

R. W. JAMES BUILDING

ASTRONOMY

PHYSICS

OCEANOGRAPHY



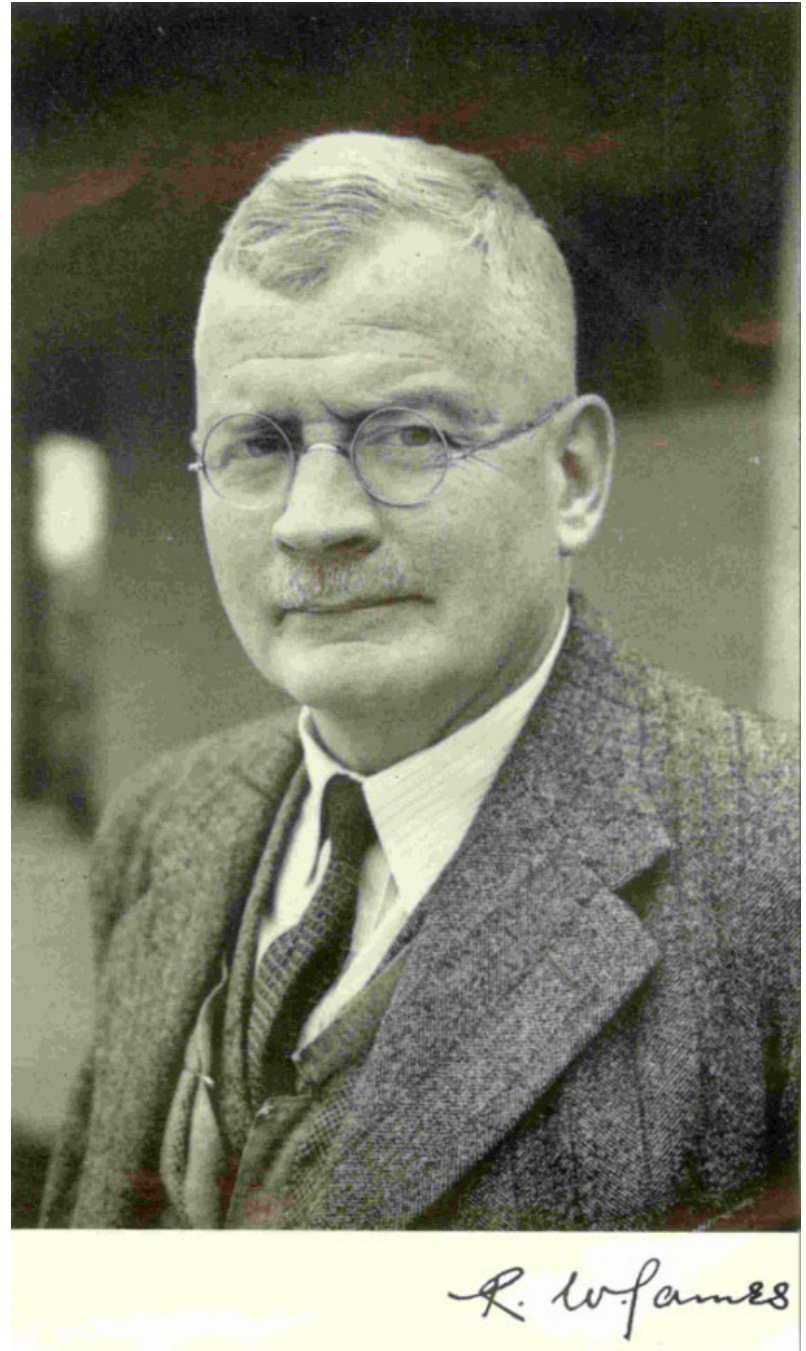
RW James

A biography

Andy Buffler

UCT Physics

18 March 2022



The early years

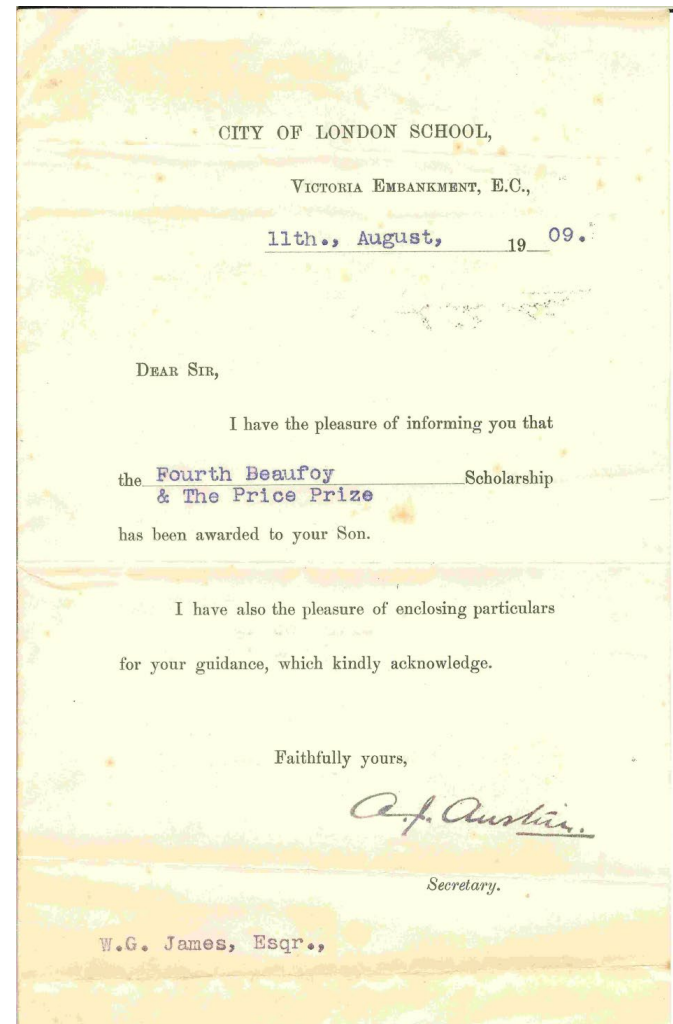
Born in Paddington, London, 9 January 1891

... father was an umbrella maker and store keeper

Showed mathematical ability at secondary school ... almost became an actuary ... but had an interest in science and astronomy ... realised that you can't do astronomy without mathematics ... and so worked hard at it.

Spent 2 post-matriculation years at City of London School ... where his interests turned to physics for the first time ...

... was awarded an entrance scholarship of £80 per year to Cambridge ...



Dr. J.R.Tanner.
Tutor.

St. John's College,
Cambridge.

11 December 1908

Dear Mr James,

I am very glad to be able to write in confirmation of my telegram to say that you have been elected to a Foundation Scholarship of £80 for two years. You will be interested to know that you came out exceedingly well and it was decided not to press against you the weakness of the Test Paper. The work was good and even in fact you obtained almost exactly the same mark in each paper and in the Practicals, and your Elementary Mathematics ~~was~~ exceedingly good. The only weak point was the Essay, ^{pass} this although up to standard was not a very satisfactory performance.

You will find information about the steps necessary to be taken for your admission to the College in the paper enclosed. I think this should be done as soon as possible because your choice of rooms in College dates from the payment of the Caution Money and fees and there are already a good many names upon the list.

Believe me,

Yours sincerely,

J.R. Tanner

The Cambridge years

1909 ... started at St John's College Cambridge

... Natural Sciences Tripos

... specialised in physics, chemistry and geology (Part I)

... obtained a first class in 1911

... then specialised in physics (Part II)

Lectured by JJ Thomson on the properties of matter and electricity, and CTR Wilson (inventor of the cloud chamber) on physical optics, who, according to James “combined the best content with the worst delivery.”



R. W. James Esq

THE BURSARY, 1 NEW COURT
ST JOHN'S COLLEGE
CAMBRIDGE

28 Oct-1909

With the Senior Bursar's Compliments

The Master will admit the Scholars Election
Saturday next at 1-15 pm.
You are requested to be in my rooms at 1 pm
in cap and gown.

J. G. Leatham

The Cambridge years

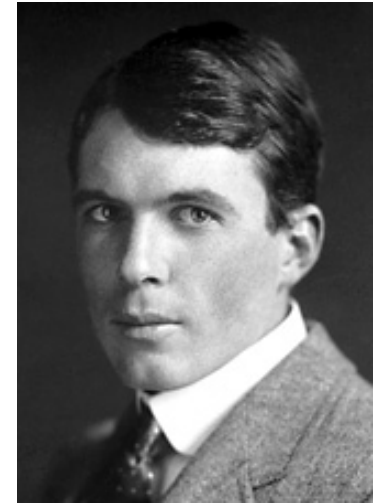
Worked at the Cavendish Laboratory under JJ Thomson between 1912 and 1914

... didn't make a lot of progress due to lack of equipment and workshop access.

... but James did meet William Lawrence Bragg at Cambridge ...

William Lawrence Bragg

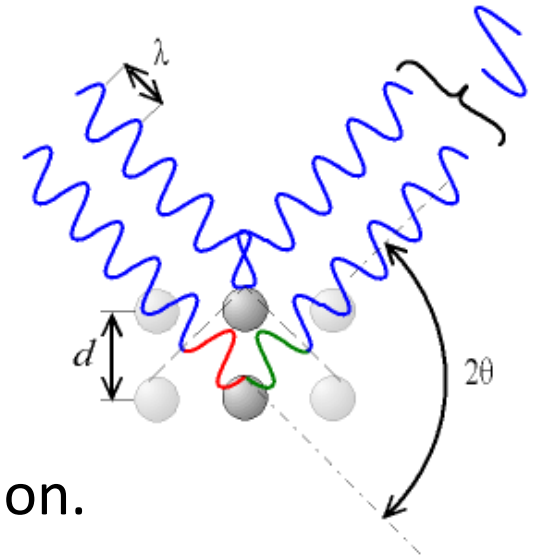
(son of William Henry Bragg)



“Bragg's Law” ... Developed at Cambridge in 1912
... makes it possible to calculate the positions of the atoms within a crystal from the way in which an X-ray beam is diffracted by the crystal lattice.

$$n \lambda = d \sin \vartheta.$$

Bragg's law confirmed the existence of real particles at the atomic scale, as well as providing a powerful new tool for studying crystals in the form of X-ray diffraction.



Awarded the Nobel Prize in Physics in 1915 at the age of 25 (together with his father).

Cape Times 10 March 2022



The Shackleton expedition

Ernest Shackleton was putting together a team to attempt to be the first to traverse the continent of Antarctica on foot ... the “Imperial Trans-Antarctic Expedition”

... and was looking for a physicist to join the team



5 minute interview with James ...

“Is your health good?”

“Would you mind losing your finger?”

“Can you sing?”

... “Very well, I’ll take you”



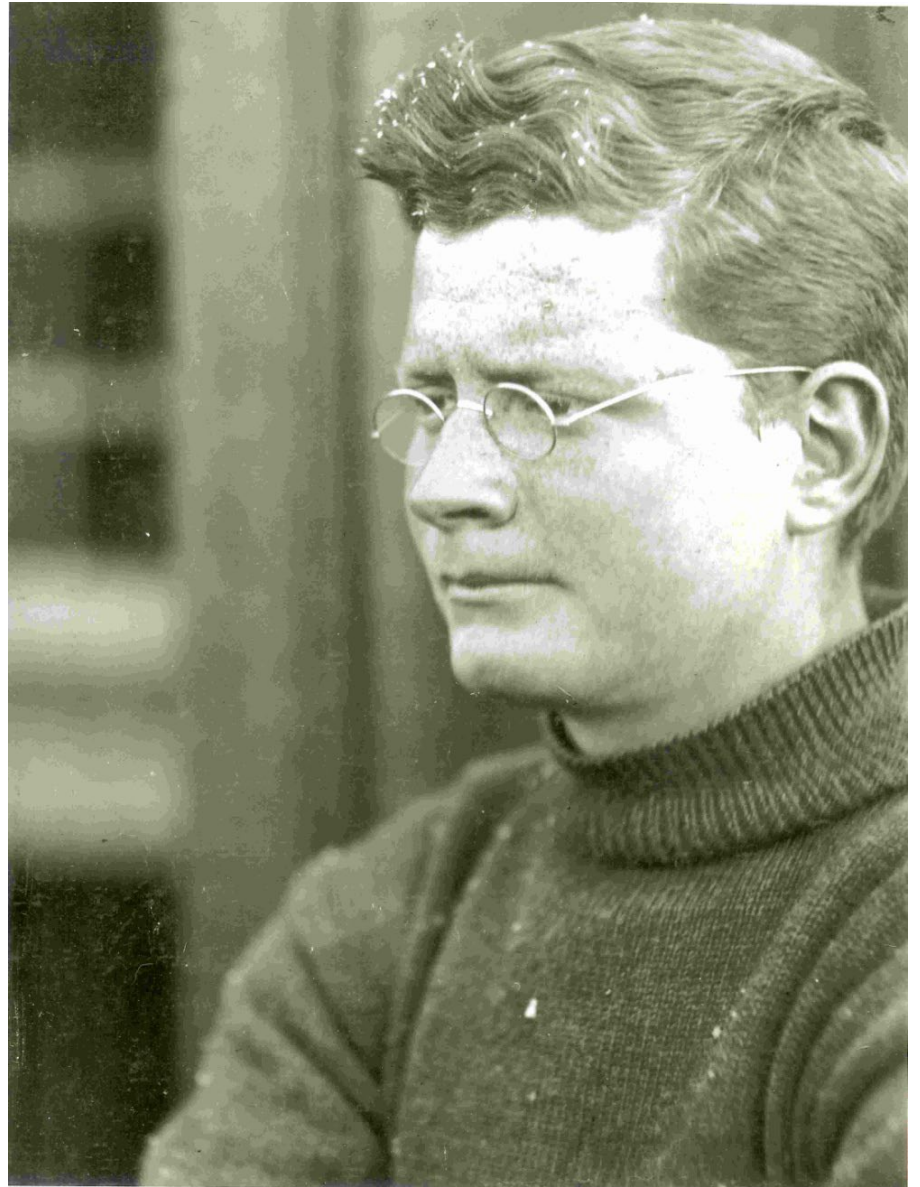
Expedition of 28 men departed 5 December 1914
on board the *Endurance* from South Georgia Island







James worked on
magnetic observations
and the movement and
physics of pack ice.



VII. "Some Problems Relating to Antarctic Sea-Ice."

By R. W. JAMES, M.A.

THE Antarctic pack-ice presents for our consideration a variety of interesting problems, whether we study it from the broad geographical point of view, or from the purely physical standpoint. In the first case we are concerned mainly with its distribution and movements on a large scale, while in the second, we are more concerned with its formation and growth, the mechanism of its movement, its decay, and the changes in its salinity and crystalline structure. The present paper is founded on observations made during the drift of Sir Ernest Shackleton's *Endurance* in the Weddell Sea in the years 1915 and 1916, both while the ship was beset and also after she was crushed, when the party continued to drift, camped on the ice. Most of the physical phenomena described may, however, be taken as typical of Antarctic ice generally, although the geographical aspects of the drift have naturally a local application.

It is hardly necessary to emphasise the importance from the explorer's point of view, of a knowledge of the distribution and movements of the ice-pack. Although eighty years have elapsed since the discovery by Ross of the Antarctic Continent, yet less than one-half of its outline has even been seen, still less mapped. With the exception of that part of the continent which lies directly south of Australia, which was carefully studied by Sir Douglas Mawson's Expedition in 1912 and 1913, and of the Graham Land peninsula, to the south of Cape Horn, only the area originally discovered by Ross has been charted in any detail. The great tract lying south of the Pacific, between the Ross Sea and Graham Land, is totally unknown, while in the other great uncharted region, between Mawson's farthest west and the Weddell Sea, only a few distant observations of land have been obtained.

This is due to two causes. In the first place, it is easier to make a landing in the Ross Sea than anywhere else in Antarctica, since it is generally possible to get through the pack-ice in this region, while, in other parts, ice conditions

July 26th. 1924.

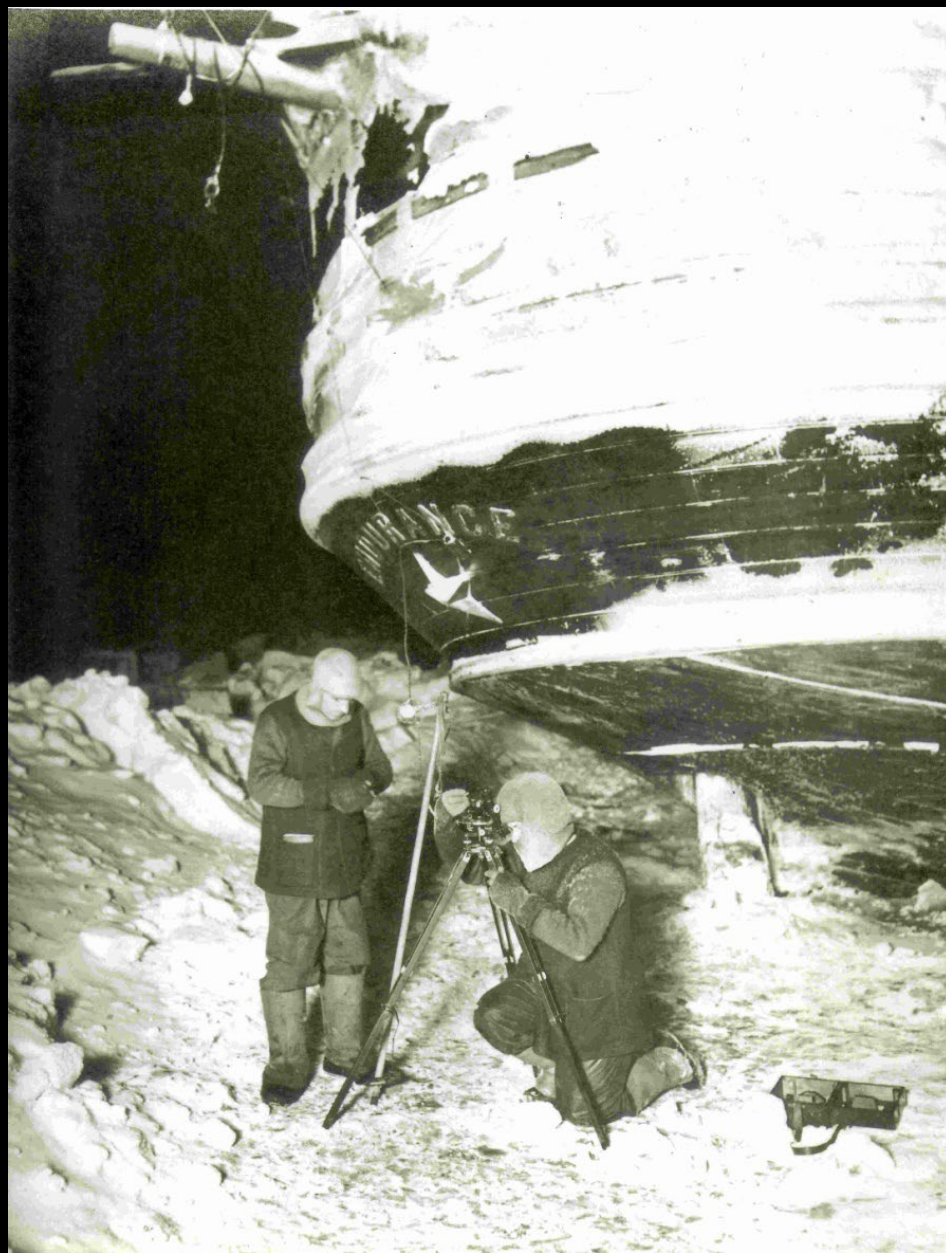
Manchester Memoirs, Vol. lxxviii (1924), No. 7.

VII. "Some Problems Relating to Antarctic Sea-Ice."

By R. W. JAMES, M.A.

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James kept a good diary
... which was lovingly repackaged
by Lesley Jennings
(copy in the Frahn Library)



Adult Plumage

Plumage after losing down.

Pygoscelis Adelae

2 February 1916

Up at 1 a.m. Good thick hoosh and started for Ocean Camp just after 2 with 16 men. The surface and going very good, and we arrived with the empty sledge in 2 hrs and 8 mins. I was cook's mate and general hoosh stirrer. Two petrol tins, cleaned with some opportune soda bi-carbonate, served as cooking pots. Hoosh was made of dog pemmican with stray tins of beetroot, cauliflour and baked beans, and was a great success. Coffee was the drink. About 6.30 we started on the homeward way.

Lat. 65° 14½', Long. 52° 18'W.



Landed on Elephant Island ... 11 April 1915
James had learnt how to tell the time from lunar
occultations in order to fix their longitude.









Eventually rescued from Elephant Island on 30 August 1916 ...
... 20 months after leaving South Georgia Island ...
... and all 28 men safe!





ENDURANCE22

9 March 2022

At the Bottom of an Icy Sea, One of History's Great Wrecks Is Found

Explorers and researchers, battling freezing temperatures, have located Endurance, Ernest Shackleton's ship that sank in the Antarctic in 1915.



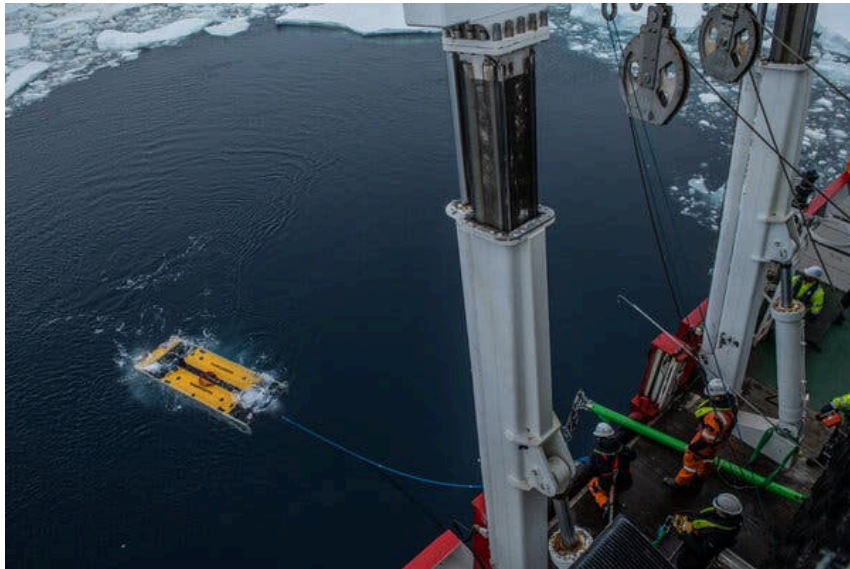
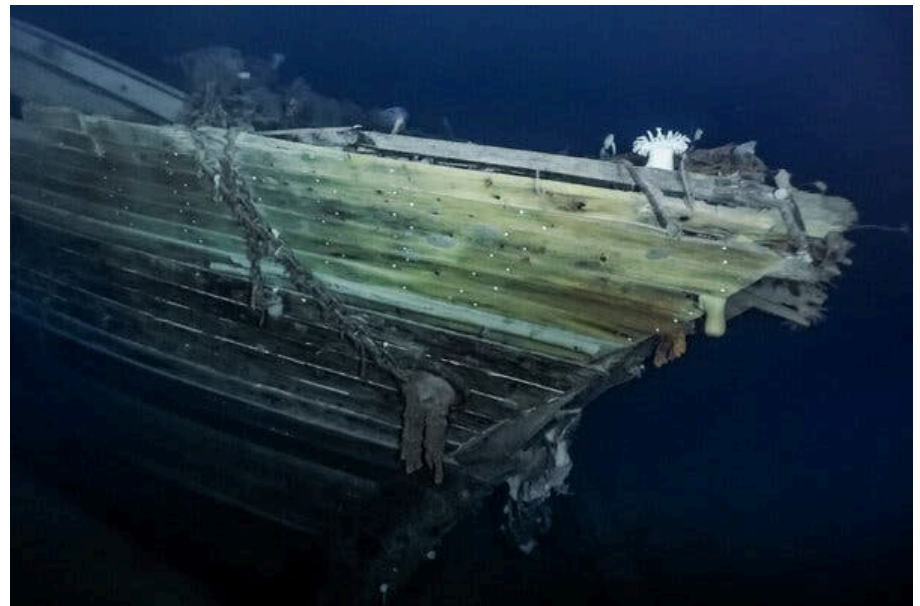
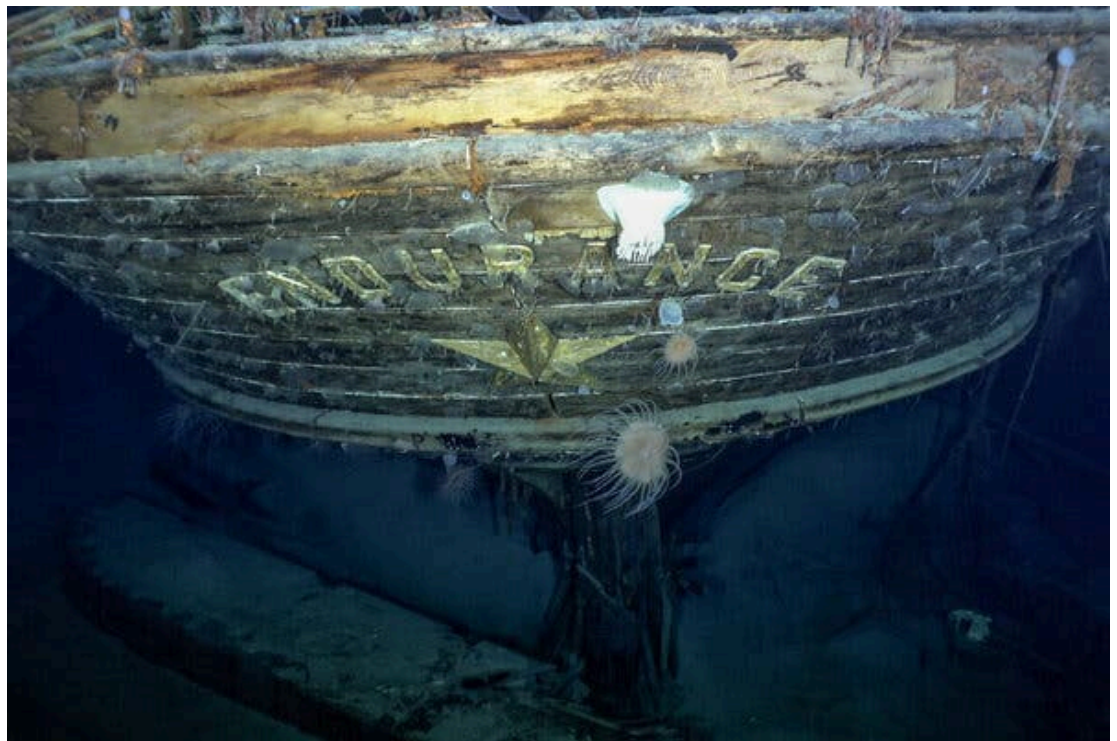
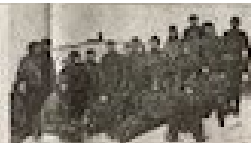


Photo credits: Falklands
Maritime Heritage Trust



The Bush administration considers the war on terrorism a top priority, and has released



Estimating the Size

"[The] fact is that neither these men nor a [European] from the United States have been particularly well educated with it. There is no language in which there is no word for the word 'poison' in the sense of the word 'poison' and the word 'poison' is not the word 'poison' in the sense of the word 'poison'." — *Journal of the American Medical Association*, 1910, 35, 2235



John, James, Jeff, and David James in Cleveland, Ohio, with a picture of their father, Ray James. Photo: Tim Arndt

**‘Our dad’s
sums saved
lives and
helped find
Endurance’**



May 2000

Reg James kept precise records that led to the epic rescue of all aboard the *Endurance* — one of the great survival stories of human history

© 2000 Blackwell Science Ltd, *Journal of Internal Medicine* 247: 101–107

■ Cops from Brooklyn, Tulsa and Portland always know their physical fatherland is to be avoided, especially when getting things figured out (otherwise, why they?)

...and they don't believe that the
...as a young female, experts
...would help attract local use of the
...world's most famous vine, the Lianas,
...highlighted by the fact the north pole area
...that previous jobs.

The immediately perceived work of the *Endurance* was illustrated last January when the ship sailed past the Strait of

for differentiating between L-shaped and non-L-shaped cities.

It was a thoughtful blend of points of research and 10-year legislative support, including those the core of EPA's polar research went to. Despite it actually had to affect an earlier meeting when the new House came.

It is not certain the work would have been done without reference to the fact that the work was a previous flight mission with all 28 men involved.

One of the medical keepers near Hospital Annex, code 23, suffers the painful (Pain) Black King's British and Transatlantic (British) culture of a medical.

The detailed calculations after the step for cases dropped in 1995 – using a method for dealing involving step and month increments

— along with the efforts of other migrant Capt. Frank Brindley personally helped lead the crew to safety, about an epic voyage during which they camped on floating ice west to their ship, then stranded in Melbourn, where a wreck.

After several days in negotiations with the party leaders on Christmas Island, Mark Karpis and five others then travelled to Miami in one

The remaining seven letters among them, were removed from the book and placed in the



The Environment focused on the business and industry sector.

strong line laser and a half meter or a foot of scale and vernier.

Without the precise logistical calculations, the crew would never have reached the journey to tell the extraordinary tale.

The housekeepers know all about their guests' behavior with regard to smoking, for all work is well regulated and order properly," said Miss Jones, 411 North Jackson.

The large, unsegmented, cylindrical cell is a

from which they was the heavy equipment, in addition? They were absolutely grounded in history. That was the only way we could be sure, wherever we were, that we had something to contribute."

Among the family heirlooms, some of them adapted to modernity, are two of his letters: *Diary* and the *unpublished manuscript* about the *linkages* – all written with the cane.

The authors gratefully acknowledge the assistance of the following:



The place of the Endurance in the Antarctic reached 1,000 hits, surpassing the earlier, Peter Dinklage, *Blindness* (1995) and *Forrest Gump* (1994).

treasure trove of photos and memorabilia, mostly from the 1950s and 1960s, is exhibited in the petrochemical wing. A large section highlights the work of the late American geologist and paleontologist, James H. Van Dine.

...the industry, for example, to ensure that calculations and reports are correct, and that the data is the product of the same process.

"Nostalgia-Ology" something about it and
five years ago when a chapter of nostalgia
is finally being it. It's only by modern

So what do you do after spending 2 years in freezing conditions in the South Atlantic ?

... and the year is 1916 ?

... and you are English ?

... you join the army and get shipped off to France ...



James in the army

1917 ... joined the Royal Engineers ... in the first experimental sound ranging section (established by WL Bragg (!))
... sound ranging is a method of getting the positions of enemy guns by recording the times of arrival of the sound at a series of microphones placed behind the front line.

The image shows an open notebook. The left page is blank and aged, with the number '14' at the bottom. The right page is a yellowed 'EMPLOYMENT FORM' with handwritten details for a man named James. The form includes fields for Surname, Christian Names, Date of Birth, Regiment, Rank, Permanent Home Address, and Civil Profession or Occupation before the War. It also has a section for 'Nature of occupation desired after the War' and 'Name of organization or association, if any, with which an arrangement for securing employment after the War has been made'. The handwriting is in dark ink, and the form has a slightly worn, historical appearance.

EMPLOYMENT FORM.

This form may be required when an Officer's services are terminated. It should be completed as far as possible now, but subsequent alterations may be made. It is not applicable in the case of Officers who will remain in the Regular Army after the war.

Surname *JAMES*
Christian Names *REGINALD WILLIAM*
Date of Birth *JAN 9. 1891*
Regiment *R.E. (Tunnage)*

NOTE.—State whether commission is Regular, Special Reserve, Territorial or Temporary. The number of the battalion is on no account to be stated.

Rank *A/CAPT.*
Permanent Home Address
34 MASFIELD RD FALLOWFIELD
MANCHESTER

Civil Profession or Occupation before the War } *Research Student in Physics, Canada*
Physicist to Antarctic Exped. 1914-1916
Professional, academic, or other qualifications } *B.A. Cambridge (Natural Tripos Part II)*
B.Sc. Lond. (Hon. Physics) 1914.

Nature of occupation desired after the War } *UNIVERSITY WORK*
Physics

Name of organization or association, if any, with which an arrangement for securing employment after the War has been made }

14 15

James was posted in France

... renewed contact with
Bragg (who was in charge of
the technical side of
development)

... also met Darwin and
Bosanquet

SERVICE GÉOGRAPHIQUE
DE L'ARMÉE
CABINET
du
Général Directeur
GROUPES DE CANEVAS DE TIR
N°

Paris, le 20 Septembre 1918

N° du répertoire 27

ORDRE DE SERVICE

Le Capitaine JAMES du Maps G.H.Q. Britannique, en mission au Service Géographique de l'Armée, se rendra à l'Etat-Major de la 7^e Armée pour y visiter les Sections de Repérage par le Son.

Il se présentera à son arrivée au Chef du Groupe de Canevas de Tir

LE GÉNÉRAL Directeur du
Service Géographique
P.O. le Lt-Colonel,

P.O. J. Dagallier

By the end of the war James was officer in charge of the sound ranging school, with the rank of Captain.



G.H.Q. LOCAL PASS.

(Not valid unless signed on back by bearer).

Name.....Capt. James R. W......
Unit.....Depot Field Survey Bn. R.E......
has permission to pass the posts at G.H.Q., 1st
Echelon, from.....18-9-18 to 18-12-18......

DEPOT FIELD	
SURVEY	
ROYAL ENGINEERS.	
No.
Date.	<u>18-9-18.</u>

C. Ireland
Capt. Adjt.
Depot F. S. Bn. R.E.

DINNER TO
DEPOT FIELD
SURVEY COMPANY,
ROYAL ENGINEERS
29TH AUG. 1918



LIEUTENANT
T. H. HUGHES
ARTIST RIFLES

"MY MORALE IS HIGH TO-NIGHT"

SOME
DINNER
I TELL
YOU

ITS
MY
JOB
HERE

WHY DOESN'T
GANDLER HAVE
ICE?



SOUP MULIGATAWNY
SOLE MEUNIÈRE
SAUMON MAYONNAISE
JAMBE
A LA
RUSSE
ST JESSE

POULET ROTI
PETITS PÔIS POMMES DE TERRE

TRIPLE
ANCHOUÏES
WINES COFFEE



OFFICER CMDG.
LT COL. KING R.E.



"NOW FOR THAT
POULET ROTI OF
GANDLER'S"



Elfraves

T. H. Hughes

Andrew B. Dea

L. N. King's

Ce Robinson

T. Cum

Miss Handland

Miss Chandler

Chas. A. Copland

H. L. Cook

James at the Dept of Physics, University of Manchester

Head of Department: WL Bragg

1919: Lecturer

1921: Senior lecturer

1934: Reader in Experimental Physics (“Associate Professor”)

Worked closely with WL Bragg and CH Bosanquet

1921 ... measured the **absolute reflecting power** of “rock salt” (NaCl) crystals for X-rays ... the quantitative relationship between the reflected rays and the incident X-ray beam.

... verified the theory of CG Darwin ... developed before the war.
... The “BJB” experiments showed that NaCl reflected nearly as a mosaic, or “ideally imperfect crystal”

Phil. Mag. **41** (1921) 309; and **42** (1921) 1

... also measured the secondary extinction of total reflected intensity due to X-rays reflected by upper layers not reaching the lower layers ...

From the PHILOSOPHICAL MAGAZINE, vol. xliv. September 1922.

The Distribution of Electrons around the Nucleus in the Sodium and Chlorine Atoms. By W. LAWRENCE BRAGG, M.A., F.R.S., Langworthy Professor of Physics, The University of Manchester; R. W. JAMES, M.A., Senior Lecturer in Physics, The University of Manchester; and C. H. BOSANQUET, M.A., Balliol College, Oxford.

1. **I**N two recent papers* in the Philosophical Magazine the authors have published the results of measurements made on the intensity of reflexion of X-rays by rock-salt. The mathematical formula for the intensity of reflexion, as calculated by Darwin †, involves as one of its factors the amount of radiant energy scattered in various directions by a single atom when X-rays of given amplitude fall upon it. The other factors in the formula can be

WL Bragg: “The quantitative side of X-ray reflection was thoroughly thrashed out.”

Early crystal research using X-rays was experimentally challenging ... the first structures determined by intensity measurements had at most one or two variable parameters not fixed by the symmetry of the crystals.

New methods developed by Bragg and James for measuring **absolute angles of reflection** allowed crystals having a large number of parameters to be tackled ... first complex crystal to be worked out was that of barium sulphate ...

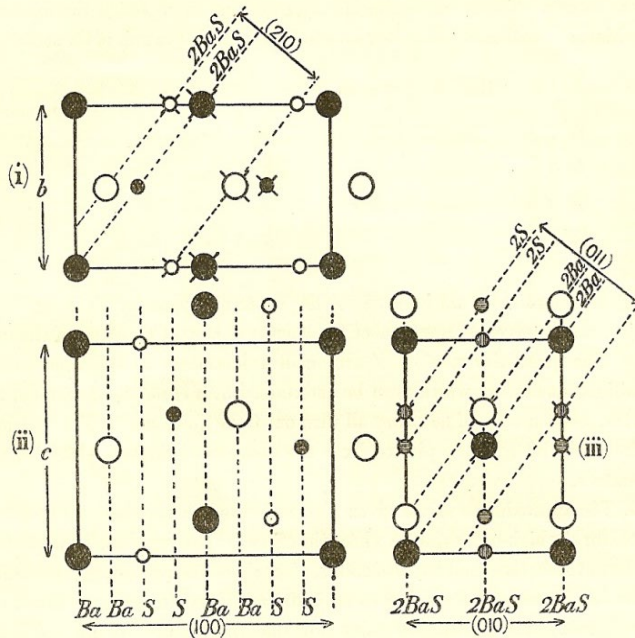


FIG. 3.

Large circles represent Ba atoms, small circles S.

Plain black circles represent atoms in the plane of the paper.

Plain white circles represent atoms in half a unit above or below the black.

Horizontally shaded circles represent atoms $a/4$ below the plane of the paper, vertically shaded, those $3a/4$ below.

Circles with crosses lie $c/6$ above the corresponding plain circles in 3 (i), and $a/8$ above in 3 (iii).

The Crystal Structure of Barytes, Celestine and Anglesite.

By R. W. JAMES, M.A., Senior Lecturer in Physics, Manchester University
and W. A. WOOD, B.Sc., Manchester.

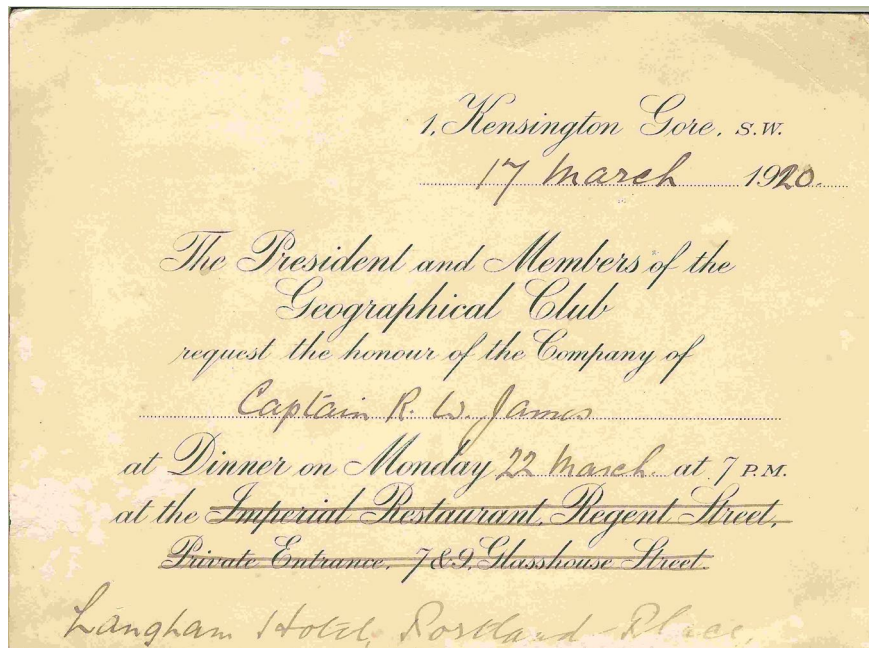
(Communicated by Prof. W. L. Bragg, F.R.S.—Received September 9, 1925.)

Proc. Royal Soc. A **109** (1925) 598

Department of Physics, University of Manchester



The "Rucksack Club" ... climbing in the north of England.



Although his friends colleagues thought that he was to be a bachelor forever ... “giving excellent lectures and doing sound research” (Bragg) ...

MARRIAGES

BERRIDGE—WATSON.—On December 23, 1936, at St. Peter's Church, Hornsey London, by the Rev. Claude Easterling, **JACK STANLEY**, youngest son of the late Richard James and Sophia Ellen **BERRIDGE**, of Oxfordshire, to **MARGARET**, youngest daughter of the late Joseph and Sarah Mary **WATSON**, of Cheshire and Manchester.
19, Seymour Road, Hornsey, London, N. 8.

JAMES—WATSON.—On December 23, at S. Chad's Church, Ladybarn, Manchester, by the Rev. T. M. Gribbin, M.A., rector, **REGINALD WILLIAM JAMES**, of Withington, Manchester, to **ANNIE**, only daughter of the late Mr. and Mrs. John **WATSON**, of Rochdale.

... and then offered himself as a candidate for the Chair of Physics at UCT ...

BACK FROM HONEYMOON TO LECTURE

South African Post for
Professor

PROFESSOR R. W. JAMES, reader in experimental physics at Manchester University, has been appointed Professor of Physics at Capetown University in succession to Professor Schonland, it was announced to-day. He is leaving for South Africa in March.

Professor James, who was married recently, was appointed lecturer in physics at Manchester University 18 years ago, and reader three years ago.

While still a student at Cambridge he accompanied Shackleton's 1914 expedition to the South Pole as physicist to the party.

In the Great War he served in the sound ranging organisation for establishing the position of enemy guns.

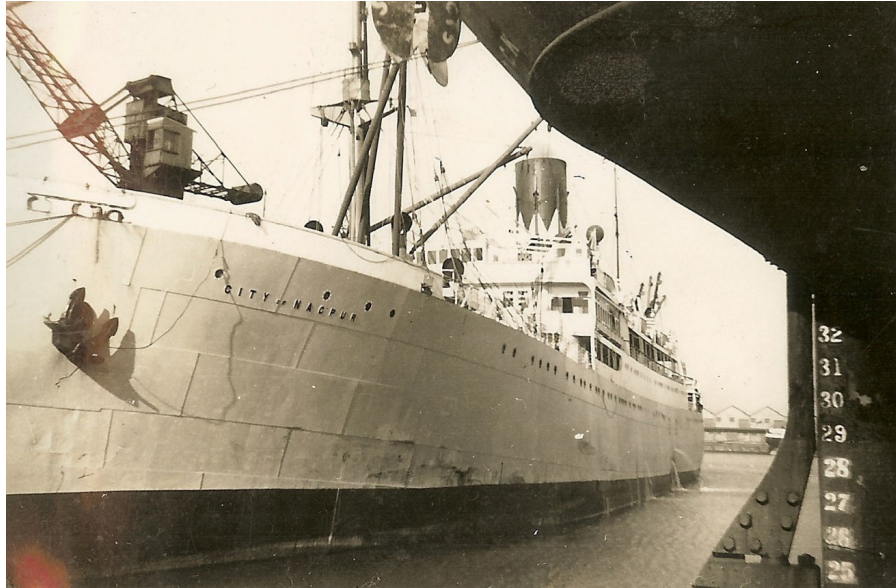
'VARSIITY RESEARCH

To-day, at Manchester University, Professor James delivered a lecture to the Science 'Masters' Association in place of Professor Bragg, who is attending a conference at Zurich.

Professor James had returned specially from his honeymoon in order to deliver the lecture, and the announcement was received with cheers from those present.

Dealing with "the architecture of solid matter," Professor James said Manchester University had gained wide repute for the work it was doing in the elucidation of the structure of crystals.

The voyage out to Cape Town



With wife Anne aboard
the SS "City of Nagpur",
April 1937



James at UCT Physics

UCT was firmly established as a very good teaching institution ...
... aimed to get the very good students into graduate schools in England

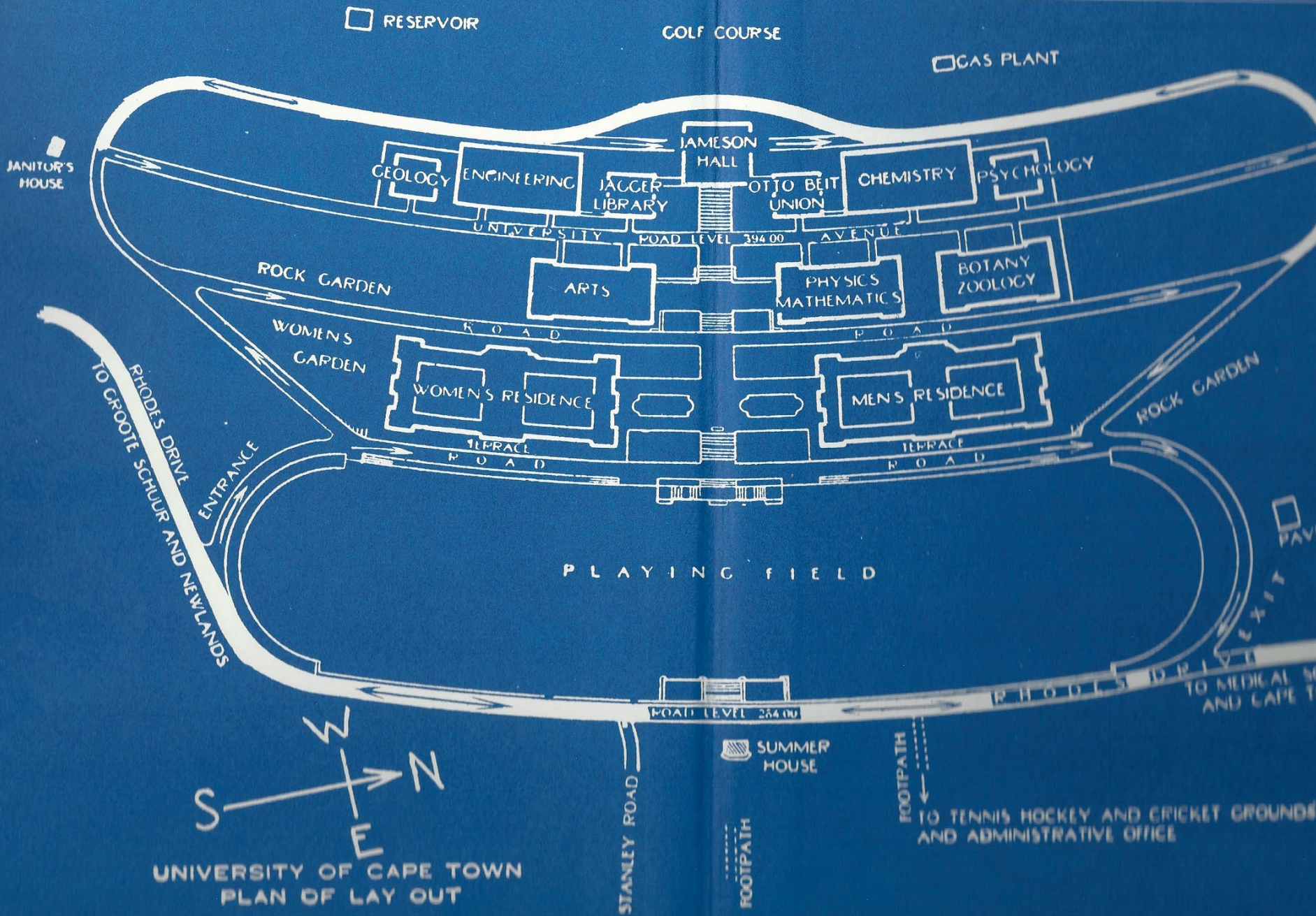
... James immediately put effort onto building research in the Physics Dept (with support from professors from other departments, and the principal TB Davie.)
... marked the change in UCT being mainly a teaching institution.

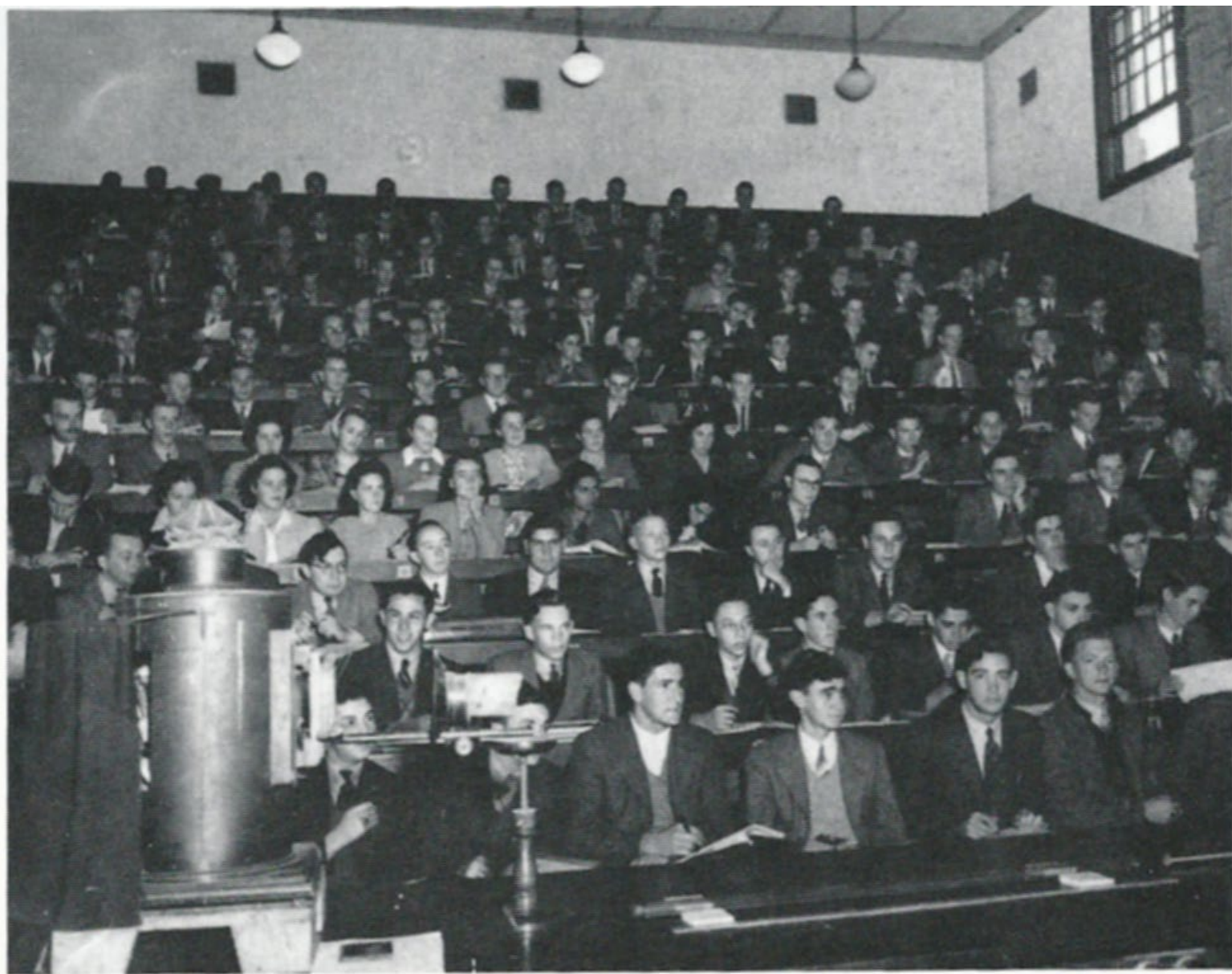
James established a research group in crystallography ...
... mainly focussing on the structures of organic crystals

Physics Department grew a strong for excellent teaching and research



*The finished product. UCT at last settled in on the Promised Land, 1933.
This panorama should be compared with Solomon's original vision shown in the
frontispiece.*





Physics I lecture, 1944, with male students far outnumbering women, as was then usual. Note the numbered seats to facilitate checking the register which every student present had to sign.



Ernest Rutherford at UCT !

Meeting of the British Association for the Advancement of Science which met on the brand new UCT campus in **July 1929**.

UCT gave Rutherford an honorary DSc on this occasion.

CE Lewis

Chair of UCT Council

??

Lawrence Crawford

Professor of Pure Mathematics

??

Basil Schonland

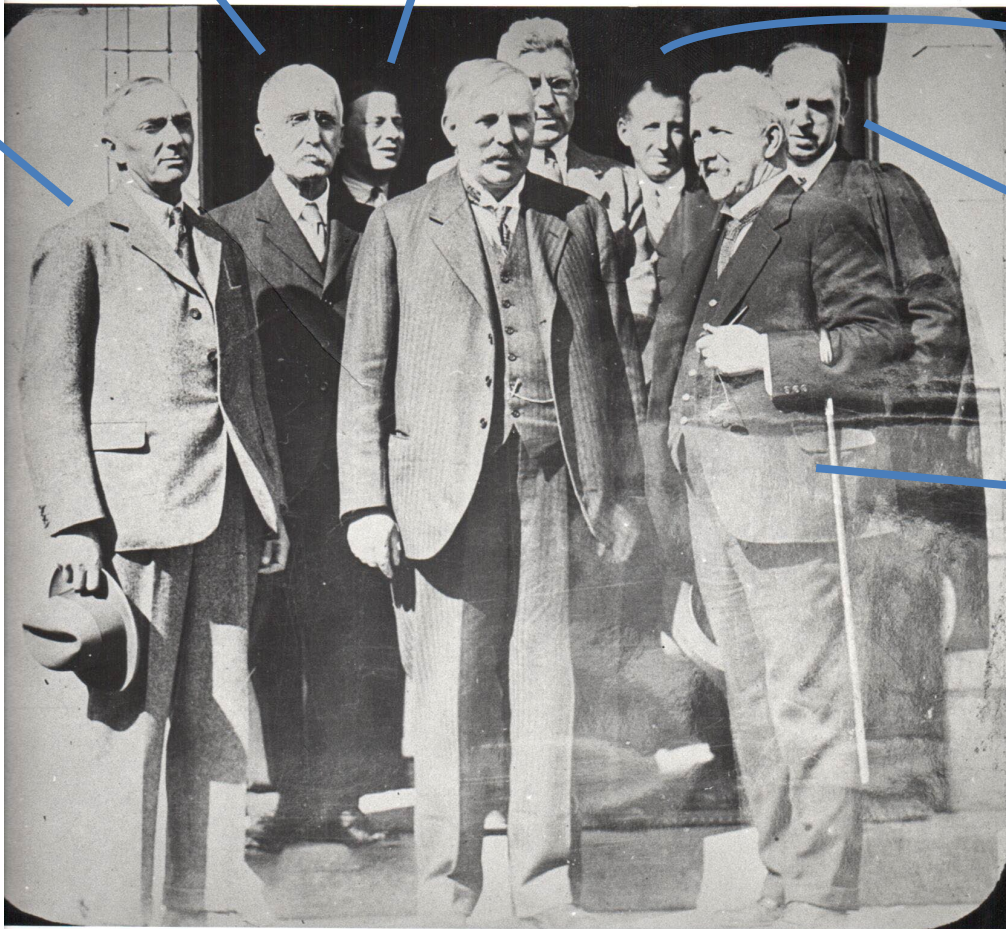
(Professor of Physics)

Alexander Brown

(Professor of Applied Maths)

Sir Jock Beattie

(UCT Principal and VC)



Thanks Howard Phillips

Reprinted from *Acta Crystallographica*, Vol. 1, Part 3, JULY 1948

PRINTED IN GREAT BRITAIN

Acta Cryst. (1948). 1, 132

False Detail in Three-Dimensional Fourier Representations of Crystal Structures

BY R. W. JAMES

University of Cape Town, South Africa

(Received 6 February 1948)

An investigation is made of the diffraction rings to be expected in a three-dimensional Fourier representation of a crystal structure when the Fourier series terminates while the coefficients are appreciable. The method followed is an extension of that used by Bragg and West in discussing the analogous problem for two-dimensional projections. The diffraction rings for one-, two- and three-dimensional representations are compared.

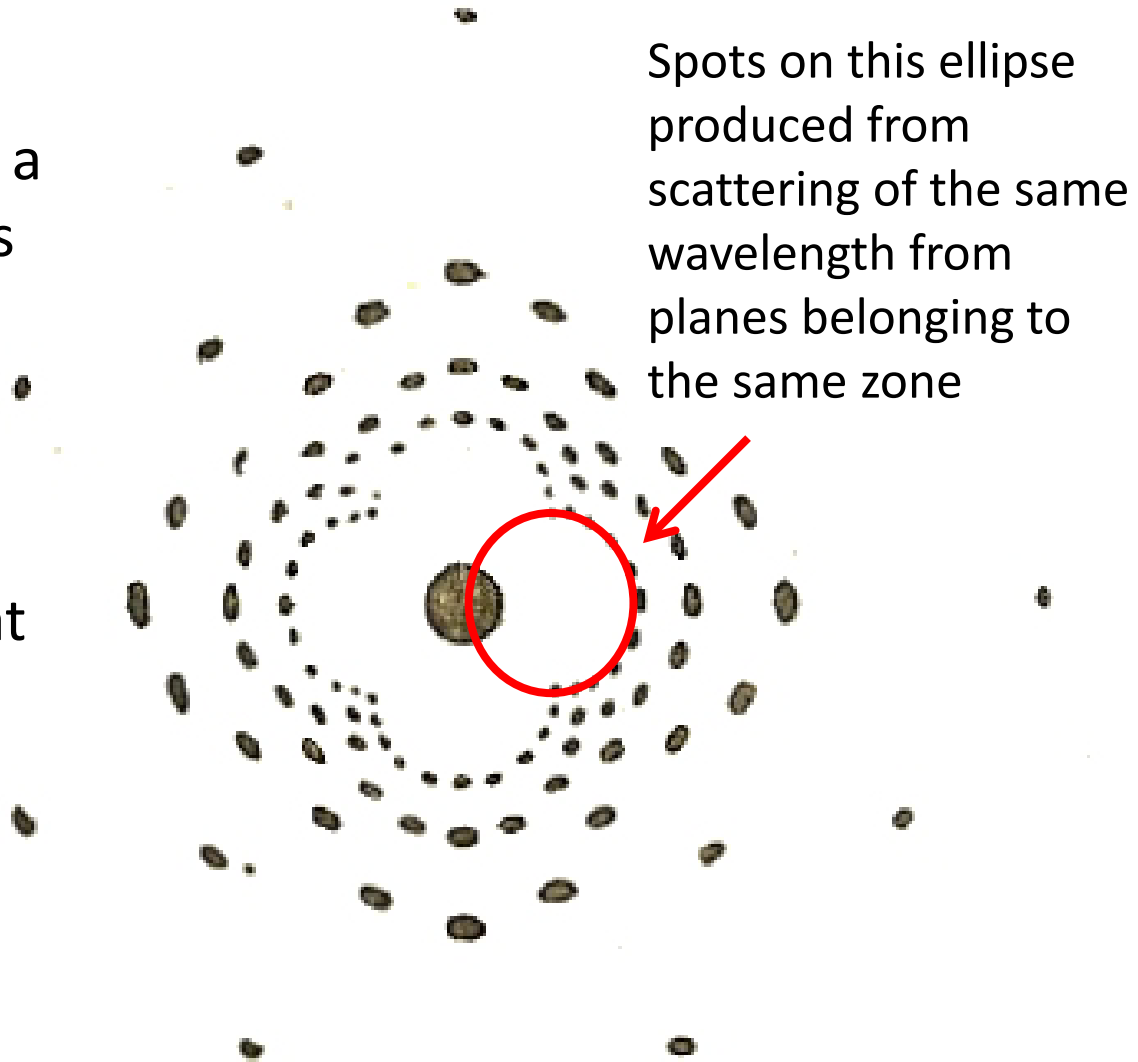
“Laue method” ...

Use an X-ray beam having a continuum of wavelengths ... which are reflected off the crystal onto a photographic plate.

Spots are produced for different wavelengths that satisfy the reflection condition $n\lambda = d \sin \vartheta$.
(ϑ fixed, λ variable)

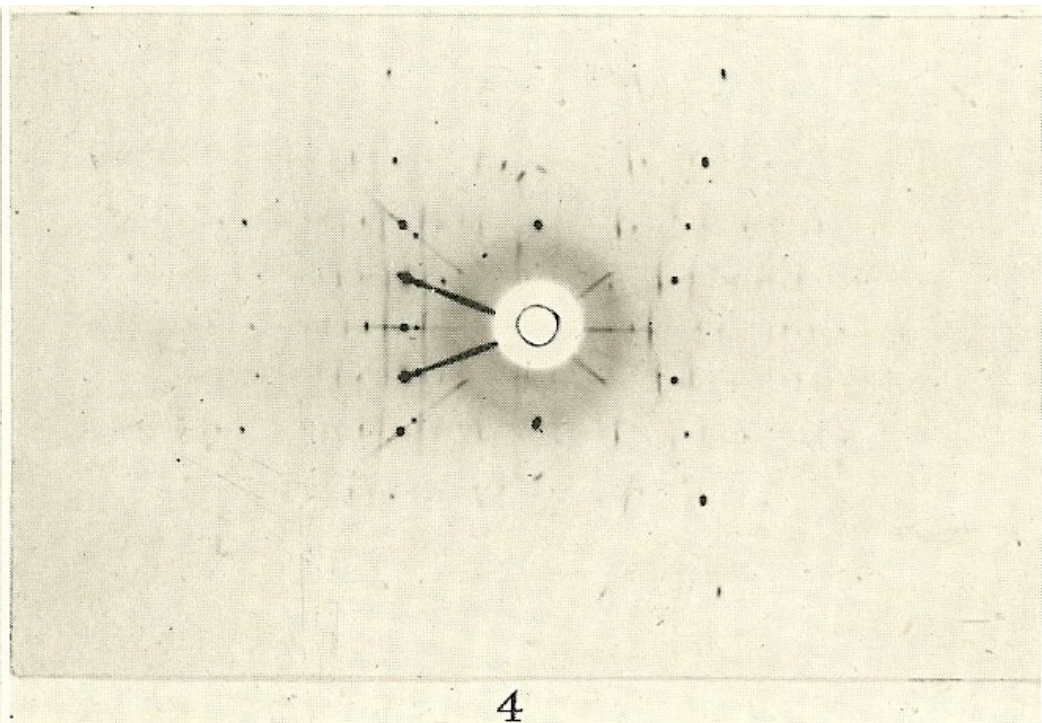
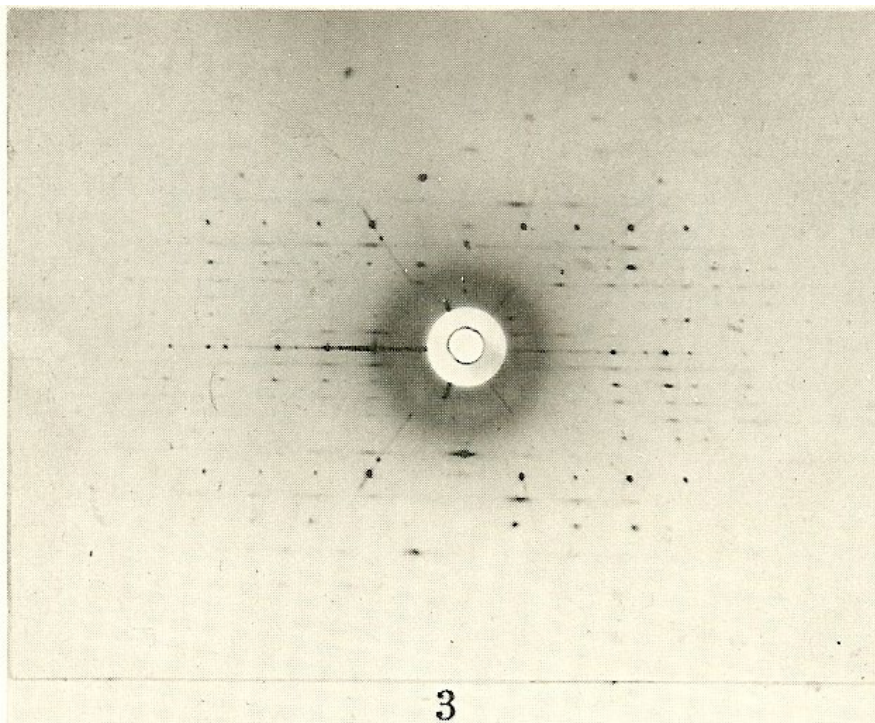
Experimentally easy ...
... but can be hard to interpret photos.

Spots on this ellipse produced from scattering of the same wavelength from planes belonging to the same zone



A representation of a Laue photograph of a simple cubic crystal, produced with the X-ray beam perpendicular to the cube face.

Laue photographs



*Reprinted without change of pagination from the
Proceedings of the Royal Society, A, volume 190, 1947*

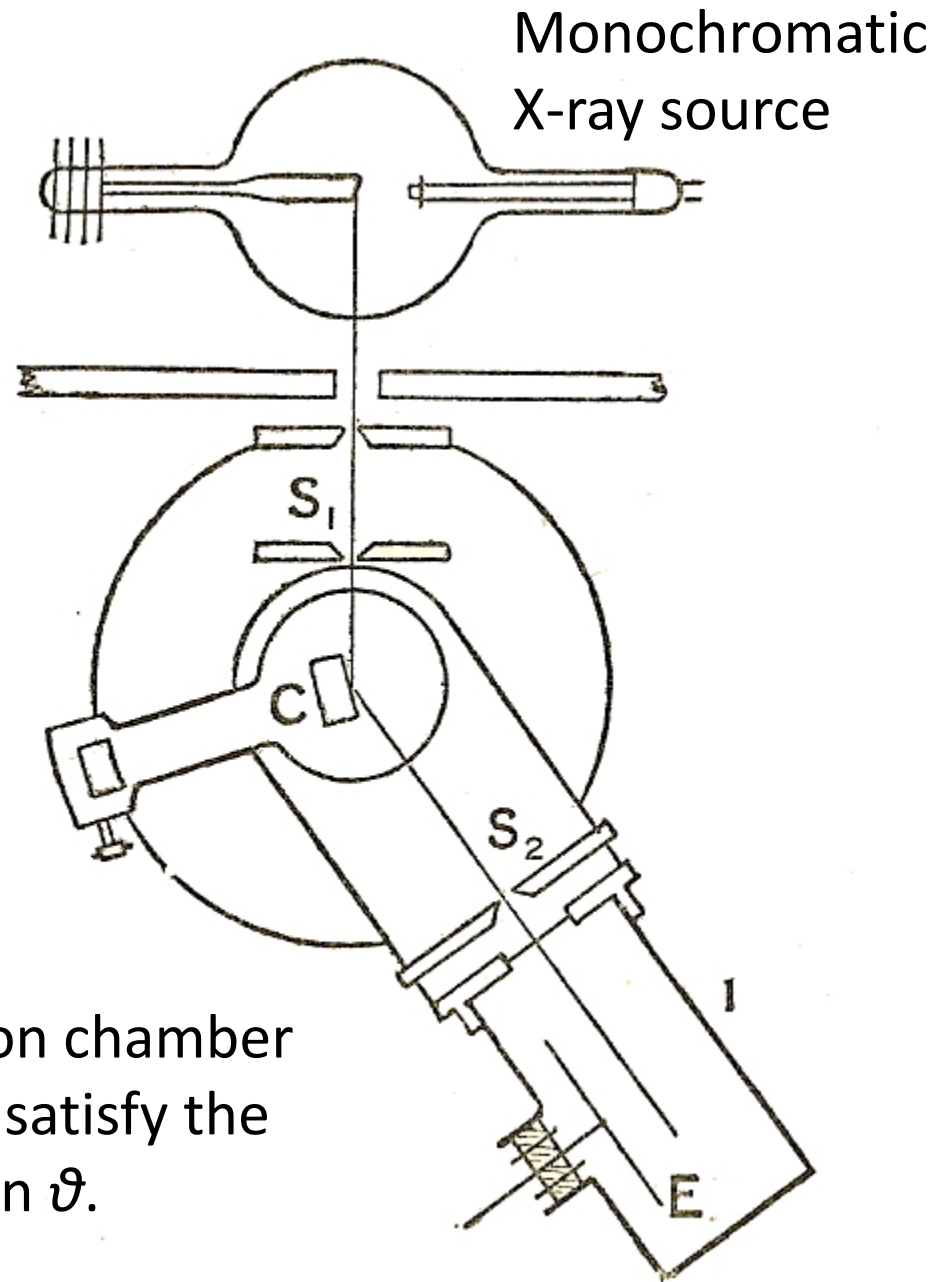
Some apparent periodic errors in the crystal lattice of the
molecular complexes of 4:4'-dinitrodiphenyl with
4-iodo- and 4-bromodiphenyl

BY R. W. JAMES AND D. H. SAUNDER

The University of Cape Town

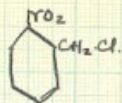
X-ray spectrometer

easier to use and gave more reliable results



Crystal and detector (ionization chamber and electrode) are rotated to satisfy the reflection condition $n\lambda = d \sin \vartheta$.
(λ fixed, ϑ variable)

Space-group of o-Nitrobenzylchloride



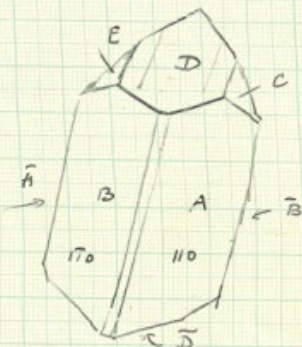
From F. Fairbrother.

1) Crystallographic Examination

Crystals: ^{lustrous} Pale yellow, almost rhombohedral in appearance.

Examined by H. E. Buckley.

Readings as follows



D = 001

C = 011

E = 071

A 110

B 170

C	108° 17'	40° 34'	170°
D	127° 43'	40° 14'	
E	87° 49'	39° 54'	

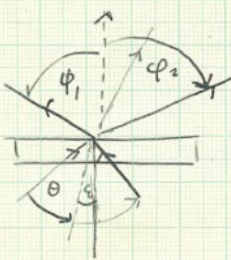
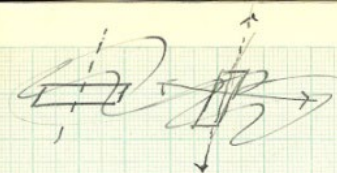
① A	209° 15' 6"	72° 54'
D	136° 21' 6"	
A	30° 5'	106° 16'
D	316° 20'	73° 45'
A	209° 16'	107° 4'

A	151° 49' 6"	106° 52'
D	44° 57' 6"	
A	331° 51' 6"	72° 6'
D	225° 0' 6"	106° 51'
A	151° 46' 6"	72° 16'

Average 73° 11' 106° 52'

B	224° 43'	104° 42'
A	120° 1'	
B	43° 52'	76° 9' 75° 9'
A	300° 23'	103° 29' 104° 29'
B	224° 43'	75° 40'

Av. 75° 55' 104° 5' 75° 40' 104° 36'



$$\frac{\sin \phi_1}{\sin (\theta + \epsilon)} = \frac{\sin \phi_2}{\sin (\theta + \epsilon)} = \beta$$

We measure $\phi_1 + \phi_2$
 $\phi_1 + \phi_2$ simply and estimated.

H₂. Yellow Lp. Brn^t

Rt.

$\phi_1 + \phi_2$

181° 37' 22"
66° 56' 15"
65° 41' 07"

66° 56' 15"
65° 41' 07"

26%

26%

131° 37' 22"
66° 56' 15"
65° 41' 07"

40° 22' 01"
52° 30' 01"
52

85° 17' 37"
19° 38' 22"
65° 39' 15"

$\phi_1 + \phi_2$	65° 41' 07"
	65° 39' 15"
	65° 40' 11"

Notes

Appr. estimating normal 68° 6' 15"

ϕ_1	85° 17' 37"
	68° 6' 15"
	17° 11' 22"

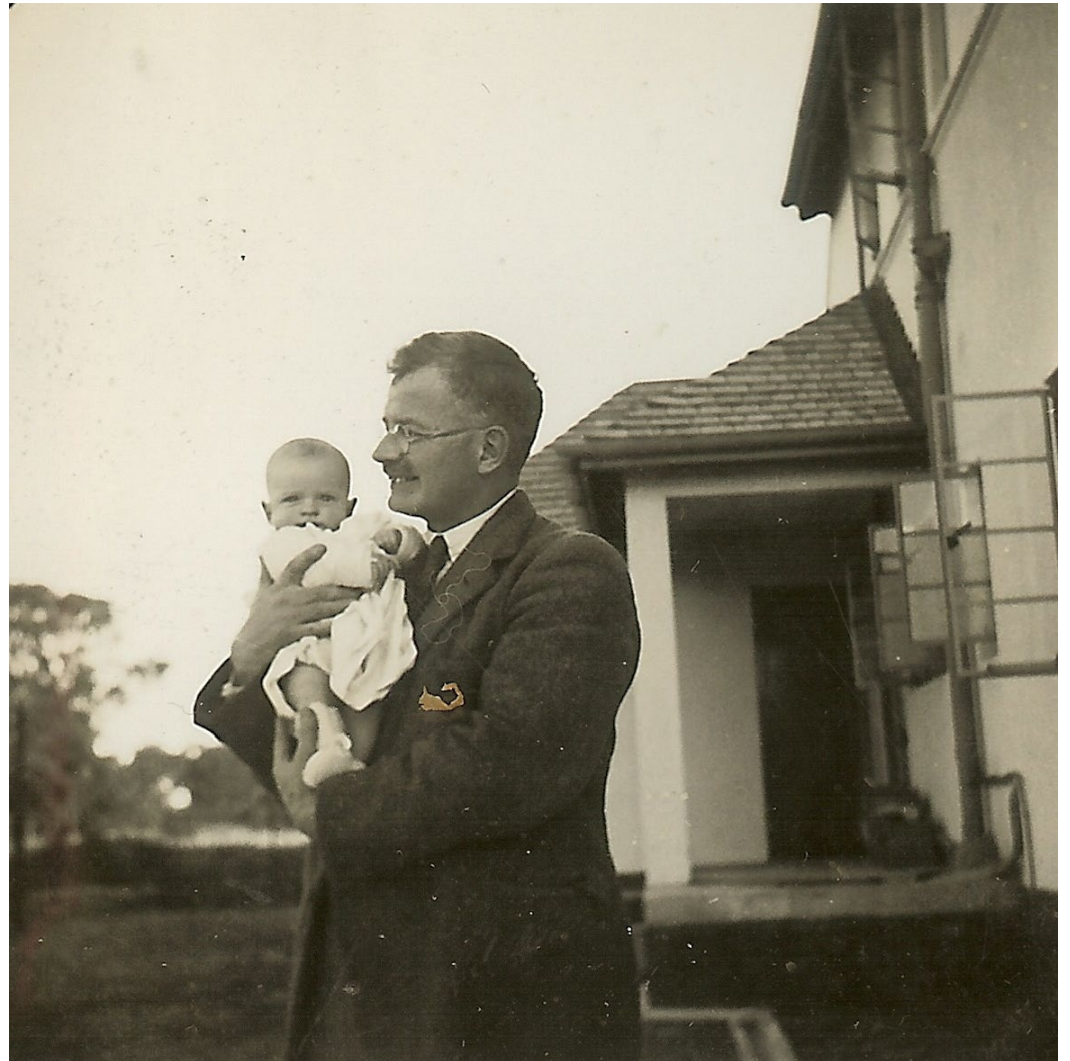
ϕ_2	68° 6' 15"
	19° 38' 22"
	48° 27' 53"

Three children ...

John (b. 1938)

David (b. 1940)

Margaret (b. 1943)



ELECTIONS AND ELECTRONS

From Mr. M. WHITEFORD (23,
Mostert-road, Observatory):

It was no doubt the printer's tricky little devil who was responsible for the advertisement that Professor James would lecture on Tuesday night on "The Election" instead of on "The Electron." Had the subject been "The Ions," he would no doubt have made it "The Lions," for the Professor looks as if he could give Mr. Pagel quite a rough time in a wrestling bout.

The Professor was hugely tickled, and when he saw the crowds rolling into the lecture-room he concluded that a good many had come to hear an election speech, for the average man's opinion on his subject is that of Shakespeare:

"Throw physics to the dogs. I'll none of it."

He apologised to the class for the mistake, but if any "fools had come to scoff," they "remained to pray," or, surely to pay, for no one withdrew.

One understands the mistake, for in an election we have electrified masses, and in an electron an electrified particle.



THE OPTICAL PRINCIPLES
OF
THE DIFFRACTION OF X-RAYS

By

R. W. JAMES,

M.A., B.Sc., F.INST.P.

PROFESSOR OF PHYSICS IN THE UNIVERSITY OF CAPE TOWN

LONDON
G. BELL AND SONS LTD
1948

PREFACE

THE second volume of this work, the first of the more detailed volumes planned to follow the general account of the subject given in Vol. I, is intended to provide an outline of the general optical principles underlying the diffraction of X-rays by matter, which may serve as a foundation on which to base subsequent discussions of actual methods and results. Accordingly, reference has been made to experiments only where these illustrate principles, and all details of actual techniques, and of their application to specific problems have been considered as lying beyond the scope of the volume.

Difficulties connected with the departure of the author in charge of the preparation of the volume to take up new work in South Africa, and, still more, the war, have greatly delayed its completion. Fortunately, the topics dealt with in the volume are such as do not change greatly with time; but the work has become during the writing somewhat longer than was intended in the original plan, since it has become necessary to include much material not published when the volume was first contemplated. It is hoped that the work has on the whole benefited by this. For example, Chapter V, which deals with thermal motion in crystals, contained in the original draft, completed in 1936, a fairly detailed account of the Faxén-Waller theory, almost in the form in which it appears in the present volume; but the recent experimental work of Lonsdale and others on diffuse scattering has given point and completeness to the whole treatment.

The writer wishes particularly to express his indebtedness to Prof. H. Bethe, and Prof. R. Peierls, F.R.S., both of whom gave invaluable help during the writing of the more theoretical parts of Chapters III, IV, and V. Prof. Peierls in particular read and criticised the whole of Chapter V in its original form. Prof. D. R. Hartree, F.R.S., also gave great help in the course of many discussions during the writing of Chapter III, and read it and criticised it in its completed form. Thanks are due to many workers who have allowed the reproduction of diagrams and photographs from their works, and due acknowledgement is made in each case in the text.

THE UNIVERSITY OF CAPE TOWN
November, 1947

R. W. JAMES

James writes about his own work:

“My load of teaching and administration became too heavy for me to do much work myself, but I was fortunate in having from time to time a number of able assistants, among them Dr. D. H. Saunder, Miss E. M. Archer, and Dr. Aaron Klug, who did his first X-ray work in Cape Town.”

Reprinted from *Acta Crystallographica*, VOL. 3, PART 3, MAY 1950

PRINTED IN GREAT BRITAIN

Acta Cryst. (1950). 3, 176

The Application of the Fourier-Transform Method to the Analysis of the Structure of Triphenylene, $C_{18}H_{12}$

BY A. KLUG*

Physics Department, University of Cape Town, South Africa

(Received 11 May 1949)

The Fourier-transform method of Ewald and Knott has been successfully applied to determine the approximate crystal structure of triphenylene, $C_{18}H_{12}$. Since the molecules are asymmetric and do not lie at special positions in the unit cell, the treatment as developed here is more general than any hitherto attempted. It is suggested that the method may be found useful in making the preliminary estimate of a crystal structure composed of planar molecules.

James (left) and Sir Lawrence Bragg outside the (old) UCT Physics Building in 1952



**James' old
green Austin
(kept alive by
physics
workshop
technicians)**

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SENIOR LECTURER IN PHYSICS IN THE UNIVERSITY OF MANCHESTER

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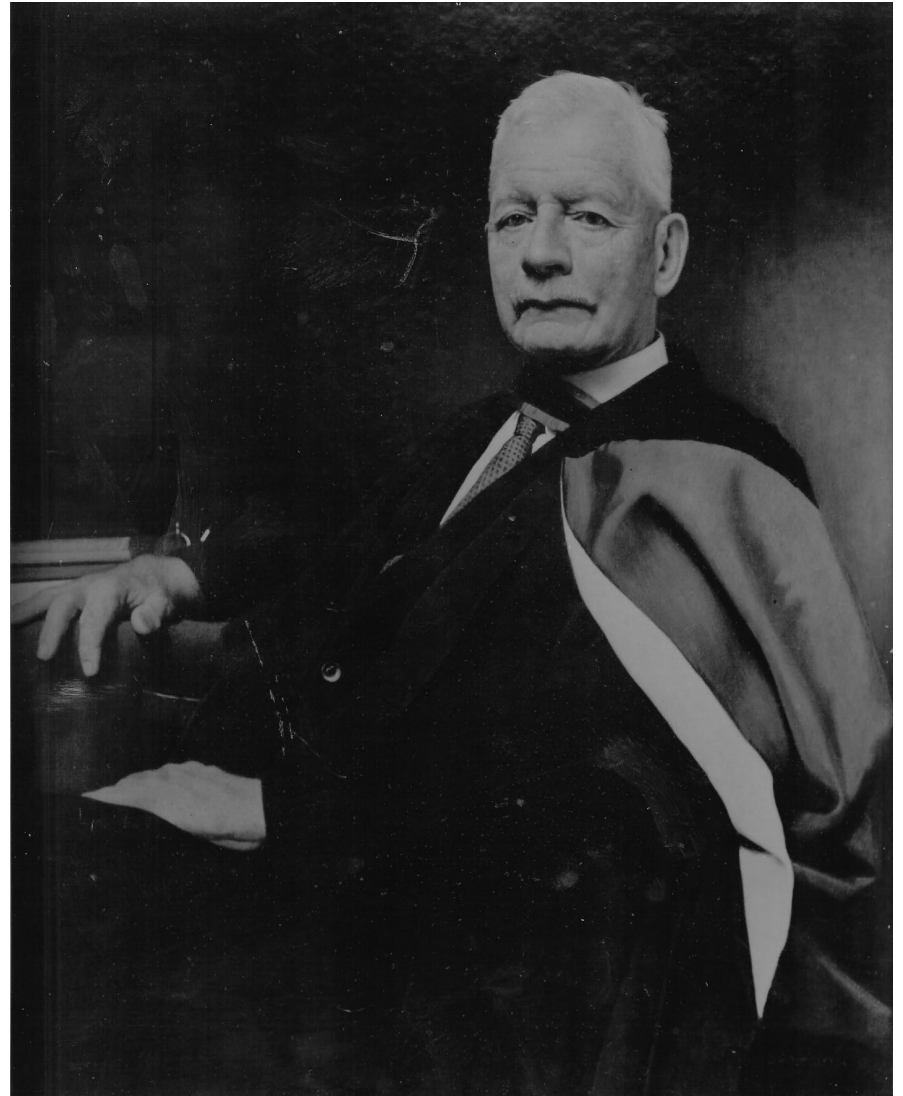
1953

James was very well respected
by the university community

... served on many senior
university committees

... Dean of Science

... then acting principal in 1956,
and again after TB Davies'
death in 1957.



James as VC of UCT

... UCT was protesting against the government's policies of segregation in South African universities.

... TB Davie made the first great stands for academic freedom
... Separate Universities Bill going through parliament when James was VC.

... had to speak out on many occasions against the curtailing of UCT's freedom to admit all academically-qualified students.

... his speeches were always factual, objective and restrained.

... described by many as “statesmanlike” in quality.

Extracts from a speech given by James (as VC of UCT)
to 2000 people in the City Hall in June 1957
to protest the "Segregation of Universities" Bill

The duty which clearly falls to me, as the responsible academic head of the University, is to tell you something about our official attitude to the question of academic segregation, and also what is in fact our present practice in admitting students.

The University Senate, which is the body of professors, and the responsible academic body of the University, passed the resolution almost without debate, with only three dissentients in a body of about fifty. The University Council passed it without a dissentient vote, although not quite unanimously.

I mention these facts because it has been very widely stated that the teaching body and students of the University have been influenced by communist agitation and "by an indoctrination with liberalistic ideas". The phrase is

Nothing could be more ridiculous. Professors as a class are essentially conservative, and anyone who, like myself, has spent his life working in universities, knows that ~~if you go here and there you get a professor with pinkish tendencies, who is sometimes inclined to be a little more~~, as a group, a university senate is extremely poor soil for propaganda. It is the very nature of professors to argue; their instinctive reaction against any proposition is to question it, and unanimity ^{on} any topic, especially one of general interest, is a rare thing.

This came about as a result of half-baked thinking about racial matters by men totally unqualified to hold any opinion on the subject, and yet astute enough to exploit existing prejudices in a population ripe for the purpose. I myself was working in a German university for most of 1932, and saw the yeast working. I assure you that we must not take this threat lightly.

Retirement years

RW James retired from UCT in 1957

... but was asked back as a “temporary part time lecturer” in August 1958.

... still remained active interacting with research students.

Died 7 July 1964.

Sir Lawrence Bragg writes in his tribute to James ...

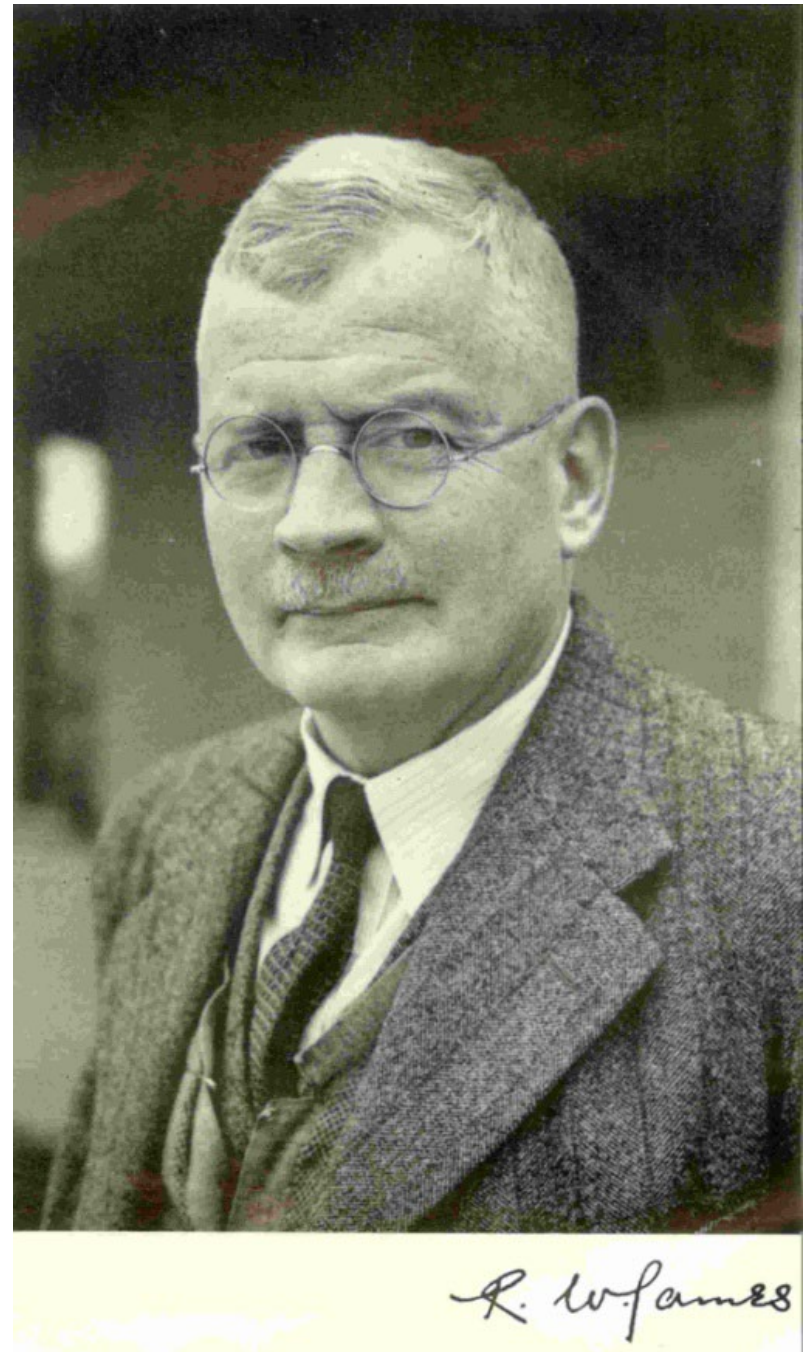
“James's whole life gives a rare impression of final fulfilment. For nearly twenty years at Manchester he had lived a quiet bachelor life quite settled in his ways, though one perhaps detected at times a somewhat wistful feeling about friends who had a wider experience-and then came a marriage in which he was exceedingly happy and a family of which he was touchingly proud. For the same period, he had been a member of a staff, quietly pursuing his specialized research and giving sound lectures-and then he became head of a department and successfully created at the Cape a reputation for his research team and his teaching ...

... after years as a Professor mainly concerned with the running of his department, he was chosen by his colleagues at a time of stress and danger to be their leader and representative, and he did not fail to meet the responsibilities they laid on him. Coming at the end of his active career, it was a wonderful tribute to the simple integrity and soundness of a lovable man.”

Epilogue

James' close relationship with Bragg flavoured his entire life.

UCT Physics is truly honoured to have in our public history a physicist who is consistently remembered as a real gentleman, an honourable leader, an excellent teacher and a pioneer in the field of X-ray crystallography.





Cabinet in foyer
of RW James Building