrative officer of the University, we will forward it through channels to AEC Headquarters for review and appropriate action.

If we can be of further assistance to you in this matter, please advise us.

Very truly yours,

Original signed by
C. S. Shoup
Chief, Biology Branch
Research and Development Division

cc: C. W. Nipton, Memphis

| | | | | | | | | |
|---------|-----------------|----------|--|--|--|--|--|--|
| OFFICE | Rec. Admin. Br. | Rec. Br. | | | | | | |
| SURNAME | Shoup:skt | Shoup | | | | | | |
| DATE | 4/7/59 | 4-8-59 | | | | | | |

1108574

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

1829
1829

Dr. G. S. Shoup, Chief
Biology Branch
Research and Development Division
United States Atomic Energy Commission
Oak Ridge, Tennessee

Dear Dr. Shoup:

Dr. Frederick W. Lenzmann, has been under investi-
gation on contract number AT-(40-1)-1004 between the
University of Tennessee and the United States Atomic Energy
Commission. Dr. Lenzmann left the employ of the University on March
15, 1958. His last salary payment of \$1,000.00 was made
including a portion of the final report. The final
report on this contract will be prepared by 31, 1958
and estimated at \$1,000.00. The cost of this report should
be paid by the A.E.C. as the University has no funds which
could be used to purchase equipment. The cost of this
report will be paid by the A.E.C. as the University has no
funds which could be used to purchase equipment. In
addition, the cost of this report will be paid by the
A.E.C. as the University has no funds which could be
used to purchase equipment. The cost of this report
will be paid by the A.E.C. as the University has no
funds which could be used to purchase equipment. If
any further information is needed, please advise me
and I will be glad to provide it.

John Wood
Director of Division

JWW:SLB

CONTRACT - 1829 (U of Tenn.)

1108575

APR 1 1959

ORG:JDB

Oak Ridge, Tennessee
February 13, 1959

Dr. F. W. Longemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Longemann:

Thank you for your letter of February 10, 1959, advising us that you do not plan to renew Contract No. AT-(40-1)-1829 since you are leaving the University of Tennessee to accept a new position at Cornell University.

Inasmuch as the contract does not expire until May 31, 1959, and since you have indicated that you are leaving the university prior to this date, we shall appreciate your advising us, as soon as possible, whether the University desires to select a new senior investigator to continue the project. Since the selection of a senior investigator requires prior approval from the Headquarters, it will be necessary that we receive a formal request from the University together with a curriculum vitae on the individual selected.

In the event the University desires to continue the project after your departure, we shall appreciate receiving a progress report covering the findings under the contract up to the date of your departure. In the event the University does not desire to continue the project, then we should like to receive a final report which shall contain a summary of all the work performed under the project from the inception date of the contract to the proposed termination date. It is suggested that you prepare the appropriate report prior to your leaving the University.

Your cooperation in advising us in this matter as soon as possible will be appreciated.

Very truly yours,

R 1014

CONTRACTS - 10000000

Handwritten: 13.59

| | | | | |
|--------|---|------------------------------------|-----------------------------------|--|
| OFFICE | RES. SEC. DIV. W. C. Tilton, Memphis | SEC. DIV. W. C. Tilton, Memphis | RESEARCH AND DEVELOPMENT DIVISION | |
| NAME | W. C. Tilton | W. C. Tilton | | |
| DATE | 2/13/59 | 2/16/59 | | |

1108576

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

February 10, 1959

Dr. H. L. Roth, Director
Research and Development Division
U. S. Atomic Energy Commission
Oak Ridge, Tennessee

Dear Dr. Roth,

I have just received notice that a progress report will be due on March 1, 1959 for my contract AT-(40-1)-1429. I would like to inform you at this time that I will not be applying for a renewal of this contract. In addition, I would like your permission to submit a final report, instead of a progress report, by the 15th of March of 1959.

I shall be leaving the University at the end of March to take a new position at Cornell University.

Sincerely yours,



Frederick W. Wentmann

1108577

1108577

CFB 11 1959

001:578

Cockfield, Tennessee
February 27, 1959

Mr. Cecil Q. Tipton
Administrative Assistant
to the Vice President
University of Tennessee
Memphis 3, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Mr. Tipton:

Reference is made to your letter of February 23, 1959, advising us that the university does not desire to continue the research under Contract No. AT-(40-1)-1829 after Dr. Frederick Lengemann's departure from the University on March 23, 1959.

In view of the above, we propose to close out the contract as of March 23, 1959. Therefore, we shall appreciate receiving a financial statement reflecting the actual expenditures of both the University and the A&C funds under the contract through the proposed termination date. Upon receipt of the financial statement, we shall initiate action for the preparation of a modification to the contract to indicate the new termination date and the actual contributions of both the University and the A&C to the project. In the event the amount of funds the A&C has paid to the University is greater than the amount determined to be the actual cost to the A&C, the difference shall be returned to us. Incidentally, prior to our closing out the contract, it will be necessary that we receive a satisfactory final report as indicated in our letter of February 13, 1959, to Dr. Lengemann.

Your cooperation in this matter is appreciated.

Very truly yours,

CONTRACTS-1829-2/29

C. C. Choup
Chief, Biology Branch
Research and Development Division

R 1290

Handwritten: Done 2/27/59

| | | | |
|----------------------------------|---------|--|--|
| cc: Frederick Lengemann, Memphis | | | |
| OFFICE | | | |
| DATE | 3-27-59 | | |

1108578

THE UNIVERSITY OF TENNESSEE
ADMINISTRATIVE OFFICE
62 SOUTH DUNLAP
MEMPHIS 3, TENNESSEE



March 6, 1959

Dr. C. S. Shoup
U. S. Atomic Energy Commission
Oak Ridge, Tennessee

Re: Contract No. AT-(19-1)-1029

Dear Dr. Shoup:

I enclose financial statements for the referenced contract as of March 1, 1959, which reflect the estimated status of the account as of March 23, 1959.

It is my intention to render a final report as of March 25, 1959 which will indicate the exact status of the account as of that date.

Very truly yours,

Cecil G. Tipton
Administrative Assistant
to the Vice President

CST/LL
Enclosures *1-1-1959*
cc: Dr. Frederick Langford

MAR 8 - 1959

1108579

CONFIDENTIAL - (65-21-1029)

CONTRACT NO. AT-(40-1)-1829

STATUS OF TOTAL COST BUDGET

MARCH 1, 1959

| | <u>ORIGINAL BUDGET</u> | <u>EXPENDITURES TO DATE</u> | <u>ESTIMATE THROUGH 3-23-59</u> | <u>TOTAL EXPENDITURES AND ESTIMATES</u> | <u>REMAINING BALANCE 3-23-59</u> |
|--|------------------------|-----------------------------|---------------------------------|---|----------------------------------|
| Salaries | \$7,474.82 | \$2,808.70 | \$ 482.64 | \$ 5,291.34 | \$2,183.48 |
| Equipment | 1,700.00 | -0- | -0- | -0- | 1,700.00 |
| Supplies | 1,700.00 | 734.42 | 194.00 | 928.42 | 771.58 |
| Travel | 400.00 | 127.51 | -0- | 127.51 | 272.49 |
| Overhead and Indirect Costs (Including Retirement) | 5,061.18 | 3,531.00 | 434.05 | 3,965.05 | 1,126.13 |
| Totals | <u>16,336.00</u> | <u>8,201.63</u> | <u>610.69</u> | <u>8,812.32</u> | <u>8,123.68</u> |
| Less: University Contribution as Per Statement-- | | | | <u>1,481.25</u> | <u>1,071.75</u> |
| Total Applicable to AEC | | | | 7,331.07 | 7,051.93 |
| Less: Remaining 10% Not Filled-- | | | | | 705.19 |
| AEC Funds Received to Date | | | | <u>7,720.00</u> | |
| Estimated Refund as Per AEC Statement | | | | <u>43,921.93</u> | <u>43,921.93</u> |

1108580

3 23 59

MAR 9 - 1959

CONTRACT NO. AF-(11-1)-1120

STATUS OF ACCOUNT

MARCH 1, 1959

| | <u>ORIGINAL BUDGET</u> | <u>EXPENDITURES TO DATE</u> | <u>ESTIMATE THROUGH 3-23-59</u> | <u>TOTAL EXPENDITURES AND ESTIMATES</u> | <u>REMAINING BALANCE 3-23-59</u> |
|---|------------------------|-----------------------------|---------------------------------|---|----------------------------------|
| Salaries | \$1,171.82 | \$2,333.70 | 207.01 | \$ 2,541.34 | \$1,033.25 |
| Equipment | 1,700.00 | -0- | -0- | -0- | 1,700.00 |
| Supplies | 1,450.00 | 528.17 | 174.00 | 702.17 | 747.83 |
| Travel | 200.00 | 127.51 | -0- | 127.51 | 72.49 |
| Overhead and Indirect Costs (Including Retirement) | <u>857.18</u> | <u>378.50</u> | <u>59.55</u> | <u>1295.23</u> | <u>127.27</u> |
| Totals | \$3,580.00 | \$3,369.88 | 266.56 | \$3,636.44 | \$1,775.93 |
| Less: Remaining 10% Not Billed | | <u>350.00</u> | | | <u>350.00</u> |
| ABC Funds Received To Date | | <u>17,722.00</u> | | <u>17,722.00</u> | |
| Estimated Funds to be Returned | | | | <u>\$3,920.93</u> | <u>\$3,920.93</u> |

1108581

INSTITUTIONAL CONTRIBUTIONS

CONTRACT NO. AT-(40-1)-1529

MARCH 1, 1959

| | <u>ORIGINAL BUDGET</u> | <u>EXPENDITURES TO DATE</u> | <u>ESTIMATE THROUGH 3-23-59</u> | <u>TOTAL EXPENDITURES AND ESTIMATES</u> | <u>REMAINING BALANCE 3-23-59</u> |
|-----------------------------|--------------------------|-----------------------------|---------------------------------|---|----------------------------------|
| Salaries | \$3,300.00 | \$2,475.00 | \$ 275.00 | \$ 2,750.00 | \$ 550.00 |
| Supplies | 250.00 | 208.25 | 20.00 | 228.25 | 13.75 |
| Overhead and Indirect Costs | <u>1,200.00</u> | <u>3,154.50</u> | <u>350.00</u> | <u>3,505.00</u> | <u>701.00</u> |
| Totals | <u><u>\$7,750.00</u></u> | <u><u>\$5,835.75</u></u> | <u><u>\$ 625.00</u></u> | <u><u>\$6,461.25</u></u> | <u><u>\$1,274.75</u></u> |

THE UNIVERSITY OF TENNESSEE
ADMINISTRATIVE OFFICE
62 SOUTH DUNLAP
MEMPHIS 3, TENNESSEE



February 23, 1959

ms 71, 1959

Dr. C. S. Shoup, Chief
Biology Branch
Research & Development Division
U. S. Atomic Energy Commission
Oak Ridge, Tennessee

Re: Contract No. AT-(40-1)-1520

Dear Dr. Shoup:

Dr. John Wood, Chief of our Division of Chemistry and the immediate superior of Dr. Frederick Lengemann, advises me that Dr. Lengemann will leave the University on March 23, 1959.

The University will not exercise its option to select a new senior researcher to continue the work of the subject contract, and we wish to close the account on March 23, 1959.

It appears that a substantial balance of the funds received to date will be unexpended as of March 23. It is requested that we be advised of the commission's wish as to the disposition of these funds.

Very truly yours,

Cecil G. Tipton
Administrative Assistant
to the Vice President

CCT/11



1108583

1829(40) Tipton
3 1959
FEB 25 1959

THE UNIVERSITY OF TENNESSEE
ADMINISTRATIVE OFFICE
62 SOUTH DUNLAP
MEMPHIS 3, TENNESSEE



March 2, 1959

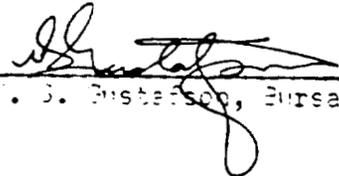
Dr. Kenneth Kasschau
Research and Development Division
Oak Ridge Operations Office
United States Atomic Energy Commission
Post Office Box E
Oak Ridge, Tennessee

Dear Dr. Kasschau:

Enclosed herewith are the final IO's voucher for the following contracts:

AT-(40-1)-1619
AT-(40-1)-1631
AT-(40-1)-2416

Sincerely yours,


W. S. Gustafson, Bursar

WSS:ka

Enclosure

1-2-59

- contract being closed out - funds are to be returned

Will pay when contracts are renewed with funds

CONTRACTS - 1829 (40-1) T...

MAR 4 - 1959

1108584



UNITED STATES
ATOMIC ENERGY COMMISSION

ORS:JDB

Oak Ridge, Tennessee
February 4, 1959

Dr. F. W. Lengenann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: RENEWAL OF CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengenann:

Your attention is invited to Appendix "C" of the contract which provides that a renewal proposal and a progress report will be due March 1, 1959. The renewal proposal and progress report may be submitted at any time after six months of performance under the current contract period. In any event, they should reach us no later than the prescribed date.

The information to be submitted is as follows:

1. Progress Report. Include information outlined in Appendix "C".
2. Expenditure Statement. Include a current expenditure statement for the present contract period. Information included should be as follows:
 - A. Statement should be based on both the contributions of the institution and the AEC.
 - B. The statement should reflect (1) the costs of the project to date, (2) an estimate of the costs for the remainder of the contract period, and (3) an estimate of the funds which will be available for financing the project during the proposed period of performance.
3. Renewal Proposal. Include the information as required in Appendix "C" of the contract. A budget should be included indicating the total costs to carry the project for the proposed period, based on the contributions of the institution as well as the funds requested from the AEC.

Handwritten signature
2-5-59

1108585

4. Ten-Percent Voucher. Include a voucher for the remaining ten percent of the agreed consideration as provided by Article III of the contract. This voucher will be held by us pending approval for renewal of the contract, after which it will be paid or if the contract is not renewed, it will be paid upon receipt of the complete scientific report.
5. Incident Report. Include information as required in Attachment "A".
6. Radioisotopes Purchase Report. Include listing of all radioisotopes provided for in the budget for the current period at the regular price established by the AEC, but which are purchased or will be purchased during the current period at a price less than the established price by using the discount authorized by an AEC Discount Certificate issued to the Contractor. For each such purchase, the report shall state (1) the price established by the AEC, (2) the price paid or to be paid using the discount, and (3) the savings realized or to be realized.

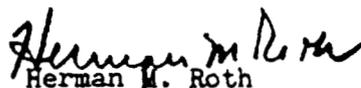
The progress report, expenditure statement, and renewal proposal should be endorsed by the proper administrative officials and six copies of each, together with the voucher, should be submitted at the same time to:

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

If you do not contemplate requesting renewal, we shall appreciate your advising us as soon as possible.

Your cooperation and assistance in this matter is appreciated.

Very truly yours,



Herman M. Roth
Director
Research and Development Division

Enclosure:
Attachment "A"

cc: G. L. Hinton, Memphis, w/encl.

Attachment "A"

Incident Reports

AEC regulations require that reports be submitted on accidents, fires, and unusual operational incidents which occur in connection with work being performed under AEC supported contracts. Reports are required for the following types of incidents:

1. Serious Incidents

Immediate reports by phone (Oak Ridge 5-8611, extension 4657) or teletype to Research and Development Division, U. S. Atomic Energy Commission, Post Office Box E, Oak Ridge, Tennessee, on fatal injury where death seems imminent; injury of five or more in one fire or accident; damage of \$5,000 or more to Government property; nuclear radiation of personnel or chemical exposure, resulting in overexposure sufficiently serious to warrant hospitalization for observation or treatment; and other accidents or incidents of which immediate information is considered in the best interest of the program.

2. Fires, Explosions, Lightning, Windstorms, Floods, and Sprinkler Leakage

Reports on industrial loss of \$50 to \$5,000 of Government property from these causes, together with any loss and damage to private property.

3. Other Property Damage Accidents

Reports on other accidental property damage of \$50 to \$5,000 to Government property.

4. Personal Injuries

Reports of personal injuries, including disability from occupational disease and nuclear radiation occurring in connection with work being performed under AEC supported contracts.

Reports on items 2, 3, and 4 may be included in the annual progress or final report. If no such incidents have occurred during the current contract period, please include a statement to this effect in your progress report or final report.



UNITED STATES
ATOMIC ENERGY COMMISSION

File

IN REPLY REFER TO:

ORS:JDB

Oak Ridge, Tennessee
December 10, 1958

Dr. F. W. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

Thank you for submitting a copy of the document entitled "The Metabolism of Magnesium and Calcium by the Rat".

The AEC's Patent Branch has reviewed the document submitted and has found no inventions disclosed which require patent action prior to its release for publication. Accordingly, no delay in release will be requested.

Your cooperation in this matter is appreciated.

Very truly yours,

Herman M. Roth

Herman M. Roth
Director
Research and Development Division

J. S. ...

CONTRACTS - 1829/40

Tenn

1108588

Office Memorandum • UNITED STATES GOVERNMENT

TO : S. W. Scott, Chief
Patent Branch

DATE: December 9, 1958

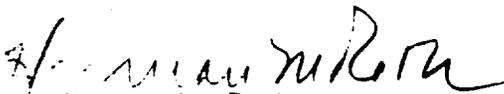
FROM : Herman M. Roth, Director
Research and Development Division

SUBJECT: PATENT REVIEW OF UNCLASSIFIED DOCUMENTS - CONTRACT NO. AT-(40-1)-1829
UNIVERSITY OF TENNESSEE (DR. F. W. LENGEMANN)

SYMBOL: ORS:JDB

In compliance with a memorandum dated August 19, 1957, symbol MCP:DSZ, subject "Patent Review of Documents Prior to Release", we are submitting for your review and appropriate action, one copy of the following document prepared in connection with the work being performed under the above contract:

"The Metabolism of Magnesium and Calcium by the Rat"


Herman M. Roth

Enclosure:
Document


12-9-58

CONTRACTS-1829-4-1 Tenn

1108589

File

Office Memorandum • UNITED STATES GOVERNMENT

TO : S. W. Scott, Chief
Patent Branch

DATE: December 9, 1958

FROM : Herman M. Roth, Director
Research and Development Division

SUBJECT: PATENT REVIEW OF UNCLASSIFIED DOCUMENTS - CONTRACT NO. AT-(LO-1)-1829
UNIVERSITY OF TENNESSEE (DR. F. W. LENGEMANN)

SYMBOL: ORS:JDB

In compliance with a memorandum dated August 19, 1957, symbol MCP:DSZ, subject "Patent Review of Documents Prior to Release", we are submitting for your review and appropriate action, one copy of the following document prepared in connection with the work being performed under the above contract:

"The Metabolism of Magnesium and Calcium by the Rat"

Herman M. Roth
Herman M. Roth

Enclosure:
Document

ORS
12-9-58

CONTRACTS-1829

1108590

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

December 5, 1950

Dr. H.M. Roth, Director
Research and Development
Atomic Energy Commission
Oak Ridge, Tennessee

Dear Dr. Roth,

I am enclosing a manuscript entitled "The Metabolism of Magnesium and Calcium by the Rat" which I am about to submit for publication. The work was performed as part of my A.T.C. contract A740-1-1129. I would like your permission to publish this article.

Sincerely yours,



Frederick W. Lenzmann

CONFIDENTIAL - 1250

1108591

DEC 8 1950

File



UNITED STATES
ATOMIC ENERGY COMMISSION

REF ID: A66000

ORS:EMM

Oak Ridge, Tennessee
September 3, 1958

Dr. F. W. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: DISSEMINATION OF PUBLISHED AND UNPUBLISHED UNCLASSIFIED
TECHNICAL INFORMATION TO FOREIGN NATIONS

Dear Dr. Lengemann:

In a previous letter to you, we advised you of the AEC's policy in regard to the dissemination of unclassified published technical information, resulting from the work under your contract, to foreign nations. Enclosed with our letter was an attachment listing several nations, transmittals to which were permitted and encouraged provided similar information was requested in exchange.

The AEC's policy has now been revised to permit the dissemination of unpublished technical information as well as the published information. Also, there have been some changes in the listing of nations forwarded by our previous letter. We are enclosing a complete statement of the AEC's policy and procedures in the dissemination of the published and unpublished technical information, which includes a new listing of the countries to which information may be forwarded, provided information is requested in exchange.

Your cooperation in applying the enclosed procedures in the dissemination of information developed under your contract will be appreciated.

Very truly yours,

Herman M. Roth

Herman M. Roth
Director
Research and Development Division

Enclosure:
Outline

Cont 1829

*ORS
Bureau
9-3-58* 9

1108592

ACC:AFR

Oak Ridge, Tennessee
May 12, 1958

The University of Tennessee
College of Medicine
Division of Chemistry
Memphis, Tennessee

Attention: Dr. Frederick W. Langemann

Subject: MODIFICATION NO. 1 TO CONTRACT NO. AT-(40-1)-1829

Gentlemen:

Enclosed, in triplicate, is proposed Modification No. 1 to the subject contract which provides for additional research and extension of the period, to May 31, 1959, during which the work under the contract may be conducted. Also enclosed is a Notice of Research Project form which is to be used in submitting your summary statement.

If the modification, as submitted, is satisfactory, will you kindly sign two of the enclosed copies in the space provided for the Senior Investigator, have such two copies signed by the proper official of the University and return them to this office. The remaining copy is for your retention. After signature on behalf of the Commission, one duly signed copy of the modification will be returned for your files.

The completed summary statement, with the date of its submittal shown thereon, should be returned with the signed copies of the modification.

Very truly yours,

John R. Moore
Director, Contract Division
Oak Ridge Operations

Enclosures:

1. Proposed Mod. 1 (in trip.)
2. Notice of Research Project Form

BCC: Div. of Biology & Medicine, AEC Headquarters
C. S. Shoup

1108593

1829 (45) Term
H 3578

J. W. Ould, Jr., Assistant General Counsel

April 29, 1958

John R. Moore, Director, Contract Division

PREPARATION OF MODIFICATION TO CONTRACT AT-(40-1)-1829 WITH
UNIVERSITY OF TENNESSEE, MEMPHIS, TENNESSEE

SYMBOL: ACD:BSH

Please prepare an appropriate modification to the subject contract to provide for additional research to be completed not later than May 31, 1959, with new funds in the amount of \$8,530. This action is covered by Contract Authorization No. M-58-383, dated April 21, 1958, in the amount of \$8,530.

A Request for Contract Action dated April 25, 1958, from the Research and Development Division, is enclosed for your use.

John R. Moore

Enclosures:

1. Request for Cont. Action
2. Budget
3. Resume'
4. Cont. Auth.
5. Renewal Proposal

CC: L. D. McKay
~~C. S. Shoup~~ ✓
A. Brown, w/encls. 1, 2 & 4

1108594

4 2219

CPS:JDB

Oak Ridge, Tennessee
April 25, 1958

Dr. F. W. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

This is to advise you that we have initiated action for the preparation of a modification to Contract No. AT-(40-1)-1829 to provide for the continuation of the current research and provide for the performance of additional research to be completed not later than one year from the effective date of the modification, June 1, 1958. The AFC will contribute \$8,500 in new funds to the total cost of \$16,336. A copy of the budget to be included in the modification is enclosed for your information. The modification will be forwarded to you for signature as soon as it is complete.

Your cooperation is appreciated.

Very truly yours,

Original signed by
C. S. Shoup

C. S. Shoup
Chief, Biology Branch
Research and Development Division

[Handwritten signature]
Enclosure:
Budget

cc: C. J. Tipton, Memphis, w/encl.

4-25-58

CONTRACTS - 1829

| | | | | | | | |
|---------|----------------------|----------------------|--|--|--|--|-------------|
| OFFICE | Res. Ser. Fr. | Bio. Fr. | | | | | |
| SURNAME | <i>[Handwritten]</i> | <i>[Handwritten]</i> | | | | | <i>T...</i> |
| DATE | 4-25-58 | 4-25-58 | | | | | |

1108595

| | |
|---|---|
| <p>6. Contract Board Docket No. _____ (To be assigned by Board Secretary)</p> | <p>7. Request Submitted By: (signed) _____ Date: _____ Title: _____</p> <p style="text-align: right;"> <small> RECEIVED BY C. E. SHILLING CREEP BIOLOGY BRANCH RESEARCH AND DEVELOPMENT DIVISION </small> </p> |
| <p>8. <u>Complete Description of Services to be Furnished by Contractor:</u> Headquarters designated research contract TITLE: "The Metabolism of Alkaline Earth Metals by Bone"</p> <p style="text-align: center;">(If more space is required use separate sheets and attach hereto:)</p> | |
| <p>9. <u>Description of other changes to be covered by Modification:</u> Modify contract to provide for additional research to be completed not later than May 31, 1959, with new funds in the amount of \$8,580.</p> <p style="text-align: center;">(If more space is required use separate sheets and attach hereto:)</p> | |
| <p>10. <u>Negotiated Contracts.</u> (Show why it appears desirable to negotiate new contract or to negotiate modification to existing contract) Memorandum from C. W. Shilling to S. R. Sapirie dated April 21, 1958.</p> <p style="text-align: center;">(If more space is required use separate sheets and attach hereto:)</p> | |
| <p>11. <u>Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval:</u> (Furnish brief description of action in this space and attach pertinent documents) None</p> | |
| <p>12. <u>Disputes:</u> Attach a statement summarizing the dispute together with pertinent documents and Background Material. None</p> | |

1108596

K76

Form OR-569 (2/53)

REQUEST FOR CONTRACT ACTION (submit in duplicate)

1. TO: **J. R. Moore** Chairman Contract Board. From: **Res. & Dev. Div.**

It is requested that the Contract Board take the necessary action to process the following described contract action in accordance with the provisions of Bulletin OR-O&M-19:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract No. **AT-(40-1)-1829**
Contractor: **University of Tennessee**
Memphis, Tennessee

Review and approval of Contract, Sub-contract or Purchase Order.
Number: _____
Name: _____

Other (Explain) _____

3. Nature of Services to be Covered by Contract

Construction Architect-Engineer Other (Explain) **Research**

4. Funding Amount to be Obligated by this Contract Action **\$,580.00**

Source of Funds

Approved ORO Financial Plan, _____ Quarter, Fiscal Year 19____
Project No. _____ or, Activity No. _____
Funds to be Obligated: Allotment No. _____ (F.Y. 19____ Funds)
Procurement Directive No. _____ Dated _____
Issuing Office _____

Concurrence in Funding Statement: (signed) _____
Chief, Budget Branch

5. Project or Activity to be Covered by Contract Action:

Location of Work: _____ Construction Directive No. _____
Estimated Cost of Work to be Covered by this Contract Action \$ _____
Schedule: Date Work to Start _____ Estimated Completion Date _____
Description of Project or Activity: _____

(If more space is required use separate sheets and attach hereto:)

ORS
Burlina
4-25-58

~~5 2805~~

ORS
Lew
4/25/58

- - Resp -

ORB
Shroy
4/25/58
CONTRACTS - 1829 (40/Tenn)

1108597

Budget for Contract No. AT-(40-1)-1829
0-1-58 - 5-31-59

| | | |
|---|------------|---------------------|
| <u>Salaries and Wages:</u> | | \$7,694.00 |
| Dr. F. W. Lengeemann (30% of time) | \$1,800.00 | |
| Consultants | 1,100.00 | |
| Research Technicians | 4,294.00 | |
| Administrative and Secretarial Assistance | 500.00 | |
| | | |
| <u>Equipment:</u> | | 1,700.00 |
| | | |
| <u>Supplies:</u> | | 1,600.00 |
| | | |
| <u>Travel:</u> | | 100.00 |
| | | |
| <u>Publication and Communication:</u> | | 100.00 |
| | | |
| <u>Overhead and Indirect Costs:</u> | | 4,842.00 |
| | | |
| | Total | <u>\$16,330.00*</u> |

The A O's contribution to the above budget will be \$4,500.

*Recognize that the project may receive additional financial support as described in the proposal.

1108598

UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D. C.

Contract Authorization No. EA-52-383

TO : S. R. Sapiro, Manager
Oak Ridge Operations Office

FROM : Charles W. Shilling, M. D., Deputy Director
Division of Biology and Medicine, Washington

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR
CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM
TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY
SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND BIOLOGY
AND MEDICINE.

SYMBOL : **EMM:JFB**

APR 21 1958

The research proposal described below has been approved by the Division of Biology and Medicine, funds are available, and you are authorized and requested to negotiate a contract in accordance with the following terms and conditions:

1. Institution: **The University of Tennessee**
2. Investigator (s): **Frederick W. Longemann**
3. Title: **The Metabolism of Alkaline Earth Metals by Bone**
4. () New Contract, () Renewal of Contract No. AT(40-1)1822
5. Duration: 6/1/58 through 5/31/59
6. AEC Technical Representative: **John F. Bonner**
7. Funds are authorized for the obligation of this contract as follows:

| <u>Allotment No.</u> | <u>Budget Category</u> | <u>Previous</u> | <u>Amount This Action</u> | <u>Total</u> |
|----------------------|------------------------|-----------------|---------------------------|-----------------|
| <u>06-81-91 (2*)</u> | <u>6220</u> | <u>_____</u> | <u>\$ 8,580</u> | <u>\$ 8,580</u> |
| <u>_____</u> | <u>_____</u> | <u>_____</u> | <u>_____</u> | <u>_____</u> |
| <u>_____</u> | <u>_____</u> | <u>_____</u> | <u>_____</u> | <u>_____</u> |

CONTRACT - 1822 (1/1) T
11
APR 23 1958

1108599

- 8. It is suggested that in the best interests of the government the following type contract be negotiated: ~~Lump-sum~~
- 9. It is requested that the title to any capital equipment procured under this contract shall be vested with:

() the contractor; () the government.

- 10. If radioisotopes are to be used in this research, it is requested that the savings available to the contractor under the Radioisotope Research Support Program (Ref. AEC Manual Chapter 7510) be considered in the negotiation of the amount to be funded under this contract.

11. Other comments:

12. Security Requirements:

In accordance with the provisions of Chapter 3403 of the AEC Manual and the requirements of the Declassification Guide, it has been determined that the following security precautions should be taken in connection with the proposed research contract:

Since there is essentially no chance for the development of restricted data, this project has been placed in Category I as defined in Chapter 3403 of the AEC Manual.

- 13. Reports: () Reports are to be required as provided for by "Revised Guide for the Submission of Research Proposals" dated February 6, 1954.

() Special reports instructions are as follows:

Enclosures: () "A" - Proposal, dated March 1, 1955
 () "B" - Notification letter, dated
 () "C" - Other correspondence, none letters

Distribution:

Addressee: Original (w encl.) Division File: Yellow copy (w encl.)
 1st copy (w encl.) Pink copy (w/o encl.)
 2nd copy (w encl.)

Branch File: White copy (w encl.)

Program Analysis Branch:
 White copy (w/o encl.)

6

BBM:JFB

APR 21 1958

Dr. Frederick W. Langmuir
Division of Chemistry
The University of Tennessee
School of Biological Sciences
Memphis, Tennessee

Dear Dr. Langmuir:

I am pleased to inform you that renewal of Atomic Energy Commission contribution toward support of your project, "The Metabolism of Alkaline Earth Metals by Bone," has been approved for an additional year.

The contractual details will be handled by our Oak Ridge Operations Office, and you may expect to hear from a representative of that office shortly with regard to the negotiations. Responsibility for the technical and scientific administration will, of course, remain with the Division of Biology and Medicine in Washington.

We hope that the coming year will see further gains in the fine progress already reported.

Sincerely yours,

John F. Bonner
Assistant to Chief
Medical Research Branch
Division of Biology and Medicine

/cc: Oak Ridge Operations Office

Medical Res.

Bonner:gas

3/26/58

1108601

OFS:JDB

Oak Ridge, Tennessee
March 24, 1958

Dr. Frederick W. Longemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(10-1)-1829

Dear Dr. Longemann:

Thank you for your letter of March 13, 1958, requesting permission to use the \$88 savings the University realized by the use of an AEC Discount Certificate in order to purchase additional supplies under Contract No. AT-(10-1)-1829.

This is to advise you that we offer no objections to your utilizing the \$88 savings to purchase supplies as indicated in your letter of March 13.

Very truly yours,

C. S. Shoup
Chief, Biology Branch
Research and Development Division

| | | | | | | |
|---------|-----------------|-------------|--|--|------------------------------|--|
| OFFICE | Res. Ser. & Pr. | Bio. Br. | | | | |
| SURNAME | Earleton:rd | C. S. Shoup | | | CONTRACTS - 1829 (U of Tenn) | |
| DATE | | 3-24-58 | | | | |

1108602

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

March 13, 1958

Dr. F. S. Shoup
Chief, Biology Branch
Research and Development Division
United States Atomic Energy Commission
Oak Ridge, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Shoup:

As stated in my Radioisotope Purchase Report the University has realized a portion of the amount of the contract as a result of the purchase of consumable supplies during the remaining period of performance of the contract or will be credited to the Government's account. I am willing to accept your decision as to the exact disposition of this money, however, I would like to request that I be allowed to use the funds to purchase supplies for the project.

Sincerely yours,

Frederick W. Lenzemann
Frederick W. Lenzemann

1108603

MAR 17 1958

CR: JDB

Oak Ridge, Tennessee
March 11, 1958

Dr. F. W. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

We have received the renewal proposal and progress report for Contract No. AT-(40-1)-1829 and have forwarded the requisite number of copies of both documents to our headquarters office for their review and appropriate action. In the meantime, we shall appreciate receiving additional information relative to the renewal of the contract.

We note in the Radioisotopes Purchase Report that the University realized a savings of 10% during the current period of performance by using an AEC discount certificate. Article VII of the contract provides that any savings under a discount certificate should be paid by the contractor to the Government or otherwise credited to the Government's account as the Contracting Officer may direct or approve. Since you have indicated that there will not be any unexpended funds remaining at the end of the current period, we assure that the 10% savings will have been utilized for other items.

We shall appreciate your advising us in this matter as soon as possible.

Very truly yours,

Original signed
C. S. Shoup

C. S. Shoup
Chief, Biology Branch
Research and Development Division

cc: C. W. Tipton, Memphis

| | | | | | | | | |
|---------------------|---------|-------------------|-------------|--|--|--|--|-------------------|
| RECEIVED 3/11/58 | OFFICE | Res. Ser. Br. | Bio. Br. | | | | | -1829 (1/5/ Term) |
| | SURNAME | W. J. Harrison:ja | C. S. Shoup | | | | | |
| | DATE | 3-11-58 | | | | | | |

1108604

Office Memorandum • UNITED STATES GOVERNMENT

TO : C. L. Dunham, Director
Division of Biology and Medicine, Headquarters

DATE: March 3, 1958

FROM : Herman M. Roth, Director
Research and Development Division, Oak Ridge

SUBJECT: RENEWAL OF CONTRACT NO. T-(10-1)-1829 - UNIVERSITY OF TENNESSEE -
(DR. F. W. LENGEMANN)

SYMBOL: ORS:JER

We are submitting for your review and appropriate action the following information concerning the contract which will expire on **May 31, 1958**:

1. Renewal Proposal (4)
2. Progress Report (4)
3. Financial Statement (Included in renewal proposal)

We shall appreciate your advising us of your decision so we may proceed with the necessary contract action at the earliest possible date.

Herman M. Roth
Herman M. Roth

Enclosure:
As Listed Above
cc: C. S. Shoup

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Mason
3-3-58

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1108605

A RENEWAL PROPOSAL TO
The Atomic Energy Commission
Division of Biology and Medicine
For the period June 1, 1958 through May 31, 1959
Contract No. AT - (40-1) - 1829

"The Metabolism of Alkaline Earth Metals by Bone"

Division of Chemistry
School of Biological Sciences
University of Tennessee
Memphis

Principal Investigator

Frederick W. Lengemann
Frederick W. Lengemann,
Assistant Professor of
Chemistry

Submitted March, 1, 1958

O. W. Hyman, Vice-President
in charge of Medical Units

1108606

FEB 2 1958

Renewal Proposal to the A.E.C.

Title: The Metabolism of Alkaline Earth Metals by Bone

Contract No. AT - (40-1) - 1829

For the period June 1, 1958 through May 31, 1959

Scientific Background

A review of some of the aspects of alkaline earth metabolism by bone has been presented previously in the original project proposal submitted to the A.E.C.. Since that time little new evidence has appeared in the literature to elucidate the mechanisms of deposition in and removal of these elements from bone. Therefore, a review of the literature will not be attempted.

However, recently a good deal of work has appeared concerning the metabolism of strontium-90 by humans and laboratory animals. A report of the Sr-90 levels in human bone has been published by Eckelmann, Kulp, and Schulert (1) and a review of the known selective processes has been compiled by Comar, Russell, and Wasserman (2). Comar implicates the intestine and the kidney as being the major sites of discrimination against strontium present in the diet. Bone is not considered to be important. However, he reports that the new born human shows a greater selection against strontium-90 than can be accounted for by the known selective processes of the maternal intestine, kidney, and placentas. It would seem possible that here is the place where the selective processes of bone would play an important role. Also, once strontium-90 is deposited in bone, the discriminatory ability of bone would be important for its removal. To test the ability of human bone to differentiate between strontium and calcium is difficult. However, some evidence has been obtained that selection may occur during the resorption phase of bone metabolism of human bone and is presented in the accompanying progress report. More evidence is needed to confirm this.

1108607

References

1. Eckelmann, W. R., J. L. Kulp, and A. R. Schulert
Sci. 127: 266 - 274 (1958)
2. Comar, C. L., R. S. Russell, and R. H. Wasserman
Sci. 126: 485 - 492 (1957)

1108608

Scientific Scope

As stated in the original proposal the major objectives of the research program are:

1. To compare the metabolism by bone of the members of the alkaline earth group of elements.
2. To investigate the phases of mineral metabolism by bone to determine what processes are enzymes influenced.
3. To determine the rates of strontium and calcium removal and to attempt to alter them.
4. To describe the mechanism by which stable strontium inhibits calcification and increases the discrimination against radioactive strontium.

The accompanying progress report details the results obtained to date in fulfilling these objectives. More work remains to be done. The following program is planned for the next fiscal year.

1. The Uptake of Strontium and Calcium by Human Bone

Some data has been obtained but more evidence is needed before conclusions can be made. To this end, an effort will be made to secure more fetuses and to culture the bones obtained. The Sr/Ca ratio at equilibrium and during removal can be found conveniently by the methods now in use. The amount of work done will depend upon the supply and cooperation received. If sufficient numbers are forthcoming, other alkaline earths may be investigated.

Continuing attempts will be made to obtain human periosteum and to grow it in tissue culture to obtain bone.

2. The Effect of Species upon Strontium Uptake

The work to date indicates that the medium does not function in the selection but that the mechanism is contained within the bones. The variation noted between embryonic chick and human bone suggests that species do vary in their selective ability. To investigate this the Sr/Ca ratios at equilibrium

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and during removal will be investigated for the bones of as many species as can be obtained. If the results indicate a species difference, other alkaline earths will be investigated.

3. The Effect of the Degree of Calcification upon Discrimination

In the studies made thus far, it has been noted that the ends of the bones selected for calcium and against strontium more than did the shafts. This was observed for both human and chick bone. Also, the human bones were more calcified than the chick bones and showed much different Sr/Ca ratios. To investigate this tibias from 7-9-12- and 14-day old embryos will be cultivated for 7 days with activity in the medium. At this time one-half of the bones will be removed and assayed while the remainder will be shifted to non-labeled medium for four days before being assayed. Thus, the effect of the degree of calcification on the equilibrium ratio and removal ratio should be obtained.

If human embryos can be obtained the wide variation in their ages should make comparisons possible and indicate the effect of the degree of calcification.

4. Continuation of the Alkaline Earth Study

It is expected that by June all of the alkaline earths will have been compared on the basis of long term uptake, short term uptake, and short term removal of the alkaline earth metals. However, data on the effect of carrier upon the uptake and removal of these metals will still have to be obtained. Also, it would be of advantage to be able to compare these alkaline earths on the basis of the sites in bone where selection is occurring. By comparison it will be possible to determine if the selection is of the same nature as occurs with strontium.

For this bones will be labeled and after changing to a non-labeled medium will be removed and assayed at 10 and 30 minutes, 1, 2, 4, 6, 16, and 24 hours, and at 2, 4, 6, and 8 days. A removal curve would result that should make it possible to determine the number of compartments in which the isotope is dis-

tributed, their size, and their turnover times. Similar information would be obtained for uptakes by labeling bones for the periods of time stated above and plotting the uptake curves.

5. The Function of Enzymes in Selection

In testing live and heat killed bone it was determined that only live bone had a means of discrimination against strontium. To see if this is due to specific enzymes, known inhibitors such as beryllium, phlorizin, fluoroacetate, fluoride, and cyanide will be put into the medium. An inhibition of the selection mechanism will be looked for. The specific area in which the inhibition occurs will be determined by placing bone in labeled medium for 10 and 30 minutes, 1, 2, 4, 8, 16, and 24 hours. One-half of the bones will be placed in medium containing inhibitor and the other half will serve as controls. The strontium and calcium contents at each of these points will be determined and a curve plotted from the data. The equations for the curves should give the number, size, and mobility of the compartments. By comparing control and test groups an indication of the area of selection should be obtained. A similar experiment would be run for removal studies. Further investigation into the exact biochemical mechanisms will be made if the data appear promising.

6. Hormonal Effects

Bones will be labeled for periods of 24 hours, 2, 4, and 6 days and then transferred to a non-labeled medium containing parathyroid extract. Groups of the bones will then be removed at 30 minutes, 1, 2, 4, 8, 16, and 24 hours, and 2, 4, 6, and 8 days to attempt to ascertain the effect of the hormone upon the selection ratio and the removal of radiostrontium and radiocalcium from bone.

7. Effect of Temperature on Sr/Ca ratio in Bones

Data from short term uptake experiments indicated that selection against strontium for the shafts of bone occurred only at 39 degrees C. This would

tend to be evidence that a vital process is involved. To test this further, bones will be labeled for a period of 5 days and then removed to non-labeled medium. At this time equal sized groups will be placed in incubators at 4 degrees, 25 degrees, and 37 degrees Centigrade. The ratio of strontium to calcium will be determined at the end of a four day period. In addition, bones will be placed in labeled medium for several days to determine the Sr/Ca ratio under the same temperature conditions. If the experiments prove fruitful, an attempt will be made to determine the reason for the lack of selection.

Scientific Personnel

Principal Investigator: Lengemann, Frederick W., Ph. D., Assistant Professor of Chemistry. Thirty per cent of his time to be devoted to the project.

Information as to experience, training, and publications has been previously submitted in the original research proposal.

Other Personnel: A full-time technician, Mrs. Stuart Trapp, is to be employed and all of her time will be devoted to the project.

A part-time technician, all of his time to be spent on this project, will also be employed. It is intended to hire a medical or dental student for these purposes to perform the more tedious jobs and thus free skilled personnel for the more exacting details.

Other Financial Assistance

A proposed project is being submitted to the National Institutes of Health that will have as its major purpose the investigation of the effects of Vitamin D, parathyroid hormone, parotin, insulin, and thyroxine upon bone metabolism. It is intended to study the uptake of calcium and phosphorus simultaneously with the disappearance of accumulation of metabolites within the bone. None of the personnel to be employed or materials to be used for that research will be paid from

or purchased by funds provided by the Atomic Energy Committee.

Only twenty per cent of the senior investigator's time will be devoted to that project, thus continuing the thirty per cent allocation of his time to be spent on the A. E. C. contract.

All calculations of the University contribution to the A. E. C. research project have been made with the understanding that no project occupies the research facilities full time, Only that portion directly attributable to the A. E. C. has been taken as the University contribution.

Equipment and Facilities Available

The purchase of a scintillation counter, a large centrifuge, and a scaler during the past few months has materially increased the productiveness of my laboratory. An order has been placed, but not yet filled, to purchase a semi-automatic balance. The Department itself has recently acquired a Beckman DK-2, 2 recording spectrophotometers, and a Baird infra-red double beam spectrophotometer. Purchase of an ultra centrifuge is under way. These, in addition to the items of equipment and facilities listed in the original proposal, indicate that we are well equipped to carry out a research program from many angles of attack.

However, we have found that the major block in our research program is the voluminous amount of counting necessary. Especially during the time studies we produce large numbers of samples. Separating the bones into ends and shafts has doubled the amount of counting. To expedite this phase an automatic sample changer would be extremely valuable. Thus it should be possible to count samples almost continuously. Accuracy would be increased since we could then count for a given number of counts instead of the fixed time system now used. The present intention is to purchase an automatic sample changer and modify it so that it will count each sample twice, once without an absorber and once with the absorber.

1108613

Travel

The item of "travel" would be for the purpose of exchanging information, presenting papers, and to meet others interested in bone metabolism. It is planned to attend the Gordon Research Conferences and the Federation Meetings.

1108614

BUDGET

| <u>Personnel</u> | <u>University</u> | <u>AEC</u> |
|--|-----------------------|------------|
| Principal Investigator (30% of time) | \$1800.00 | |
| Administrative Assistant | 200.00 | |
| Departmental Secretary | 200.00 | |
| Consultation (\$10.00 / hr.) | | |
| Dr. Wood | 400.00 | |
| Dr. Williams | 200.00 | |
| Dr. Koeppe | 300.00 | |
| Dr. Cohn | 200.00 | |
| 1-1/2 Technicians (includes 5-1/4% for retirement and social security) | | \$4294.00 |
| Part-time Secretary | | 100.00 |
| <u>Equipment</u> | | |
| Automatic sample changer | | 1700.00 |
| <u>Supplies</u> | | |
| Fertile eggs | | 400.00 |
| Serum | | 300.00 |
| Chicken plasma | | 50.00 |
| Rats and feed | | 100.00 |
| Radioisotopes | | |
| Be-7 | | 100.00 |
| Ca-45 (| Based on AEC discount | 50.00 |
| Sr-89 (| | 50.00 |

1108615

BUDGET
(cont'd.)

| <u>Supplies</u> | <u>University</u> | <u>AEC</u> |
|--|-------------------|-------------|
| Special supplies (T.C. Detergent, G. M. Tube, Gloves, planchets, bacteriological pipettes, note books, data sheets, disposal of radioactive waste) | | \$300.00 |
| Common laboratory solvents and reagents | 100.00 | |
| Common laboratory glassware | 150.00 | |
| <u>Travel</u> | | 400.00 |
| <u>Publication and Communications</u> | | 100.00 |
| <u>*Utilities</u> | 942.00 | |
| <u>*Maintenance</u> | 1081.00 | |
| <u>*Library</u> | 752.00 | |
| <u>*Depreciation</u> | 540.00 | |
| <u>*Loss of income</u> | 891.00 | |
| <u>SUBTOTAL</u> | 7756.00 | 7944.00 |
| Overhead (8%) | | 636.00 |
| <u>TOTAL</u> | 7756.00 | 8580.00 |

Requested of A. E. C.

8580.00

*See additional sheets for computation of these costs.

1108616

Calculations of Indirect Costs

- Schedule I - Personnel supplied by Grant
- Schedule II- Equipment supplied by Grant
- Schedule III- Supplies included in Grant
- Schedule IV- Travel included in Grant
- Schedule V- Institutional personnel
(Detailed in budget)
- Schedule VI - Square footage of building space occupied part time
(But computed as full time occupancy by the Project)

| | | |
|---------------------------------|---------------|--------------|
| Office and Laboratory | | 740 sq. ft. |
| Walk-in incubator | | 36 |
| Sterilizing room | | 100 |
| Shop | | 20 |
| Cold room | | 30 |
| Freezer room | | 14 |
| Bulk storage room | | 20 |
| Rat room | | 35 |
| Dog and operating rooms | | 60 |
| Constant temperature room | | 30 |
| Dark room | | 9 |
| High level isotope laboratory | | |
| Division office | | 50 |
| Adm. School Biological Sciences | | 90 |
| Institutional Administration | | 221 |
| Library | | 172 |
| | | 1637 |
| | "Dead Space" | |
| | (total x 0.1) | 164 |
| | TOTAL | 1801 sq. ft. |

- Schedule VII- Cost of Utilities required but not included in Grant

Square footage (Schedule VI) x cost of heat, light, gas
and water/sq. ft.

$$1801 \times \$0.523 = \$942.00$$

Schedule VIII -

Cost for Maintenance and Custodial Service

Square footage (Schedule VI) x cost of custodial and
 maintenance / sq. ft. 1801 x \$0.60 = \$1081

Schedule X -

Cost of Library x sum of Schedules I, II, III, and IV
 Institutional operating expense

\$15,750 x \$8000 = \$ 752
167,104

Schedule XI -

Depreciation on Building Space and Equipment

Square footage (Schedule VI) x net building cost
 / sq. ft. x 0.02 = allowance for depreciation
 on construction.

1801 x \$ 11.25 x 0.02 = \$405

Square footage (Schedule VI) x equipment cost/sq. ft.
 x 0.05 = allowance for depreciation on equipment

1801 x 1.50 x 0.05 = \$315

TOTAL \$540

Schedule XII-

Allowance for loss of income for expending funds for
 constructing and equipping building space occupied
 by the project.

Total capital outlay x 0.03 = loss of income

\$29,716 x 0.03 = \$891

1108618

SUMMARYExpenditures Required from the Granting Agency for the Project

| | |
|-------------------------------|---------------|
| 1. Schedule I - | \$4394.00 |
| 2. Schedule II - | 1700.00 |
| 3. Schedule III - | 1450.00 |
| 4. Schedule IV - | 400.00 |
| | Subtotal |
| | 7944.00 |
| 5. 8 % of Subtotal (Overhead) | <u>634.00</u> |
| | Total |
| | 8578.00 |

Expenses Representing Institutional Contribution to the Project
and not included in the Grant

| | |
|---|---------------|
| 1. University contribution to consumable supplies | 250.00 |
| 2. Schedule V | 3300.00 |
| 3. Schedule VII | 942.00 |
| 4. Schedule VIII | 1081.00 |
| 5. Schedule X | 752.00 |
| 6. Schedule XI | 540.00 |
| 7. Schedule XII | <u>891.00</u> |
| | TOTAL |
| | \$7756.00 |

1108619

Expenditure Statement

Contract number AT-(40-1)-1829

Period: June 1, 1957 through Jan. 31, 1958

| <u>Expenditures</u> | <u>AEC</u> | <u>University of Tennessee</u> |
|--|-----------------|--------------------------------|
| Personnel | 1,538.50 | |
| Retirement | 154.76 | |
| Supplies | 1,178.89 | |
| Equipment | 2,097.81 | |
| Travel | 214.20 | |
| Overhead | 640.00 | 5,064.00 |
| | <u>5,824.16</u> | <u>5,064.00</u> |
| Estimated expenditures to May 31, 1958 | 2,815.84 | 2,532.00 |
| Grand total | <u>8,640.00</u> | <u>7,596.00</u> |

Funds available for the future financing include the contribution of \$7,756.00 by the University of Tennessee and that which the A.E.C. contributes to carry on this project.

Submitted March 1, 1958

O. W. Hyman
O. W. Hyman, Vice President
in Charge of Medical Units

1108620

Incident Report

No incidents occurred.

Radioisotope Purchase Report

Radioisotopes purchased or to be purchased at discount include:

| <u>Isotope</u> | <u>AEC Price</u> | <u>Price paid</u> | <u>Savings</u> |
|----------------|------------------|-------------------|----------------|
| Ba-133P | \$100.00 | \$20.00 | \$80.00 |
| Sr-89 | 10.00 | 2.00 | 8.00 |
| | | Total | <u>\$88.00</u> |

1108621

A RENEWAL PROPOSAL TO
The Atomic Energy Commission
Division of Biology and Medicine
For the period June 1, 1958 through May 31, 1959
Contract No. AT - (40-1) - 1829

"The Metabolism of Alkaline Earth Metals by Bone"

Division of Chemistry
School of Biological Sciences
University of Tennessee
Memphis

Principal Investigator

Frederick W. Lengemann
Frederick W. Lengemann,
Assistant Professor of
Chemistry

Submitted March, 1, 1958

O. W. Hyman, Vice-President
in charge of Medical Units

1108622

Submitted - 1829
(40-1-7em)
FEB 2

Renewal Proposal to the A.E.C.

Title: The Metabolism of Alkaline Earth Metals by Bone

Contract No. AT - (40-1) - 1829

For the period June 1, 1958 through May 31, 1959

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1108623

References

1. Eckelmann, W. R., J. L. Kulp, and A. R. Schulert
Sci. 127: 266 - 274 (1958)
2. Comar, C. L., R. S. Russell, and R. H. Wasserman
Sci. 126: 485 - 492 (1957)

Scientific Scope

As stated in the original proposal the major objectives of the research program are:

1. To compare the metabolism by bone of the members of the alkaline earth group of elements.
2. To investigate the phases of mineral metabolism by bone to determine what processes are enzyme influenced.
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Scientific Personnel

Principal Investigator: Lengemann, Frederick W., Ph. D., Assistant Professor of Chemistry. Thirty per cent of his time to be devoted to the project.

Information as to experience, training, and publications has been previously submitted in the original research proposal.

Other Personnel: A full-time technician, Mrs. Stuart Trapp, is to be employed and all of her time will be devoted to the project.

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or purchased by funds provided by the Atomic Energy Committee.

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Travel

The item of "travel" would be for the purpose of exchanging information, presenting papers, and to meet others interested in bone metabolism. It is planned to attend the Gordon Research Conferences and the Federation Meetings.

1108630

BUDGET

| <u>Personnel</u> | <u>University</u> | <u>AEC</u> |
|--|-------------------|------------|
| Principal Investigator (30% of time) | \$1500.00 | |
| Administrative Assistant | 200.00 | |
| Departmental Secretary | 200.00 | |
| Consultation (\$10.00 / hr.) | | |
| Dr. Wood | 400.00 | |
| Dr. Williams | 200.00 | |
| Dr. Koeppel | 300.00 | |
| Dr. Cohn | 200.00 | |
| 1-1/2 Technicians (includes 5-1/4% for retirement and social security) | | \$4294.00 |
| Part-time Secretary | | 100.00 |
| <u>Equipment</u> | | |
| Automatic sample changer | | 1700.00 |
| <u>Supplies</u> | | |
| Fertile eggs | | 400.00 |
| Serum | | 300.00 |
| Chicken plasma | | 50.00 |
| Rats and feed | | 100.00 |
| Radioisotopes | | |
| Be-7 | | 100.00 |
| Ca-45 (Based on AEC discount | | 50.00 |
| Sr-89 (| | 50.00 |

1108631

BUDGET
(cont'd.)

| <u>Supplies</u> | <u>University</u> | <u>AEC</u> |
|--|-------------------|-------------|
| Special supplies (T.C. Detergent, G. M. Tube, Gloves, planchets, bacteriological pipettes, note books, data sheets, disposal of radioactive waste) | | \$300.00 |
| Common laboratory solvents and reagents | 100.00 | |
| Common laboratory glassware | 150.00 | |
| <u>Travel</u> | | 400.00 |
| <u>Publication and Communications</u> | | 100.00 |
| <u>*Utilities</u> | 942.00 | |
| <u>*Maintenance</u> | 1081.00 | |
| <u>*Library</u> | 752.00 | |
| <u>*Depreciation</u> | 540.00 | |
| <u>*Loss of income</u> | 891.00 | |
| <u>SUBTOTAL</u> | 7756.00 | 7944.00 |
| Overhead (8%) | | 636.00 |
| <u>TOTAL</u> | 7756.00 | 8580.00 |

Requested of A. E. C.

8580.00

*See additional sheets for computation of these costs.

1108632

Calculations of Indirect Costs

- Schedule I - Personnel supplied by Grant
- Schedule II- Equipment supplied by Grant
- Schedule III- Supplies included in Grant
- Schedule IV- Travel included in Grant
- Schedule V- Institutional personnel
(Detailed in budget)
- Schedule VI - Square footage of building space occupied part time
(But computed as full time occupancy by the Project)

| | |
|---------------------------------|--------------|
| Office and Laboratory | 740 sq. ft. |
| Walk-in incubator | 36 |
| Sterilizing room | 100 |
| Shop | 20 |
| Cold room | 30 |
| Freezer room | 14 |
| Bulk storage room | 20 |
| Rat room | 35 |
| Dog and operating rooms | 60 |
| Constant temperature room | 30 |
| Dark room | 9 |
| High level isotope laboratory | |
| Division office | 50 |
| Adm. School Biological Sciences | 90 |
| Institutional Administration | 221 |
| Library | <u>172</u> |
| | 1637 |
| "Dead Space" (total x 0.1) | <u>164</u> |
| TOTAL | 1801 sq. ft. |

- Schedule VII- Cost of Utilities required but not included in Grant

Square footage (Schedule VI) x cost of heat, light, gas
and water/sq. ft.

1801 x \$0.523 = \$942.00

Schedule VIII -

Cost for Maintenance and Custodial Service

Square footage (Schedule VI) x cost of custodial and
 maintenance / sq. ft. 1801 x \$0.60 = \$1081

Schedule X -

Cost of Library x sum of Schedules I, II, III, and IV
 Institutional operating expense

\$15,750 x \$8000 = \$ 752
167,104

Schedule XI -

Depreciation on Building Space and Equipment

Square footage (Schedule VI) x net building cost
 / sq. ft. x 0.02 = allowance for depreciation
 on construction.

1801 x \$ 11.25 x 0.02 = \$405

Square footage (Schedule VI) x equipment cost/sq. ft.
 x 0.05 = allowance for depreciation on equipment

1801 x 1.50 x 0.05 = \$315

TOTAL \$540

Schedule XII-

Allowance for loss of income for expending funds for
 constructing and equipping building space occupied
 by the project.

Total capital outlay x 0.03 = loss of income

\$29,716 x 0.03 = \$891

SUMMARYExpenditures Required from the Granting Agency for the Project

| | |
|-------------------------------|---------------|
| 1. Schedule I - | \$4394.00 |
| 2. Schedule II - | 1700.00 |
| 3. Schedule III - | 1450.00 |
| 4. Schedule IV - | 400.00 |
| | Subtotal |
| | 7944.00 |
| 5. 8 % of Subtotal (Overhead) | <u>634.00</u> |
| | Total |
| | 8578.00 |

Expenses Representing Institutional Contribution to the Project
and not included in the Grant

| | |
|--|---------------|
| 1. University contribution to consumable supplies | 250.00 |
| 2. Schedule V | 3300.00 |
| 3. Schedule VII | 942.00 |
| 4. Schedule VIII | 1081.00 |
| 5. Schedule X | 752.00 |
| 6. Schedule XI | 540.00 |
| 7. Schedule XIII | <u>891.00</u> |
| | TOTAL |
| | \$7756.00 |

1108635



File

UNITED STATES
ATOMIC ENERGY COMMISSION

IN REPLY REFER TO:

OBS:AMC

Oak Ridge, Tennessee
January 31, 1958

Dr. F. K. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: RENEWAL OF CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

Your attention is invited to Appendix "C" of the contract which provides that a renewal proposal and a progress report will be due March 1, 1958. The renewal proposal and progress report may be submitted at any time after six months of performance under the current contract period. In any event, they should reach us no later than the prescribed date.

The information to be submitted is as follows:

1. Progress Report. Include information outlined in Appendix "C".
2. Expenditure Statement. Include a current expenditure statement for the present contract period. Information included should be as follows:
 - A. Statement should be based on both the contributions of the institution and the AEC.
 - B. The statement should reflect (1) the costs of the project to date, (2) an estimate of the costs for the remainder of the contract period, and (3) an estimate of the funds which will be available for financing the project during the proposed period of performance.
3. Renewal Proposal. Include the information as required in Appendix "C" of the contract. A budget should be included indicating the total costs to carry the project for the proposed period, based on the contributions of the institution as well as the funds requested from the AEC.

*OKS
Bundled
2-3-58*

CONTRACT - 1829 (U.S. / 1958)

1108637

4. Ten-Percent Voucher. Include a voucher for the remaining ten percent of the agreed consideration as provided by Article III of the contract. This voucher will be held by us, pending approval for renewal of the contract, after which it will be paid or if contract is not renewed, it will be paid upon receipt of the complete scientific report.
5. Incident Report. Include information as required in attachment "A".
6. Radioisotopes Purchase Report. Include listing of all radioisotopes provided for in the budget for the current period at the regular price established by the AEC, but which are purchased, or will be purchased during the current period, at a price less than the established price by using the discount authorized by an AEC Discount Certificate issued to the Contractor. For each such purchase, the report shall state (1) the price established by the AEC, (2) the price paid or to be paid using the discount, and (3) the savings realized or to be realized.

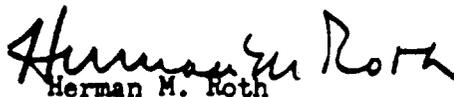
The progress report, expenditure statement, and renewal proposal should be endorsed by the proper administrative officials, and six copies of each, together with the voucher, should be submitted at the same time to:

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

If you do not contemplate requesting renewal, we shall appreciate your advising us as soon as possible.

Your cooperation and assistance in this matter is appreciated.

Very truly yours,



Herman M. Roth
Director
Research and Development Division

Enclosure:
Attachment "A" (1)

cc: C. . . Tipton, Memphis, w/encl.

Incident Reports

AEC regulations require that reports be submitted on accidents, fires, and unusual operational incidents which occur in connection with work being performed under AEC supported contracts. Reports are required for the following types of incidents:

1. Serious Incidents

Immediate reports by phone (Oak Ridge 5-8611, extension 4657) or teletype to Research and Development Division, U. S. Atomic Energy Commission, Post Office Box E, Oak Ridge, Tennessee, on fatal injury where death seems imminent; injury of five or more in one fire or accident; damage of \$5,000 or more to Government property; nuclear radiation of personnel or chemical exposure, resulting in overexposure sufficiently serious to warrant hospitalization for observation or treatment; and other accidents or incidents of which immediate information is considered in the best interest of the program.

2. Fires, Explosions, Lightning, Windstorms, Floods, and Sprinkler Leakage

Reports on industrial loss of \$50 to \$5,000 of Government property from these causes, together with any loss and damage to private property.

3. Other Property Damage Accidents

Reports on other accidental property damage of \$50 to \$5,000 to Government property.

4. Personal Injuries

Reports of personal injuries, including disability from occupational disease and nuclear radiation occurring in connection with work being performed under AEC supported contracts.

Reports on items 2, 3, and 4 may be included in the annual progress or final report. If no such incidents have occurred during the current contract period, please include a statement to this effect in your progress report or final report.

CRS:JDB

Oak Ridge, Tennessee
January 28, 1958

Dr. F. W. Lengesann
Division of Chemistry
University of Tennessee
Memphis 3, Tennessee

Subject: CONTRACT NO. AT-(LO-1)-1829

Dear Dr. Lengesann:

Reference is made to your letter of January 21, 1958, requesting permission to transfer approximately \$100 of the funds provided in the budget of Contract No. AT-(LO-1)-1829 under the category "Supplies" to the "Travel" category in order for you to attend the Federation meetings at Philadelphia.

This is to advise you that we offer no objection to the transfer of funds, as requested, provided that no additional funds will be required from the budget for the current period as a result of this transfer.

Your cooperation is appreciated.

Very truly yours,

Original signed by
C. S. Shoup

C. S. Shoup
Chief, Biology Branch
Research and Development Division

cc: C. L. Nipton, Memphis
OK J. E. Moore

CONTRACTS - 1829

| | | | | | | |
|-------------------------------|----------|---------------|-------------|--|--|--|
| 1-27-58 1-27-58 1-27-58 | OFFICE ▶ | Res. Ser. Br. | Dir. Br. | | | |
| | SURNAMES | Curleson, J. | C. S. Shoup | | | |
| | DATE ▶ | | 1-27-58 | | | |

1108640

101

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

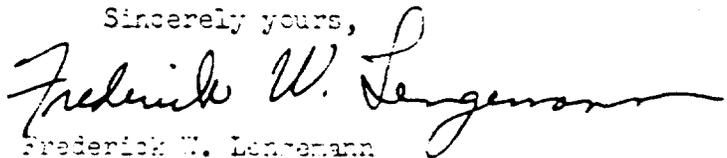
January 21, 1958

Dr. C.S. Shoup, Chief,
Biology Branch
Research and Development Division
U.S. Atomic Energy Commission
Oak Ridge, Tennessee

Dear Mr. Shoup,

Due to a gross underestimation of the cost of travel,
I now find myself short of funds to attend the Federation meetings
at Philadelphia. Therefore, I would like to have your permission
to shift approximately \$100 from "Supplies" to "Travel". I have
an A.E.C. contract no. AT-40-1-1629.

Sincerely yours,


Frederick W. Lenzemann

1108641 - 1007 J.

JAN 23 1958

1108641



UNITED STATES
ATOMIC ENERGY COMMISSION

CRS:JER

Oak Ridge, Tennessee
November 17, 1957

Dr. F. W. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

In connection with the 1958 International Conference on the Peaceful Uses of Atomic Energy, to be held in Geneva, Switzerland, September 1-13, 1958, the AEC has established the Office for International Conference to be responsible for the U. S. technical participation. Mr. Edward R. Gardner has been designated Executive Director of the Office. Dr. L. D. Percival King has been designated Technical Director and will have the responsibility for planning, direction, and coordination of the technical activities.

We are enclosing a copy of a letter dated October 18, 1957, from Mr. Gardner extending an invitation to submit names of authors, titles and abstracts for consideration for submission to the Secretary-General of the United Nations. The provisional agenda and the procedures on the technical papers are attached to Mr. Gardner's letter. You will note that the abstracts are to be forwarded to the Technical Director, OIC, not later than January 1, 1958.

We anticipate that some AEC contractor personnel will be invited to attend the Conference and present papers. In the event you are invited to attend the Conference, we shall appreciate your advising us. Also, if you propose to utilize any AEC funds for the travel expenses, you will note in your contract that prior approval of the AEC is necessary.

We shall appreciate your keeping us advised of your activities in the Conference if they involve research performed under the above contract.

Very truly yours,

David T. Lope
actg for

Herman C. Both
Director
Research and Development Division

Enclosure:
Cy ltr frm ERG dtd 10-18-57

1108642



UNITED STATES
ATOMIC ENERGY COMMISSION

ORS:JDB

Oak Ridge, Tennessee
October 2, 1957

Dr. F. W. Lengemann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: PATENT REVIEW OF UNCLASSIFIED DOCUMENTS
CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

The General Manager of the Atomic Energy Commission has directed that an implementation of Article VI, "Patents", be included in your contract to assure that all inventions of significance developed in the course of the contract are considered and acted upon by the AEC's patent staff.

In order to assure optimum patent coverage of your work and to insure that the AEC has an opportunity to act before its patent rights are lost by publication, you are requested to forward to us prior to release for publication, a copy of each unclassified technical report, scientific paper, or other documents containing technical information obtained in the course of or as a result of your work under the above contract.

To avoid delay in release of such documents, yet allow time for patent action to be taken, such documents should be submitted approximately six weeks prior to the date of release or publication. We will promptly approve immediate release of the document from a patent standpoint, or if foreign patenting is deemed advisable we will notify you of the estimated time release should be withheld. This time should exceed the six weeks period only in exceptional cases.

The foregoing implementation will be inserted in the next modification of your contract. In the meantime, we shall appreciate your cooperation in complying with the above requirements.

Very truly yours,

Herman M. Roth
Herman M. Roth
Director
Research and Development Division

CONTRACTS - 10-29

1108643

August 9, 1957

Dr. Frederick W. Lengenmann
School of Biological Sciences
The University of Tennessee
Memphis 3, Tennessee

Dear Dr. Lengenmann:

Dr. Parkinson is being advised that the instruments loaned to him under contract AT-(40-1)-1665 should be transferred to you under contract AT-(40-1)-1829. Dr. J. F. Bonner, Medical Research Branch, Division of Biology and Medicine, concurs in this.

I have asked Dr. Parkinson to check the instruments and serial numbers to see that they conform with our records, they are as follows:

1. GM Survey meter, Nuclear Chicago, Model 2610A with head phones and instruction book, Serial No. 411.
2. Ticker, Berkeley, Model 801, Serial 157.
3. Counter, Radioactive Products, Model A-4, Serial 76 with Pre-amp.

Very truly yours,

Richard L. Johnston, Chief
Radiation Instruments Branch
Division of Biology and Medicine

CC:
John F. Bonner,
Medical Research Branch, EM

C. S. Shoup, Chief, ✓
Biology Branch, Oak Ridge, Tenn.

CONTINUED - 1829
1829
461

RLL:REN

JOHNSTON:ved

8/9/57

CRS:EMM

Oak Ridge, Tennessee
August 7, 1957

Dr. Frederick W. Lengemann
Department of Chemistry
The University of Tennessee
Memphis 3, Tennessee

Subject: CONTRACT NO. AT-(40-1)-1829

Dear Dr. Lengemann:

Reference is made to your letter of July 26, 1957, regarding the disposition of a scaler, timer, and survey meter loaned to Dr. Jesse L. Perkinson in connection with the work being performed under Contract No. AT-(40-1)-1865.

As indicated in our letter of July 25, 1957, to Dr. Perkinson, the above items of equipment were loaned by the Radiation Instruments Branch of the Division of Biology and Medicine, Washington, D. C.; therefore, they should be contacted regarding the disposition of these items. If you wish to write them, their address is as follows:

Dr. Richard W. Johnston, Chief
Radiation Instruments Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission
1901 Constitution Avenue, N. W.
Washington 25, D. C.

If we can be of further assistance in this matter, please do not hesitate to call upon us.

Very truly yours,

Original signed by
C. S. Shoup

C. S. Shoup
Chief, Biology Branch
Research and Development Division

8/9/57

| | | | | | | |
|---------|----------------------------|------|------|-----|------|-----|
| cc: | R. W. Johnston, Washington | res. | per. | fr. | bio. | fr. |
| OFFICE | | | | | | |
| SURNAME | | | | | | |
| DATE | | | | | | |

8-7-57

1108645

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

July 26, 1957

Dr. C. S. Shoup
Chief, Biology Branch
Research and Development Division
U. S. Atomic Energy Commission
Oak Ridge, Tennessee

Dear DR. Shoup,

Dr. Perkinson has informed me that he has written you concerning the return of a scaler, timer, and a survey meter that has been on loan to him from the Atomic Energy Commission.

Rather than ship them back to Oak Ridge, I wonder if it could be arranged that the title for these items be transferred to me so that I might use them in my research?

At present I am operating with a borrowed scaler. This scaler does not possess the circuitry necessary for scintillation counting whereas the one used by Dr. Perkinson does. Since, I intend to do scintillation counting the use of Dr. Perkinson's scaler would be very beneficial.

I hope that this transferred can be arranged.

Sincerely yours,

Frederick W. Lengemann

Frederick W. Lengemann

CONTRACTS - 1079

JUL 29 1957

1108646

6.

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply
Refer To: ORS:JER

Oak Ridge, Tennessee
July 22, 1957

Dr. F. W. Lengenmann
Division of Chemistry
University of Tennessee
Memphis, Tennessee

Subject: DISSEMINATION OF NONCLASSIFIED TECHNICAL INFORMATION TO FOREIGN
NATIONS

Dear Dr. Lengenmann:

In connection with Paragraph 2, "Publication", in Appendix "B" to the contract covering your work which is being supported by the Commission, we should like to acquaint you with the Commission's policy in regard to the dissemination of nonclassified information to foreign nations.

You will note that Paragraph 2 provides for full freedom of publication of the result of the research under the contract and, further, you are urged to disseminate the results through customary scientific publication channels. This pertains to all unclassified information compiled as the result of your work under the contract. In connection with this freedom of publication, the Commission does have certain regulations governing the dissemination of information to those nations listed in Attachment "A" to this letter. These regulations are:

1. Transmittals to nations other than those listed in Attachment "A" are permitted and encouraged without qualification.
2. Transmittals to nations listed in Attachment "A" are permitted and encouraged, provided information is requested in exchange.

After filling requests or completing the action you consider desirable, we shall appreciate receiving a copy of the correspondence to you requesting the information.

Your cooperation in this matter is appreciated.

Very truly yours,

Herman M. Roth

Herman M. Roth
Director
Research and Development Division

CONTACTS 1829
Jen

Enclosure:
Attachment "A" (1)

1108647

U. S. ATOMIC ENERGY COMMISSION
 OAK RIDGE OPERATIONS OFFICE
 STATEMENT OF AUTHORITY

| | |
|--|---|
| 1. DELEGATED TO (Name, title, unit, location) Chief Biology Branch Research and Development Division Oak Ridge Operations Office | 2. DELEGATED BY (Name, title, unit, location) Director Research and Development Division Oak Ridge Operations Office |
| 3. NUMBER ASSIGNED TO THIS STATEMENT OF AUTHORITY 1888 | 5. THIS STATEMENT OF AUTHORITY IS REDELEGATION NUMBER 54 |
| 4. EFFECTIVE DATE OF THIS STATEMENT OF AUTHORITY June 1, 1957 | OF STATEMENT OF AUTHORITY NO. 1452-A |

(THE ISSUANCE AND USE OF THIS STATEMENT IS SUBJECT TO THE PROVISIONS OF INSTRUCTION OR-OR20, "DELEGATIONS OF AUTHORITY.")

1. Pursuant to the authority vested in me you are hereby designated as a representative of the Commission and of the Contracting Officer, in connection with the performance of:

Contract Number : AT-(140-1)-1829

Name of Contractor: University of Tennessee

with authority to take such action and make such decisions in connection therewith as are required of the Atomic Energy Commission with the exception that you are not authorized to (a) execute modifications of the contract, (b) make final decisions relative to disputes, claims and appeals arising under the contract, or (c) approve any purchase or sub-contract requiring approval of the Atomic Energy Commission.

2. You shall establish such controls as may be necessary to maintain that portion of the program represented by the contract within budgetary limitations. You shall also develop and maintain liaison and coordination with others concerned to assure continuity of existing budgetary and administrative policies and agreement on new policies.

3. The authority granted above may not be redelegated to others; it will remain in effect until revoked.



Herman M. Roth
 Director
 Research and Development Division
 Oak Ridge Operations Office

U. S. ATOMIC ENERGY COMMISSION
Oak Ridge Operations Office

STATEMENT OF AUTHORITY
(Assignment of Contract for Administration)

Contract No. AT-(40-1)-1829 . University of Tennessee
(Contractor)
is assigned to Dir., Res. & Dev. Div. effective June 1, 1957
(Name and Title of Official) (Date)

for administration in accordance with Statement of Authority No. 1152A . Authority for administering this contract may be redelegated to a designated AEC representative in accordance with the Statement of Authority cited above.

Herman M. Roth
(Name)

HERMAN M. ROTH
DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION

(Title)

Distribution:

Original and one to official designated
in line 2, above.

Copies to:

- Contract Division
- Assistant General Counsel
- Organization and Personnel Division
- Finance Division

CONTRACTS

1829
June

DATE: 6-17-57

G-5477

INDEX: CONT. 1829, TENN.

TO: Kasschau

FROM: Tipton

SUMMARY:

INDEXED: CONT. 1631, Tenn.

INDEXER:

REMARKS:

U. S. ATOMIC ENERGY COMMISSION
CORRESPONDENCE REFERENCE FORM

1108650

May 26, 1957

Dr. J. Rud Nielsen
Department of Physics
University of Oklahoma
Norman, Oklahoma

Dear Dr. Nielsen:

This is to notify you that the Division of Research has completed a review of the proposal for renewal of your contract on "Spectroscopic Properties of Fluorocarbons and Fluorinated Hydrocarbons" which you submitted for consideration of support by the Atomic Energy Commission.

The technical aspects of this proposal have been approved by the Division of Research and funds have been reserved for it. The negotiation of an appropriate contract is again the responsibility of the Commission's Oak Ridge Operations Office, and you should hear from them concerning it in the near future.

Sincerely yours,

A. S. Friedman
Chemistry Branch
Division of Research

cc: OROO ←

CHEMISTRY
Friedman/mw

1108651

1827
20000
MAY 2 1957

THE UNIVERSITY OF TENNESSEE

SCHOOL OF BIOLOGICAL SCIENCES

MEMPHIS 3, TENNESSEE

DIVISION OF CHEMISTRY

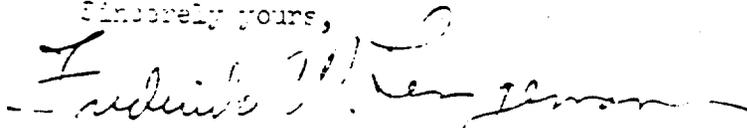
May 1, 1957

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

Gentlemen:

Enclosed you will find a 20 page summary of the project which I am about to undertake with you at the A.E.C. The contract number for this project is AT-(10-1)-1829. The signed contracts have been sent to Knoxville for the signature of the president of this university and so will be sent to your office under separate cover. I trust that everything has been executed to your satisfaction.

Sincerely yours,


Frederick S. Lantieri

1108652

1829
Lantieri
MAY 2 1957

UNITED STATES
ATOMIC ENERGY COMMISSION

In Reply
Refer To: ACCIARB

Oak Ridge, Tennessee
May 16, 1957

University of Tennessee
College of Medicine
Division of Chemistry
School of Biological Sciences
Memphis, Tennessee

Attention: Dr. Frederick W. Langemann

Subject: CONTRACT NO. AT-(40-1)-1829

Gentlemen:

Your research project, which was submitted to the Commission's Division of Biology and Medicine, Washington, D. C., has been approved by that office in the amount of \$8,640.00 and has been forwarded to this office for preparation of an appropriate contract covering the Commission's support of your project.

Enclosed are three copies of a contract, numbered as shown in the above subject, which incorporates in Appendix "A" a description of your project and the budget for the initial period which you are to follow as a general guide. Also enclosed is a Notice of Research Project form which is to be used in submitting your summary statement.

It is requested that you sign two copies of the contract in the space provided for the Senior Investigator and have such two copies signed by the proper official of the University, returning both copies to this office. The remaining copy is for your retention. The summary statement, with the date of its submittal shown thereon, should be returned along with the signed copies of the contract. After signature on behalf of the Commission, one duly signed copy of the contract will be returned for your retention.

It will be noted that the contract provides for payment in Article III of a lump sum in consideration of your performance of the research activities described in Appendix "A". The first payment, representing 45 per cent of the amount of the agreed compensation, will be paid to you upon your submission of a properly certified voucher on or before the first date established in Article II of the contract. Another

E. P. Sharp
1108653

CONTRACTS

1929
June

C. S. S.
MAY 16 1957

May 16, 1957

45 per cent of the agreed compensation will be paid to you within six months from the date of the first payment. The remaining 10 per cent of the agreed compensation will be paid to you upon receipt and acceptance of a satisfactory progress report, or the final report, as the case may be.

To assist you in preparing an appropriate voucher, there is enclosed an instruction sheet containing numbered instructions corresponding with numbers appearing on a specimen copy of the voucher form. Vouchers should be submitted to the Research and Development Division, Oak Ridge Operations Office, U. S. Atomic Energy Commission, Post Office Box E, Oak Ridge, Tennessee, in one original (white) and four copies (yellow). It is assumed that you will give your business office the benefit of these instructions.

Your attention is called to the reporting requirements outlined in Appendix "C" to the contract, especially to Item No. 3 which requires the submission of a 200-word summary statement describing the purpose and scope of your project. This 200-word summary statement should show the date of its submittal.

It is believed that the remaining portions of the contract are self-explanatory. However, if you have any questions concerning the application or interpretation of any of the contract provisions, I will be glad to furnish you with additional information.

Very truly yours,

J. R. Moore
John R. Moore
Director, Contract Division
Oak Ridge Operations

Enclosures:

1. Cont. #T-(40-1)-1829 (3 cys.)
2. Notice of Research Project Form
3. Vouchers and Instruction Sheets

BCC: Division of Biology & Medicine,
Washington, D. C.

✓ C. S. Shoup

1108654

J. . Ould, Jr., Assistant General Counsel

May 3, 1957

John R. Moore, Director, Contract Division

REQUEST FOR PREPARATION OF CONTRACT WITH THE UNIVERSITY OF TENNESSEE

SYMBOL: A-1188

Please prepare a new contract with the University of Tennessee for a period of one year beginning June 1, 1957, with Commission funds in the amount of \$8,640. Also designate Dr. Frederick W. Langermann as Senior Investigator and include provisions for compliance with AEC Manual Chapter 7510.

There is enclosed herewith a Request for Contract action dated April 30, 1957 from C. S. Shoup, Research and Development Division.

John R. Moore

Enclosures:

1. Request for Cont. Action
2. Budget
3. Resume'
4. Cont. Authorization
5. Notification of cont. negotiation
6. Proposal

CC: L. H. MacKay

C. S. Shoup

A. Brown, w/encls. 1, 2 & 4

CONTRACTS

3-17
1829(41)
T-11

MAY 3 - 1957

1108655

1740 File

1. Chairman
TO: **J. R. Moore** Contract Board. From: ~~Res. & Dev. Div.~~

It is requested that the Contract Board take the necessary action to process the following described contract action in accordance with the provisions of Bulletin OR-O&M-12:

2. Nature of Action Requested

Selection of New Contractor and Negotiation of Contract.

Modification of Contract No. _____

**The University of Tennessee
Memphis, Tennessee**

Contractor: _____

Review and approval of Contract, Sub-contract or Purchase Order.

Other (Explain) _____

Number: _____

Name: _____

3. Nature of Services to be Covered by Contract

Construction

Architect-Engineer

Other

(Explain) **Research**

4. Funding

Amount to be Obligated by this Contract Action \$ **8,610.00**

Source of Funds

Approved ORO Financial Plan, _____ Quarter, Fiscal Year 19__

Project No. _____ or, Activity No. _____

Funds to be Obligated: Allotment No. _____ (F.Y. 19__ Funds)

Procurement Directive No. _____ Dated _____

Issuing Office _____

Concurrence in Funding Statement: (signed) _____

Chief, Budget Branch

5. Project or Activity to be Covered by Contract Action:

Location of Work: _____ Construction Directive No. _____

Estimated Cost of Work to be Covered by this Contract Action \$ _____

Schedule: Date Work to Start _____ Estimated Completion Date _____

Description of Project or Activity:

(If more space is required use separate sheets and attach hereto:)

| | | | |
|---------|---------|------|----------------|
| ORS | CRS | ORS | ORB |
| Trans | Reun | Cal | Schwa |
| 4-24-57 | 4/26/57 | 4/29 | 4/30 |
| | | Disp | CONTRACTS 2-17 |

T 2/19

1108656

6. Contract Board Docket
No. _____
(To be assigned by
Board Secretary)

7. Request Submitted By: (signed) _____
Date: _____ Title: _____

ORIGINAL SIGNED BY
C. S. SHARP
- RESEARCH BRANCH
RESEARCH AND DEVELOPMENT DIV.

8. Complete Description of Services to be Furnished by Contractor:

Headquarters designated research contract
TITLE: "The Metabolism of Alkaline Earth Metals by Bone"

(If more space is required use separate sheets and attach hereto:)

9. Description of other changes to be covered by Modification:

E.M.
June
New contract for a period of one year beginning ~~May~~ 1, 1957, with Commission funds in the amount of \$8,640. Designate Dr. Frederick W. Lengenann as Senior Investigator. Include provisions for compliance with AEC Manual Chapter 7510.

(If more space is required use separate sheets and attach hereto:)

10. Negotiated Contracts. (Show why it appears desirable to negotiate new contract or to negotiate modification to existing contract)

Memorandum from Charles W. Shilling to S. R. Sapirie, dated April 17, 1957.

(If more space is required use separate sheets and attach hereto:)

11. Contracts, Subcontracts, or Purchase Orders Submitted for Review and Approval: (Furnish brief description of action in this space and attach pertinent documents)

None

12. Disputes:

Attach a statement summarizing the dispute together with pertinent documents and Background Material.

None

1108657

BUDGET FOR NEW CONTRACT - DR. F. W. LENGEMANN
FOR PERIOD 6-1-57 - 5-31-58

| | | |
|---|------------|-----------------|
| <u>Salaries and Wages:</u> | | \$6,390.00 |
| Dr. F. W. Lengemann (30% of time) | \$1,690.00 | |
| Consultants | 1,100.00 | |
| Research technician | 3,150.00 | |
| Administrative and Secretarial Assistance | 450.00 | |
| <u>Equipment:</u> | | 2,100.00 |
| <u>Supplies:</u> | | 2,500.00 |
| <u>Publication and Communications:</u> | | 100.00 |
| <u>Travel:</u> | | 300.00 |
| <u>Overhead and Indirect Costs:</u> | | <u>4,846.00</u> |
| | Total | \$16,236.00 |

The Commission's contribution to the above budget will be \$0.00.

1108658

UNITED STATES ATOMIC ENERGY COMMISSION
WASHINGTON, D. C.

Contract Authorization No. EM-57-293

TO : **S. R. Sepirie, Manager**
Oak Ridge Operations Office

FROM : **Charles W. Shilling, M. D., Deputy Director**
Division of Biology and Medicine, Washington

SUBJECT : FUND AUTHORIZATION AND TRANSMITTAL OF RESEARCH PROPOSAL FOR
CONTRACT NEGOTIATION

REFERENCE : AEC 102/16 APPROVED OCTOBER 7, 1953, AS IMPLEMENTED BY MEMORANDUM
TO MANAGERS, OPERATIONS OFFICES, DATED OCTOBER 23, 1953, JOINTLY
SIGNED BY THE DIRECTORS OF THE DIVISIONS OF RESEARCH AND BIOLOGY
AND MEDICINE.

SYMBOL : **EM:JFB**

The research proposal described below has been approved by the
Division of Biology and Medicine, funds are available, and you
are authorized and requested to negotiate a contract in
accordance with the following terms and conditions:

1. Institution: **University of Tennessee**
2. Investigator (s): **Frederick W. Longmum, Ph.D.**
3. Title: **"The Metabolism of Alkaline Earth Metals by Bone"**

4. () New Contract, () Renewal of Contract No. _____

5. Duration: **one year**

6. AEC Technical Representative: **John F. Bonner**

7. Funds are authorized for the obligation of this contract
as follows:

| <u>Allotment No.</u> | <u>Budget Category</u> | <u>Previous</u> | <u>Amount This Action</u> | <u>Total</u> |
|----------------------|----------------------------|-----------------|-------------------------------|-----------------|
| <u>06-71-91 (24)</u> | <u>6220</u> | _____ | <u>\$ 8,640</u> | <u>\$ 8,640</u> |
| _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ |

BM:JFB

APR 17 1957

Dr. Frederick W. Longmuir
Division of Chemistry
The University of Tennessee
School of Biological Sciences
Memphis 3, Tennessee

Dear Dr. Longmuir:

I am pleased to inform you that Atomic Energy Commission contribution toward support of your research entitled "The Metabolism of Alkaline Earth Metals by Bone" has been approved.

The contractual details will be handled by our Oak Ridge Operations Office, and you may expect to hear from a representative of that office shortly with regard to the negotiations. Responsibility for the technical and scientific administration will, of course, remain with the Division of Biology and Medicine in Washington.

We wish you every success in the research you are initiating.

Sincerely yours,

John F. Bonner
Assistant to Chief
Medical Branch
Division of Biology and Medicine

✓cc: Oak Ridge Operations Office

Medical

Bonner:gas

4/15/57

1108661

A PROPOSAL TO
The Atomic Energy Commission
Division of Biology and Medicine

For a Grant to Provide Funds for a Project Entitled
"The Metabolism Of Alkaline Earth Metals by Bone"

Division of Chemistry
School of Biological Sciences
University of Tennessee
Memphis

Principal Investigator

Frederick W. Lengemann
Frederick W. Lengemann,
Instructor in Chemistry

Date: Dec 18, 1956

O. W. Hyman
O. W. Hyman, Vice-President
in Charge of Medical Units

6 2253

1108662

ENTRACS

217
not

Project Proposal to be Submitted to the A.E.C.

Title: The Metabolism of Alkaline Earth Metals by Bone

Institution: Division of Chemistry
School of Biological Sciences
University of Tennessee
Memphis, Tennessee

Scientific Background

The metabolism of strontium has been of interest for many years. Because of its position in the periodic table and its ability to be deposited in bone, it has always been compared to calcium. Early workers (Shipley et al., 1922; Kinney and McCollum, 1923) conclusively demonstrated that strontium could not completely replace calcium as the structural element of bone. However, during the study of the metabolism of strontium-90, workers persistently stressed the similarities. Comar, Whitney, and Lengemann (1953) reiterated that the metabolic patterns differed by showing that dietary calcium was preferred over dietary strontium-90 by a factor of 3.6 to 1.

This finding stimulated research to find the site of the selection against strontium. MacDonald and co-workers (1956), Bauer, et al. (1956), and Comar et al. (1956) found that in animals the intestinal tract as well as the kidney contributed to the overall selection against strontium. In these experiments, bone did not appear to have a discernable preference for either calcium or strontium. However, when bones were grown in the presence of constant levels of calcium-45 and strontium-89 in an in vitro culture, Lengemann (1956) was able to demonstrate that bone did show an overall selection against strontium. This selection took place with carrier-free radiostrontium and also when 0.1 mg per cent carrier strontium was added to the medium.

1108663

Further investigation revealed that 2 hours after exposure to the labeled medium 1.08 times more strontium than calcium was present in the bones. Nevertheless, 7 days later the Sr*/Ca* ration had equilibrated at 0.83. By replacing the labeled with non-labeled medium it was possible to determine that about 1.2 times as much strontium as calcium was leaving bone.

The observation that strontium enters bone in a somewhat greater ratio than calcium has confirmation. MacDonald et al. (1956) reported that 2 hours after an intraperitoneal dose the Sr*/Ca* ratio in the femurs of rats was 1.1. Van Cleeve (1956) also found more strontium than calcium in rat femur shafts 15 minutes after intraperitoneal dosage. Bauer et al. (1956) reported that barium too appeared to enter bone at a faster rate than calcium.

That a Sr*/Ca* ratio greater than 1 was found in bone would question that exchange was the principal mechanism for the entry of radioisotopes into growing bone since MacDonald et al. (1956) and Whitney and Comar (1952) have shown that radiostrontium and radiocalcium exchange into powdered bone in a 1:1 ratio. The evidence would favor the idea, as expounded by Bauer et al. (1954), that the incorporation of radioisotopes in growing bone comes about through the process of accretion of new bone salt.

A strontium-calcium ratio greater than 1 would also tend to rule out the tertiary and secondary phosphates of calcium as being the salt initially precipitated from blood since the strontium salts are more soluble than those of calcium (Holt et al., 1954). The same results were found for the secondary and tertiary phosphates of magnesium and barium except

that $BaHPO_4$ was more soluble than the corresponding calcium salt. The character of the initial precipitate could receive some elucidation if a comparison was made of the amount and the ratio of entry into powdered and growing bone of the elements of the second group of the periodic table.

That more strontium than calcium left bone (Lengemann, 1956) was a new observation that subsequently was verified by Talmage and Comar (1956) and shown to occur in vivo. This selection could possibly account for the data of Norris and Kisielewski (1948) where it was noted that 10 days after deposition radiostrontium appeared to leave bone at a faster rate than calcium. It is interesting that the metabolic behavior of radium did not differ appreciably from that of calcium.

To explain the greater loss of strontium than calcium from bone is difficult. As mentioned before, the phosphate salts of strontium have been noted as being more soluble than those of calcium. The recrystallization process, as expounded by Neuman and Neuman (1953), would make it possible for a crystal to be repeatedly subjected to the selective processes and thus account for the bone ratio changing from 1.08 and 0.83. Solubility differences could be the mechanism involved but this not a necessity. MacDonald et al. (1952) noted that both strontium and lead are incorporated into bone crystal but that the crystal planes are distorted. This strain possibly could aid in the selection by slowing the process of crystal formation giving time for a calcium ion to exchange for that of strontium.

That strontium leaves bone in greater amounts than calcium could be an important fact if it was possible to accentuate the selection. Hamilton, Greenberg, and Copp (1946, 1947) have pursued the problem of the removal of fission products from bone but the results have not been encouraging. Their methods, as those of Ray et al. (1956), consisted for the most part of the same procedures used in cases of radium poisoning. Only methods that resulted in bone destruction seemed to increase the excretion of strontium that had been in bone more than 10 days.

The selective removal of strontium or other metals from bone can only be intelligently attempted if the processes involved can be elucidated. These processes may be purely physical-chemical or they may be under the control of enzymes. Enzymes have been shown to participate in the calcification process of in vitro cartilage slices (Gutman et al., 1942; Goldenberg and Sobel, 1952; Mark et al., 1953). That parathyroid hormone acts directly on bone (Talmage et al., 1953) to remove calcium suggests that other than physical-chemical properties are involved in this phase as well.

An estimate of the importance of enzyme systems and their contribution to the selective mechanisms of bone is susceptible to solution by the use of in vitro cultures of growing bone. Exploratory work in this laboratory has found that stable strontium is a potent inhibitor of calcification in growing bone. This is in agreement with in vitro and in vivo observations (Shorr and Carter, 1952; Sobel et al., 1951). In addition, the presence of small amounts (0.1 mg %) of stable strontium in the medium tended to increase the selection against strontium-89 by bone.

Bibliography

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- Shipley, P.G., Parks, E.A., McCollum, E.V., Simmonds, N., and Kinney, E.M. (1922) Johns Hopkins Hosp. Bull. 33, 216.

Bibliography, contd.

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- Sobel, A.E., Goldenberg, H., and Hanck, A. (1951) Proc. Soc. Expt. Biol. and Med. 78, 716.
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- Talmage, R.V., Lotz, W.E., and Comar, C.L. (1953) Proc. Soc. Expt. Biol. and Med. 84, 578.
- VanCleeve, (1956) Unpublished Data.
- Whitney, I.E., and Comar, C.L., (1952) Prog. Rpt. U.T.-A.E.C.

Scientific score of the proposed research.

The major objectives are:

- A. A comparison of the metabolism by bone of the members of the alkaline earth group. This would provide data on the deposition of important bone-seeking radioelements and make it possible to relate atomic structure and known chemical properties to suitability as a bone mineral.
- B. Investigation of the phases of mineral metabolism of growing bone to determine what processes are under the influence of enzymes.
- C. To determine the rate of strontium and calcium removal from bone and by various means to attempt to alter it.
- D. To describe the mechanism by which stable strontium inhibits calcification and increases the discrimination against radioactive strontium by bone.

It is unknown at this time whether other laboratories are engaged in studying the metabolism of calcium and strontium with these same objectives in mind. However, it should be pointed out that the in vitro bone culturing technique, as used in this laboratory, is the most direct approach now possible. The demonstration that strontium is not metabolized in bone as is calcium points up the superiority of this method. Thus, it is felt that it will be possible to make contributions not attainable by more orthodox procedures.

Experimental Plan

The in vitro procedure to be used in this study will basically be that used in tissue culture. Whole femurs and tibias from 7-day old chick embryos will be adhered to the walls of a test tube by coating the walls with plasma, positioning the bones, and then causing the plasma to clot by adding a few drops of embryo extract. The nutrient medium will be added and the tubes placed in a roller-tube apparatus and incubated. The medium will be changed every 2 or 3 days. Using this technique the following investigations will be carried out:

1. Comparative Metabolism of the Alkaline Earths by Bone

The uptake of Ca-45 by bone will be used as the standard and, in double tracer experiments, will be compared to that of Be-7, Sr-89, Ba-140, Ra and, if arrangements can be made, Mg-28. The ratio of entry into bone (Ca-45 = 1) will be determined by allowing live and powdered bone to come in contact with the radioisotopes for periods of time varied from 10 minutes to several hours. The equilibrium ratio will be found by growing the bone for several weeks in the presence of constant levels of the radioactivity. Removing some of these doubly labeled bones to a radioisotope-free medium it will be possible to obtain the removal ratio for the alkaline earth metal being compared to calcium. Accretion and resorption rates can then be calculated and used for comparative purposes.

By growing the embryonic bones in the presence of graded levels of the different alkaline earth metals (where possible) the toxicity of the metal for calcification and growth will be determined, as will the effect of the element upon the selection mechanisms of bone.

2. Comparative Strontium and Calcium Metabolism of Bones as Affected by the Type of Serum, Age of Bone, and Species.

The procedures used in Part 1 will also be used in this experiment to determine the initial, equilibrium, and removal ratios. The first phase would be to see if the type of serum used as the medium has an effect upon the ratios. For this embryonic bone will be grown in the sera from chickens, dogs, cattle, sheep, and man. Should any differences be encountered, the distributions of Ca-45 and Sr-89 in the sera will be investigated.

The second phase will be to compare calcium and strontium metabolism in embryonic and postnatal bone from chickens, rats, mice, and if specimens can be obtained, man.

3. Investigations into the Initial Uptake of Calcium and Strontium

A. To determine the time required to change the initial 1.08 ratio to the 0.83 ratio at equilibrium, bone will be placed in the doubly labeled medium for 15, 30, and 60 minutes, and 2, 3, 4, 6, 8, and 24 and then the Sr*/Ca* ratio will be determined. This should also give an estimate of the ratio at "0" time.

B. The Sr*/Ca* ratio after a 2 hour exposure to the radioisotopes will be determined in live bone and will be compared to that of powdered bone, and bone that has been killed by heat. Should the results indicate that enzyme systems are involved in this phase of bone mineralization then known enzyme inhibitors such as Be, phlorizin, CN^- , F^- , and fluoroacetate will be added to the medium to try to prevent the uptake of the calcium and strontium.

C. The rate of removal of the radioisotopes deposited in live, powdered, and killed bones will be estimated by removing the labeled material to a non-labeled medium. This should estimate the ratio of removal as applied to the material initially deposited in bone and indicate whether or not a solubility phenomenon is operating.

D. Several levels of stable strontium will be added to the medium to try to inhibit the initial uptake of calcium. The stable strontium will be added with Ca-45 and Sr-89 in one experiment and in another will precede the radioactivity by several days. After 2 hours of exposure some of the bones will be assayed for radioactivity and the rest will be placed on non-labeled medium to measure the rate of removal.

4. Long Term Uptake, Turnover, and Removal of Calcium and Strontium

A. To determine if the ratio of removal is a constant or is variable, bone will be grown for a 7-day period in the presence of Sr-89 and Ca-45. Some of the bones will then be assayed for Ca-45 and Sr-89 and the rest will be transferred to non-labeled medium. These bones will be assayed at 1, 2, 4, 6, and 8 days after the transfer.

B. If enzymes are involved in the removal of Sr-89 and Ca-45 from bone then by putting labeled bones that have been killed by heating into a non-labeled medium a different removal ratio than that of live bone should be observed. Should enzymes be involved then inhibitors will be added to the systems to try to stop or alter the removal of radionuclides.

C. The effect of stable strontium on the ratio and amount of removal of Ca-45 and Sr-89 will be estimated. Labeled bone that has been grown

in the presence of stable strontium for the entire growth period will be compared to bone to which stable strontium will be added at the time of transfer to the non-radioactive medium. Estimates of radioactivity will be made at 1 and 5 days.

5. Preliminary Experimentation

This phase will consist of short experiments to determine the effect of various hormones upon strontium and calcium metabolism of bone grown in vitro.

Scientific Personnel

Principal Investigator: Lengemann, Frederick W.; Ph.D., [REDACTED]

[REDACTED] Instructor in the Division of Chemistry. Thirty per cent of time to be devoted to project.

Experience - 1948-1951

Parttime laboratory assistant while at Cornell University. Was employed on a project studying the sodium chloride requirements of dairy cattle.

1951-1953

Worked on thesis problem for the [REDACTED] at the [REDACTED] of [REDACTED]. The problem involved counting and culturing of rumen bacteria, counting of protozoa, determination of the lower fatty acids and the "B" vitamin levels in the rumen contents of young dairy calves.

1954-55

Employed at the U.T.-A.E.C. AGR. RES. PROG. at Oak Ridge as a Research Associate. The research involved the study of endogenous calcium and phosphorus in cattle, toxicity of radiochromium and radiozinc in rats,

comparative metabolism of radiostrontium and radiocalcium in cattle and rats
comparison of radiostrontium and radium in sheep, and the metabolism of I-
131 by dairy cattle.

July 1955 to present:

Instructor in Chemistry at the University of Tennessee at Memphis.
A laboratory has been outfitted and a technique of growing bone in vitro
developed. This method has been successfully employed with studies of
calcium and strontium metabolism.

Summer of 1956:

Summer Participant at the Oak Ridge Institute of Nuclear Studies,
Medical Division. The studies consisted of determining the the absorp-
tion of calcium from milk, strontium-85 absorption in humans, the trans-
fer of calcium across the intestinal wall, the absorption radioiron and
radionickel, and the comparative metabolism of calcium and strontium in
lactating goats.

Publications

1. THE NORMAL CHLORIDE CONCENTRATION OF BLOOD PLASMA, MILK, AND URINE
OF DAIRY COWS
F. W. Lengemann, P. D. Aines, and S. E. Smith Cornell Vet. 42;
1 - 9 (1952)
2. BLOCK VS. LOOSE SALT CONSUMPTION BY DAIRY CATTLE
S. E. Smith, F. W. Lengemann and J. T. Reid J. Dairy Sci. 34;
762 - 765 (1953)
3. THE DEVELOPMENT OF RUMEN FUNCTION IN THE DAIRY CALF
F. W. Lengemann Thesis Univ. of Wis. (1953)
4. THE DEVELOPMENT OF RUMEN FUNCTION IN THE DAIRY CALF I. SOME
CHARACTERISTICS OF THE RUMEN CONTENTS OF CATTLE OF VARIOUS AGES
F. W. Lengemann, and N. N. Allen J. Dairy Sci. 38; 651 - 656 (1955)
5. COMPARATIVE UTILIZATION OF SR-90 AND CALCIUM BY DEVELOPING RAT
FETUS AND THE GROWING RAT
C. L. Comar, I. B. Whitney, and F. W. Lengemann Proc. Soc. Expt.
Biol. and Med. 38; 232 - 236 (1955)

Publications (contd.)

6. THE SECRETION OF I-131 IN MILK
F. W. Lengemann, R. A. Monroe, and E. W. Swanson J. Dairy Sci.
38; 619 (1955)
7. THE SECRETION OF THE MINERALS OF MILK AS STUDIED WITH RADIOISOTOPES
F. W. Lengemann and C. L. Comar Conf. on Radioactive Isotopes
in Agric. (Jan. 1956)

Submitted for Publication:

8. THE COMPARATIVE METABOLISM OF SR^{89} and CA^{45} BY BONE GROWN IN VITRO
F. W. Lengemann Proc. Soc. Expt. Biol. and Med. (in press)
9. ABSORPTION OF CALCIUM AND STRONTIUM FROM MILK AND NON-MILK DIETS
F. W. Lengemann, C. L. Comar, and R. H. Wasserman J. Nutr.
(submitted for publication)
10. THE EFFECT OF SEASON ON THE SECRETION OF IODINE IN MILK
F. W. Lengemann, F. W. Swanson, and R. A. Monroe J. Dairy Sci.
(submitted for publication)
11. SECRETION OF IODINE IN MILK OF DAIRY COWS USING DAILY ORAL DOSES OF
 I^{131}
F. W. Lengemann, and F. W. Swanson J. Dairy Sci.
(submitted for publication)

Other Personnel

Fulltime Technician - all of time on project

Other Financial Assistance

None

Equipment and Facilities Available

Those items available for this project consist of rollertube apparatus, drying ovens, pH meter, analytical balance, survey meter, microtome, microscope, embedding oven, autoclave, radioisotope fume hood, dishwasher, sterilizing oven, and a clinical centrifuge. The laboratory is well furnished and in addition there is a walk-in refrigerator, walk-in incubator, dog room, rat rooms, dark rooms, and a high level radioisotope laboratory.

For this research a scintillation counter and a large centrifuge would need to be provided. Since many of the isotopes planned to be used in this project are gamma emitters a scintillation counter is a necessity. There is none available for this project. The centrifuge is needed in the preparation of blood serum for medium, in the production of the chick embryo extract, and for determinations of stable calcium. The level of activity planned for this project would make it a necessity.

Travel and Other Items

The item of "Travel" would be for the purpose of exchanging information, presenting papers, and to meet others interested in bone metabolism. It is planned to attend the Gordon Research Conferences and the Federation Meetings.

BUDGET

| <u>Personnel</u> | <u>University</u> | <u>AEC</u> |
|---|-------------------|------------|
| Principal Investigator (30% of time) | 1690.00 | |
| Administrative Assist. | 150.00 | |
| Departmental Secretary | 200.00 | |
| Consultation (\$10.00 / hr.) | | |
| Dr. Wood | 400.00 | |
| Dr. Williams | 200.00 | |
| Dr. Perkinson | 300.00 | |
| Dr. Cohn | 200.00 | |
| Technician (includes 5% retirement) | | 3150.00 |
| Parttime Secretary | | 100.00 |
| <u>Equipment</u> | | |
| Scintillation Counter | | 1000.00 |
| Centrifuge (SB-2) and Accessories | | 1100.00 |
| <u>Supplies</u> | | |
| Fertile Eggs | | 400.00 |
| Serum | | 300.00 |
| Chicken Plasma | | 50.00 |
| Rats and Feed | | 100.00 |
| Radioisotopes | | |
| Mg-28 | | 500.00 |
| Ra | | 200.00 |
| Be-7 | | 100.00 |
| Ca-45 | | 50.00 |
| Sr-89 | | 50.00 |
| Ba-133 | | 200.00 |

BUDGET
(Contd.)

| <u>Personnel</u> | <u>University</u> | <u>AEC</u> |
|---|-------------------|------------|
| Special Supplies (T.C. Detergent, G. M. Tube, Gloves, Planchets, Bacteriological P. Pettes, Note Books, Data Sheets, etc.) | | 300.00 |
| Common Laboratory Solvents and Reagents | 100.00 | |
| Common Laboratory Glassware | 150.00 | |
| <u>Travel</u> | | 300.00 |
| <u>Publication and Communications</u> | | 100.00 |
| <u>*Utilities</u> | 942.00 | |
| <u>*Maintainance</u> | 1081.00 | |
| <u>*Library</u> | 752.00 | |
| <u>*Depreciation</u> | 540.00 | |
| <u>*Loss of Income</u> | 391.00 | |
| <u>SUBTOTAL</u> | 7596.00 | 6000.00 |
| Overhead (8%) | | 640.00 |
| <u>TOTAL</u> | 7596.00 | 8640.00 |

Requested of A. E. C. \$8640.00

* See additional sheets for computation of these costs.

Calculations of Indirect Costs

- Schedule I - Personnel Supplied by Grant
Schedule II - Equipment supplied by Grant
Schedule III - Supplies included in Grant
Schedule IV- Travel included in Grant
Schedule V- Institutional Personnel
(Detailed in Budget)
Schedule VI - Square Footage of Building Space occupied parttime.
(But computed as fulltime occupancy by the Project).

| | |
|---------------------------------|--------------|
| Office and Laboratory | 740 sq. ft. |
| Walk-in incubator | 36 |
| Sterilizing room | 100 |
| Shop | 20 |
| Cold room | 30 |
| Freezer room | 14 |
| Bulk storage room | 20 |
| Rat room | 35 |
| Dog and operating room | 60 |
| Constant temperature room | 30 |
| Dark room | 9 |
| High level isotope laboratory | 20 |
| Division office | 50 |
| Adm. School Biological Sciences | 90 |
| Institutional Administration | 221 |
| Library | <u>172</u> |
| | 1637 |
| "Dead Space" (total x 0.1) | <u>164</u> |
| TOTAL | 1801 sq. ft. |

Schedule VII - Cost of Utilities Required But not Included in Grant

Square Footage (Schedule VI) x cost of heat, light, gas, and
water/sq. ft.

$$1801 \times \$0.523 = \$942.00$$

Schedule VIII - Cost for Maintenance and Custodial Service

Square footage (Schedule VI) x cost of custodial and maintenance/sq.ft
1801 x \$0.60 = \$1081

Schedule X - Cost of Library

Operating expense of library x sum of schedules I, II, III, and IV
Institutional operating expense
 $\frac{\$15,750}{167,104} \times \$8000 = \$752$

Schedule XI - Depreciation on Building Space and Equipment

Square footage (Schedule VI) x net building cost/sq. ft. x 0.02 =
allowance for depreciation on construction
1801 x \$ 11.25 x 0.02 = \$405
Square footage (Schedule VI) x equipment cost/sq. ft. x 0.05 =
allowance for depreciation on equipment
1801 x 1.50 x 0.05 = \$315

TOTAL \$540

Schedule XII - Allowance for loss of income for expending funds for
constructing and equipping building space occupied by the project.

Total capital outlay x 0.03 = loss of income
\$29.716 x 0.03 = \$891

SUMMARY

Expenditures Required From the Granting Agency For the Project

| | |
|-------------------------------|---------|
| 1. Schedule I - | 3250.00 |
| 2. Schedule II - | 2100.00 |
| 3. Schedule III - | 2350.00 |
| 4. Schedule IV - | 300.00 |
| Subtotal | 8000.00 |
| 5. 8 % of Subtotal (Overhead) | 640.00 |
| Total | 8640.00 |

Expenses Representing Institutional Contribution to the Project
and not Included in the Grant

| | |
|--|---------------|
| 1. University contribution to consumable supplies | 250.00 |
| 2. Schedule V | 3140.00 |
| 3. Schedule VII | 942.00 |
| 4. Schedule VIII | 1081.00 |
| 5. Schedule X | 752.00 |
| 6. Schedule XI | 540.00 |
| 7. Schedule XII | <u>891.00</u> |
| TOTAL | \$7596.00 |

MEMORANDUM

Oak Ridge, Tennessee
April 26, 1957

Dr. F. W. Langemann
Division of Chemistry
The University of Tennessee
Memphis 3, Tennessee

Subject: RESEARCH CONTRACT

Dear Dr. Langemann:

This is to advise you that we have initiated action for the preparation of a research contract with The University of Tennessee covering your proposed work on "The Metabolism of Alkaline Earth Metals by Bone". The contract will be for a period of one year commencing July 1, 1957, with the Commission contributing \$3,640 to the total cost of \$16,236. A copy of the budget to be included in the contract is enclosed for your information. The contract document will be forwarded to you for signature as soon as it is complete.

Your cooperation is appreciated.

Very truly yours,

C. S. Shoup
Chief, Biology Branch
Research and Development Division

[Handwritten signature]
Enclosure:
Budget

AKCC: C. C. Tipton, Memphis, w/encl

CONTRACTS *[Handwritten initials]*

~~T 218~~

Res. Ser. Br. Biology-Br.

[Handwritten signatures and notes]
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