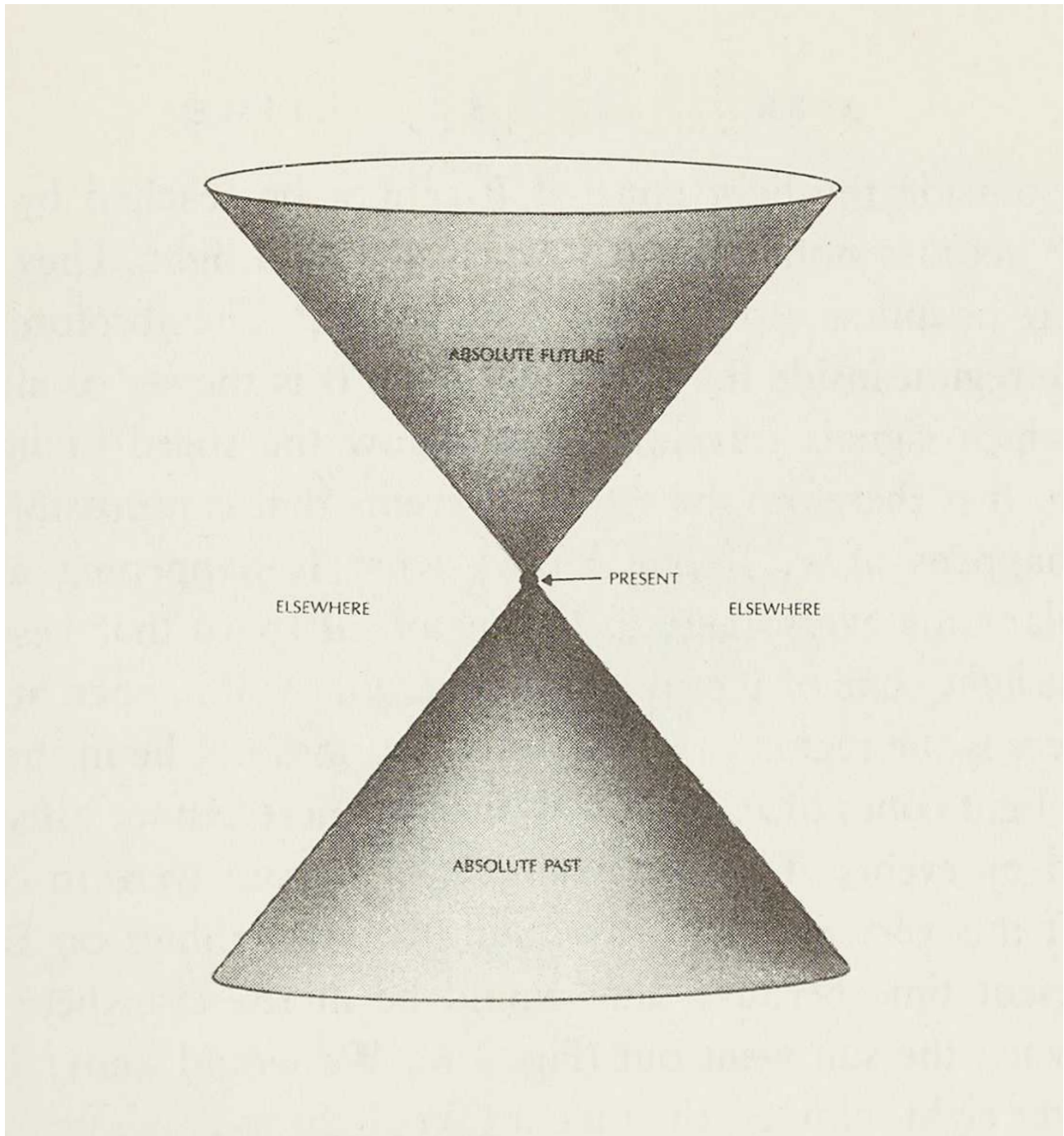
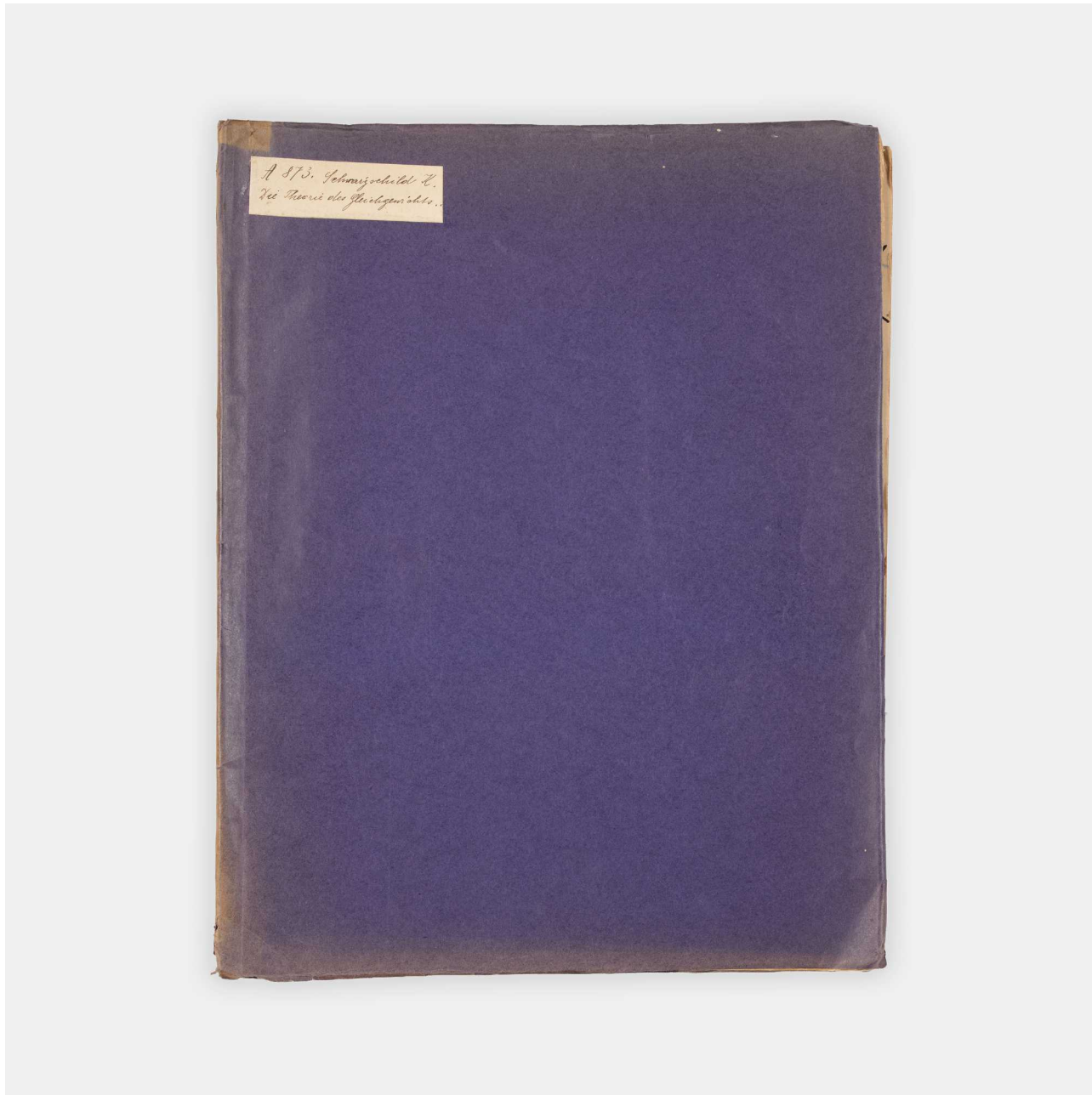


SHAPERO

RARE BOOKS



Modern Physics October 2026



The predictor of black holes

1. SCHWARZSCHILD, Karl.

Die Poincarésche Theorie des Gleichgewichts einer Homogenen Rotierenden Flüssigkeitsmasse. Inaugural-dissertation zur erlangung der doktorwürde vorgelegt der hohen philosophischen Fakultät der Kgl. bayr. Ludwig-Maximilians-Universität zu München. Separat-Abdruck aus den neuen Annalen der K. Sternwarte München, Band III. München [Munich], Akademischen Buchdruckerei von F. Straub, 1896.

£1250

First edition, the offprint of Karl Schwarzschild's doctoral thesis on Poincaré's theory of the equilibrium of a homogeneous rotating fluid mass. Uncommon, with no copies conclusively located by WorldCat (unless the British Library copy dated 1898 is simply misdated) and none in auction records. This copy from the library of Magnus F. Fischer, who may have been an astronomer, as the bookplate depicts an observatory.

Karl Schwarzschild (1873-1916) is one of the most remarkable and tragic figures in 20th century physics. After completing this dissertation he worked on the photometry of solar clusters at the Kuffner observatory in Vienna, establishing the mathematical relationship between a star's intensity and its contrast on a photographic plate. During the first decade of the 20th century he worked at Göttingen University Observatory, associating with cutting-edge mathematicians such as David Hilbert and Hermann Minkowski. In 1909 he obtained the prestigious post of director of the Astronomical Observatory at Potsdam, but enlisted when war was declared.

While at the front, Schwarzschild 'received an issue of the Sitzungsberichte (Proceedings) of the Berlin Academy of Sciences, containing a paper by Albert Einstein, arguing that gravity is merely the result of the curvature of space-time. This paper set forth the general theory of relativity, a follow-up to the special theory of 1905. In the 1915 paper, Einstein wrote down,

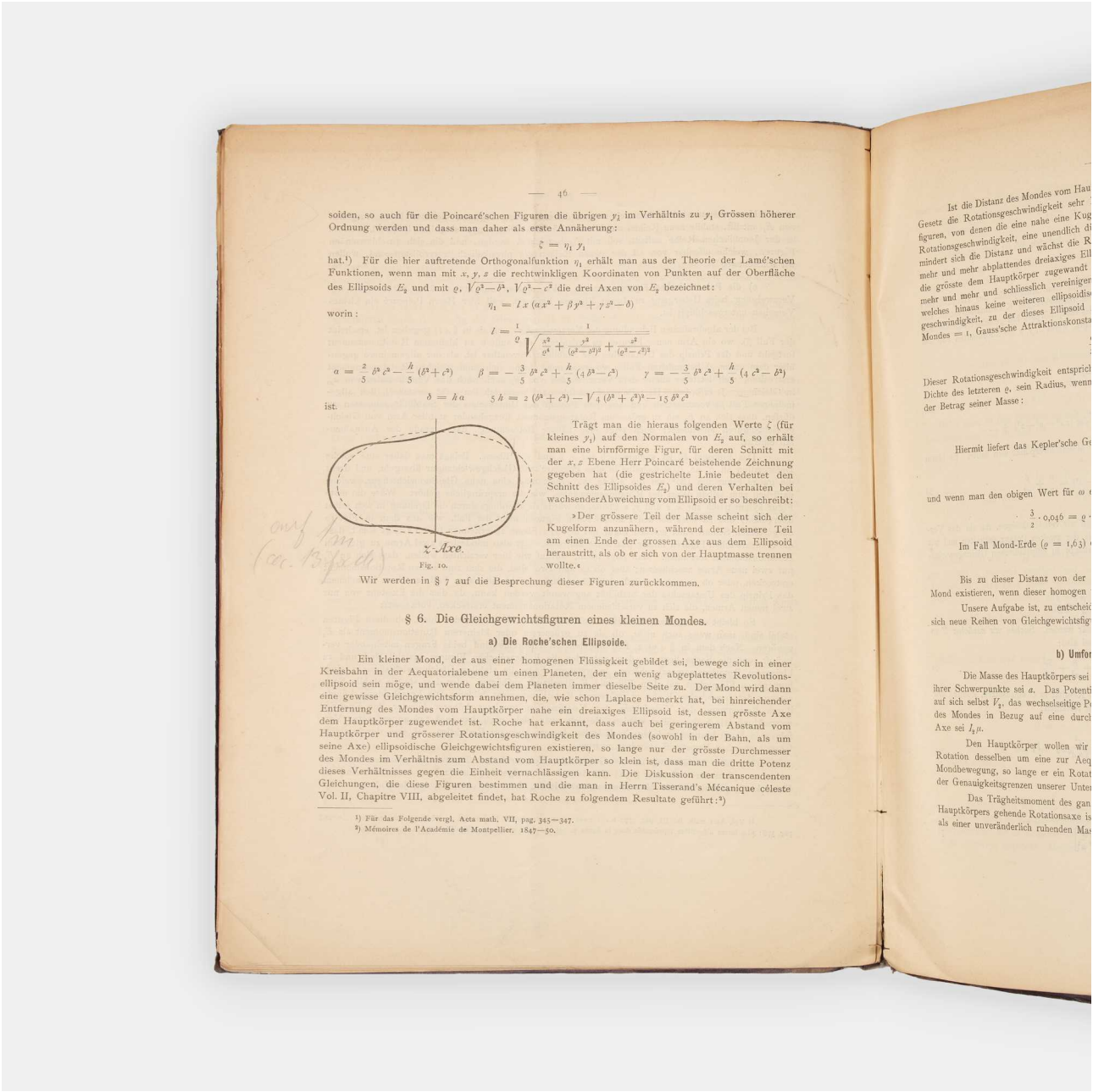
using metrics, what came to be called his "field equations," which, if solved, would allow one to calculate the forces of gravitation anywhere in space' (Ashworth, Linda Hall Library Scientist of the Day, October 9, 2024). Einstein was able to approximate the solution to the equations, enough to predict the bending of light by gravitational fields. 'Schwarzschild, in 1915, was one of the few who could work with Einstein's metrics, and he decided to see if he could find an exact solution to the field equations by considering a simple case, the curvature of space-time around a point-mass. And he was able to do so, providing the first exact solutions to the equations of general relativity'.

The most remarkable result of Schwarzschild's work was that the equations predicted a singularity - what we now know as a black hole - and he was able to provide the formula for the singularity's radius, the Schwarzschild radius, which delineates the event horizon. Schwarzschild sent two papers on his results to Einstein, who was delighted and had them published immediately. But the author did not live to see this - he died of an autoimmune disease only a few months later, in May of 1916.

Provenance: Magnus F. Fischer (bookplate).

First edition, offprint; diagrams within the text, occasional contemporary pencilled notes in the text, hand-drawn diagrams on stiff card loosely inserted, contents toned, mild vertical crease from folding; original blue-grey wrappers printed in black, contemporary wrapper of thick purple paper over the original wrappers, contemporary inscriptions and tickets to the upper wrapper and added wrapper, bookplate, original wrappers partially browned and a bit rubbed and creased, very good condition; 69 pp.

[ref: 117757]



The precursor to Bohr’s quantum theory

2. RYDBERG, J.R.

Recherches sur la Constitution des Spectra d'Émission des Éléments Chimiques. Kongl. SV. Vet. Akademiens Handlingar Band 23. No. II. Stockholm, Kongl. Boktryckeriet. P. A. Norstedt & Söner, 1890.

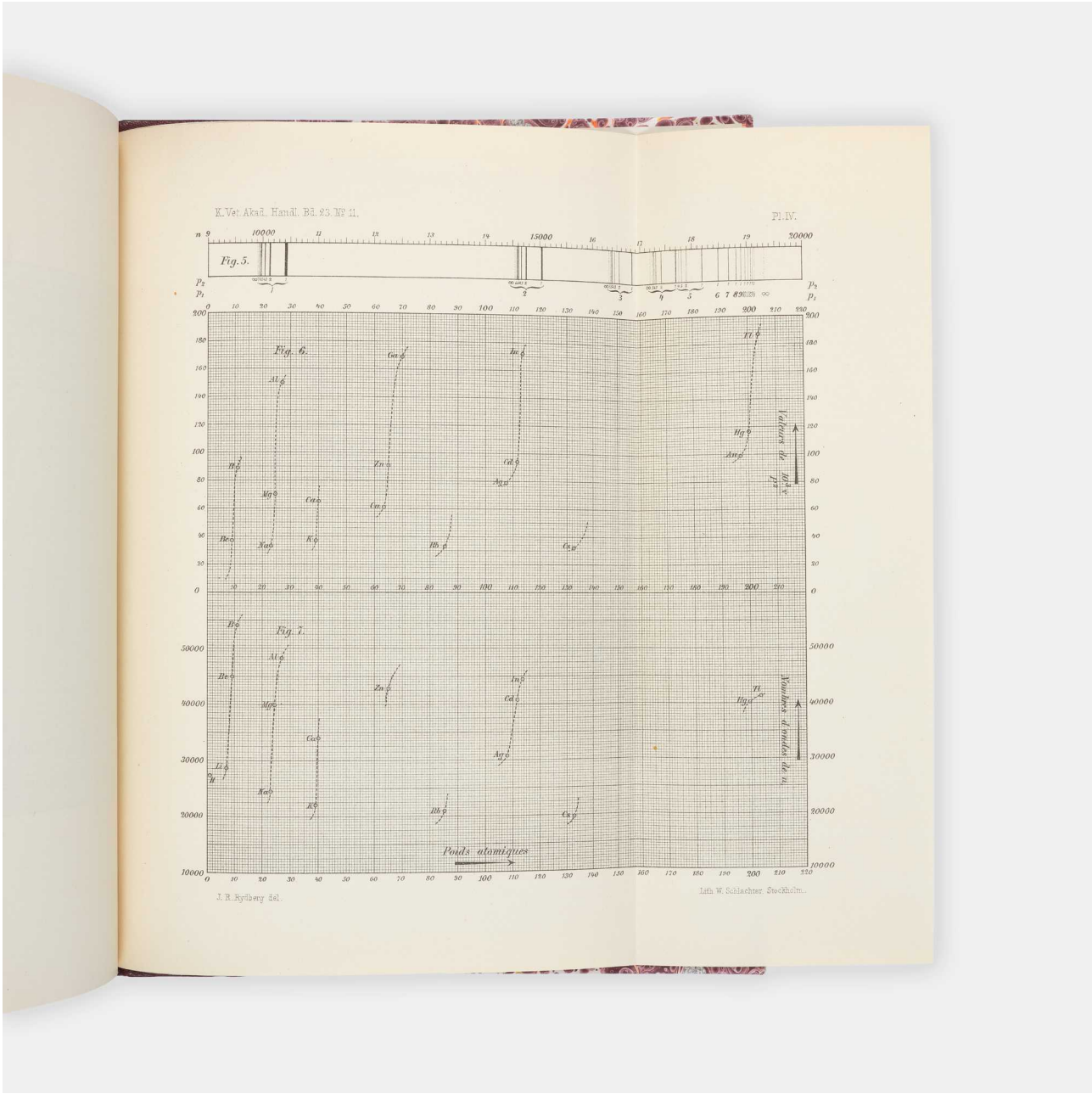
£1250

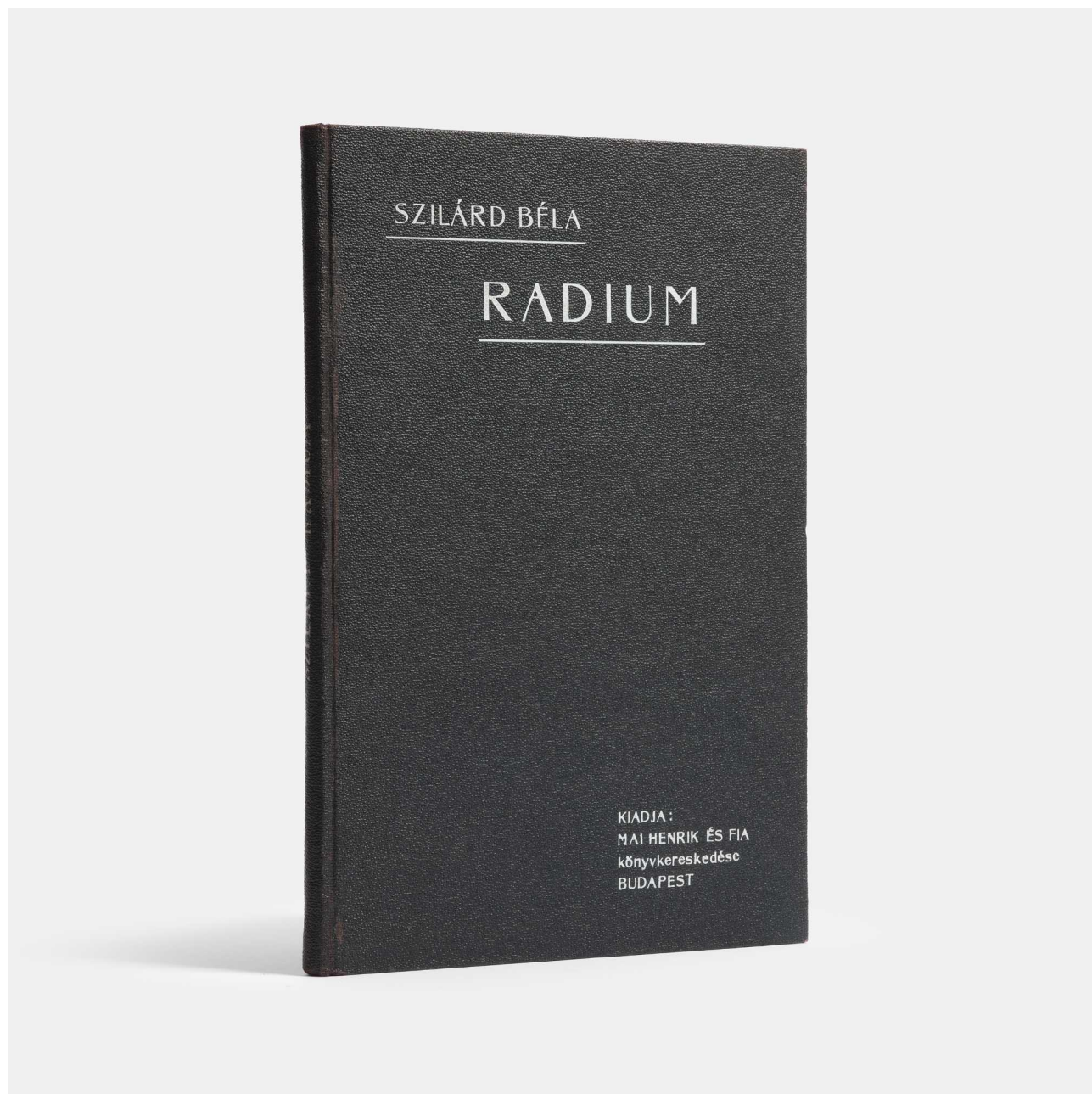
First edition of this significant work that lays out the empirical formulae governing the frequencies of atomic spectral lines, a precursor to Bohr’s development of the quantum theory. A handsomely bound copy in excellent condition, and rare in commerce.

Inspired by Mendeleev’s periodic table, Johannes Rydberg (1854–1919) was convinced that the electromagnetic spectra emitted by atoms could provide insight into atomic structure and theory. ‘Notwithstanding the imperfect spectroscopic tables then at his disposal, Rydberg discovered most of the important properties of series spectra, including the relation between corresponding series in the spectra of related elements, and foreshadowed discoveries which were made later, when experimental work has sufficiently advanced’ (*Nature* obituary, January 24, 1920). Rydberg’s work was justified and expanded by Bohr’s development of the quantum model of atomic structure in 1913, and Bohr was able to use his own theory to derive Rydberg’s results, providing confirmation of both.

First edition, first impression; tall 4to, (30 x 22.5 cm); 4 engraved plates of which 3 are double-page and 1 is folding; title page and plates faintly toned, contents clean otherwise; recent burgundy quarter morocco, marbled boards, titles to spine gilt, very good condition; 155pp.

[ref: 113097]





The first book on radioactivity in Hungarian

3. SZILÁRD, Béla.

Radium és Radioaktivitas.

Budapest, Mai Henrik és Fia Könyvereskedése, 1905.

£1250

First edition of the first book on radioactivity in Hungarian. Rare, Worldcat locates only a single institutional copy at the Hungarian Academy of Sciences.

Author Béla Szilárd worked at the Curie laboratory in Paris, then spent the First World War at the Instituto de Radioactividad of the University of Madrid, returning to Paris in 1920.

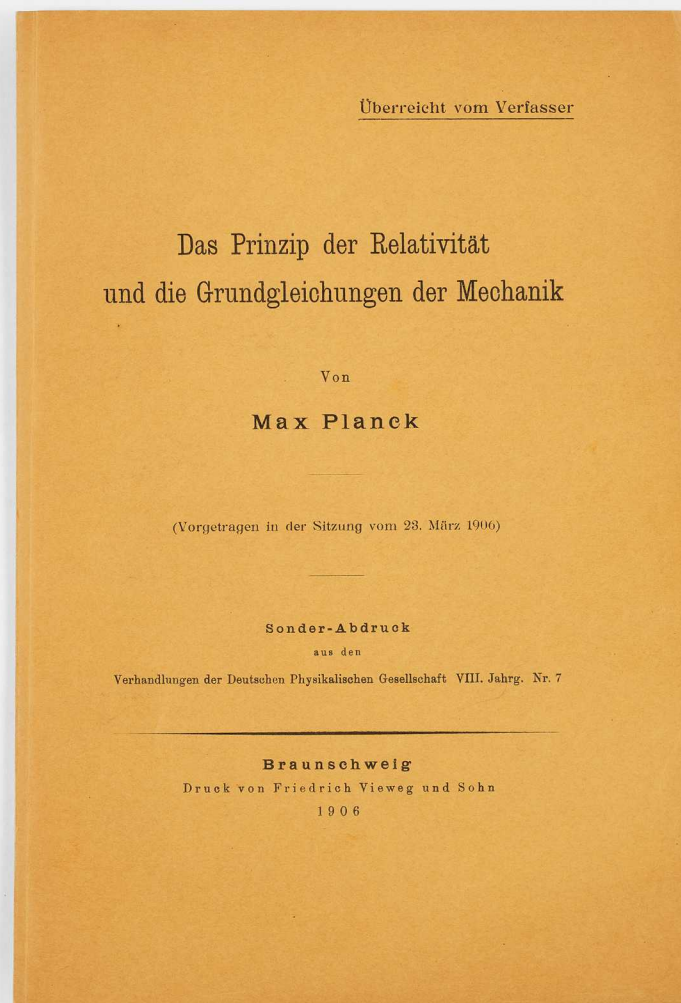
Szilárd ‘carried out some experiments on special forensic photography, on the measurement of Roentgen rays, and on the determination of the appropriate doses for medical applications... he collected data and published a map of the spread of radioactive substances around the world’ Palló, ‘Isotope Research Before Isotopy’, Hungarian Academy of Science, 2008). It was for this work that Szilard was awarded the Légion d’honneur.

‘His short book, *Radium és Radioaktivitas*, the first on radioactivity in the Hungarian language, focused on the description of rays, radioactive substances and their medical applications’ (Palló).

Provenance: Dr. Száthmáry László (ink stamp).

First edition; 8vo; diagrams in the text, contemporary ownership ink stamp and inscription to the title, pencilled inscription to the rear pastedown, contents faintly toned; original black pebble-grain cloth, titles to spine and upper board in white, spine a little dulled, cloth very lightly rubbed at the tips, front free endpaper professionally reattached by Bainbridge Conservation, endpapers toned, very good condition; 85pp.

[ref: 115254



The first response to Einstein's relativity

4. PLANCK, Max.

Das Prinzip der Relativität und die Grundgleichungen der Mechanik. Offprint from Verhandlungen der Deutschen Physikalischen Gesellschaft, No. 8., pp. 136-141.

Braunschweig, Frieddrich Vieweg und Sohn, 1906.

£25,000

The rare first edition, author's offprint, of the first public response to Einstein's special relativity. From the library of physicist Arnold Sommerfeld. This offprint is exceptionally rare, with no other copies appearing in auction records.

When Einstein's first paper on relativity was published in the *Annalen der Physik* in June, 1905, it initially attracted little notice. As his sister wrote in her biographical sketch, 'The young scholar imagined that his publication in the renowned and much-read journal would draw immediate attention. He expected sharp opposition and the severest criticism. But he was very disappointed. His publication was followed by an icy silence. The next few issues of the journal did not mention his paper at all. The professional circles took an attitude of wait and see. Some time after the appearance of the paper, Albert Einstein received a letter from Berlin. It was sent by the well-known Professor Planck, who asked for clarification of some points which were obscure to him. After the long wait this was the first sign that his paper had been read at all. The joy of the young scientist was especially great because the recognition of his activities came from one of the greatest physicists of that time' (Pais, *Subtle is the Lord*, pp. 149-150).

'The rapidity with which special relativity became a topic of discussion and research is largely due to Planck's early interest. In his scientific autobiography, Planck gave his reasons for being so strongly drawn to Einstein's theory: "For me its appeal lay in the fact that I could strive toward deducing absolute, invariant features following from its theorems". The search for the absolute - forever Planck's main purpose in

science - had found a new focus' (Pais p. 150). In addition to publishing the present paper, Planck presented Einstein's theory at the physics colloquium in Berlin during the winter of 1905-06 and discussed it at a scientific meeting held in September 1906. His assistant Max von Laue would also become an early and influential supporter.

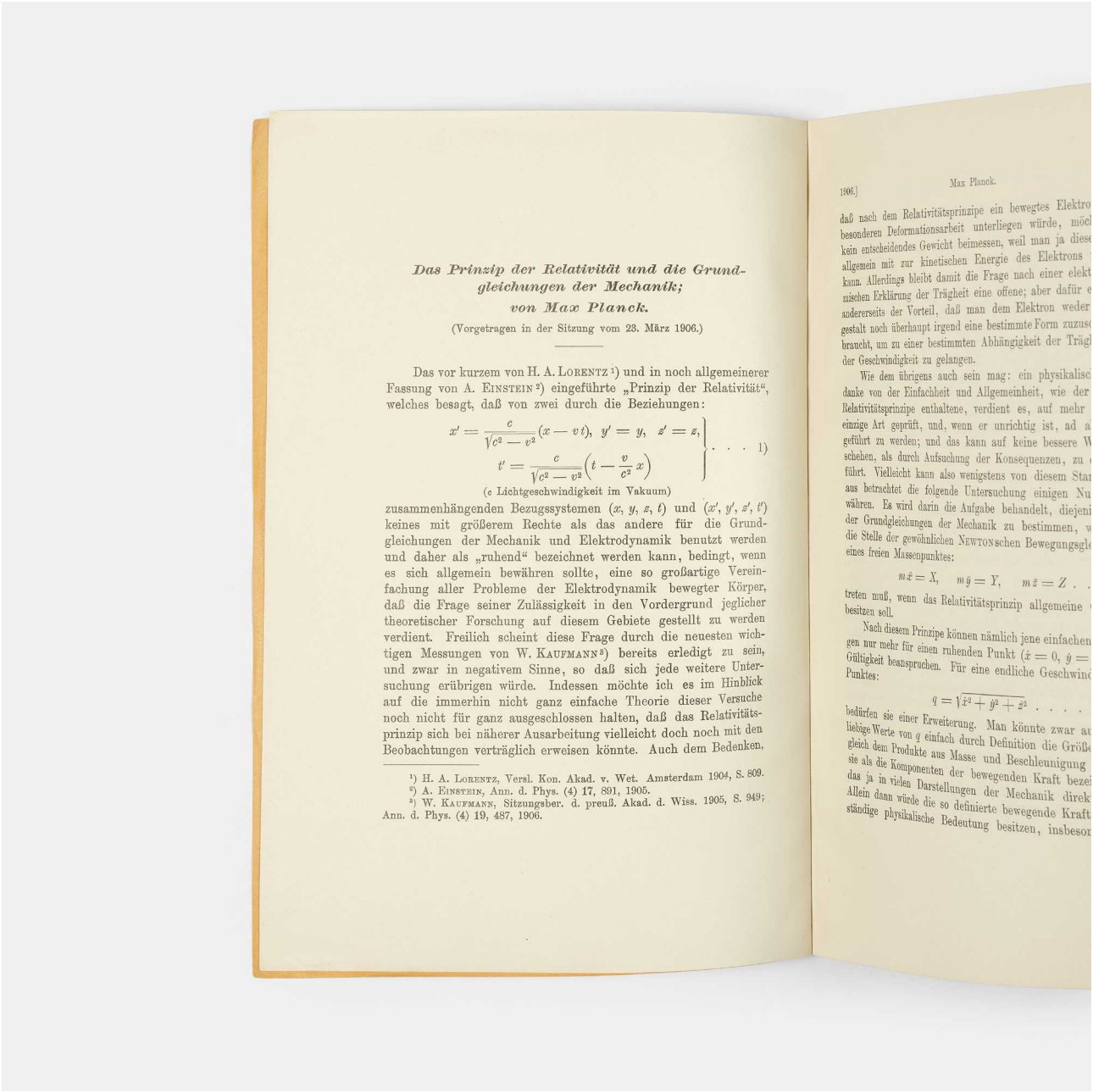
Among the new results published here are ‘the first occasion on which the momentum velocity relation, the transformation laws, and the variational principle of relativistic point mechanics were written down. Planck derived the [momentum-velocity relation] from the action of an electromagnetic field on a charged point particle...’ (Pais pp. 150-151).

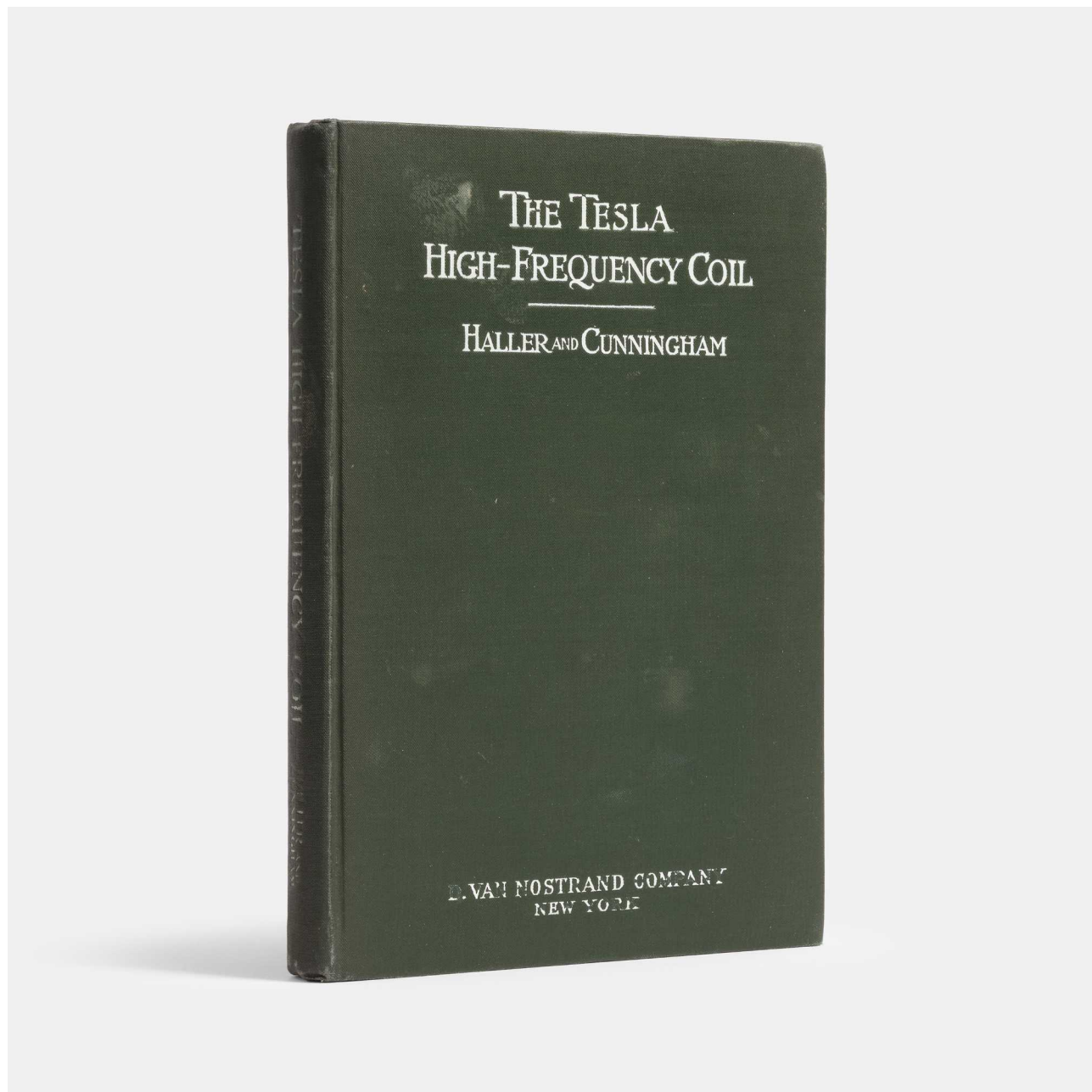
Only a decade older than Einstein, Arnold Sommerfeld (1868-1951) was one of the most influential physicists of the period. In addition to making significant contributions to atomic and quantum theory, and acting as an early supporter of Einstein, he was known as an excellent, collaborative teacher. At Munich he supervised or taught seven future Nobel Prize winners - Heisenberg, Pauli, Debye, Bethe, von Laue, Pauling, and Rabi - and dozens of others who would become famous. Sommerfeld and Planck were both friends and colleagues, with Sommerfeld penning a biographical memoir of Planck in celebration of the latter's 60th birthday celebrations, so it is natural that Sommerfeld would have received a copy of this offprint.

Provenance: Arnold Sommerfeld.

First edition; 4-leaf offprint; original wrappers, very minor creasing, a fine copy.

[ref: 121333]





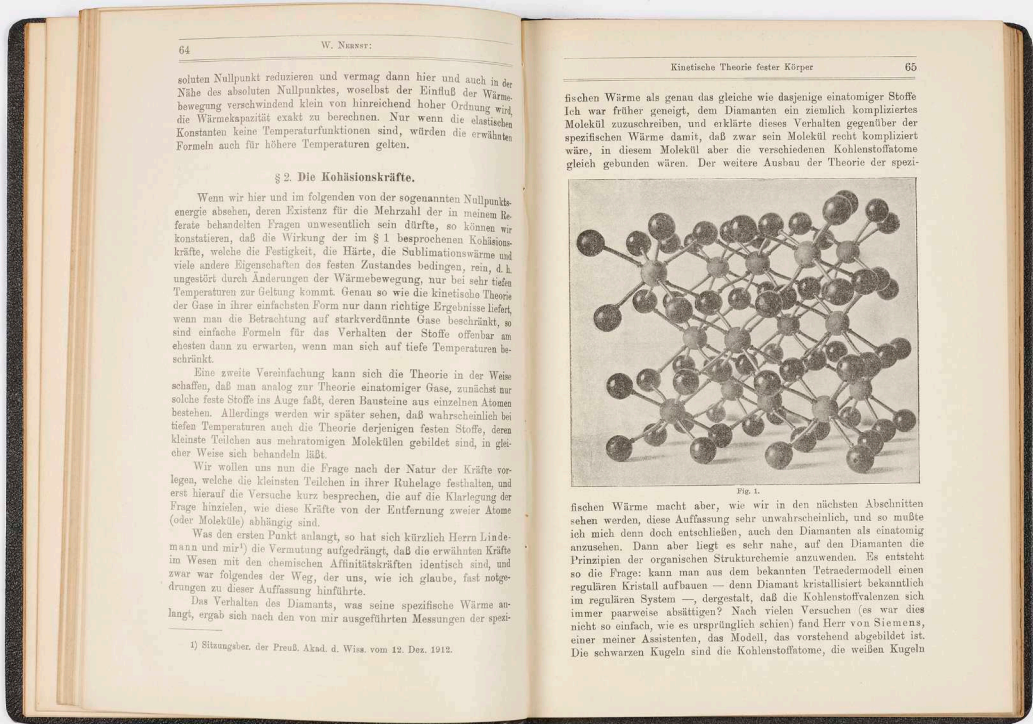
5. [TESLA, Nikola]. HALLER, George F.; CUNNINGHAM, Elmer Tilling.
The Tesla High Frequency Coil. Its construction and uses. 56 illustrations.
New York, D. van Nostrand Company, 1910.

£2500

First edition; a lovely copy of this well-illustrated popular account of one of Nikola Tesla's most famous inventions.

First edition; 8vo; frontispiece and 3 plates from black & white photographs, diagrams within the text, 16-leaf publisher's ads at rear, contents very lightly toned; original dark green cloth, titles to spine and upper board in white, cloth lightly rubbed at the extremities, minor bumps to corners, spine a little darkened with loss of much the white lettering, small spot next to title on upper board, slight loss of the white lettering on the upper board, a very good copy; 119 pp.

[ref: 123593]



The kinetic theory of matter and electricity

6. PLANCK, Max; SOMMERFELD, Arnold; LORENTZ, H.A., et al.

Vorträge Über die Kinetische Theorie der Materie und der Elektrizität. Gehalten in Göttingen auf Einladung der Kommission der Wolfskehlstiftung... mit beiträgen von H. Kamerlingh-Onnes und W.H. Keesom, einem vorwort von D. Hilbert und 7 in den text gedruckten figuren.

Leipzig & Berlin, B.G. Teubner, 1914.

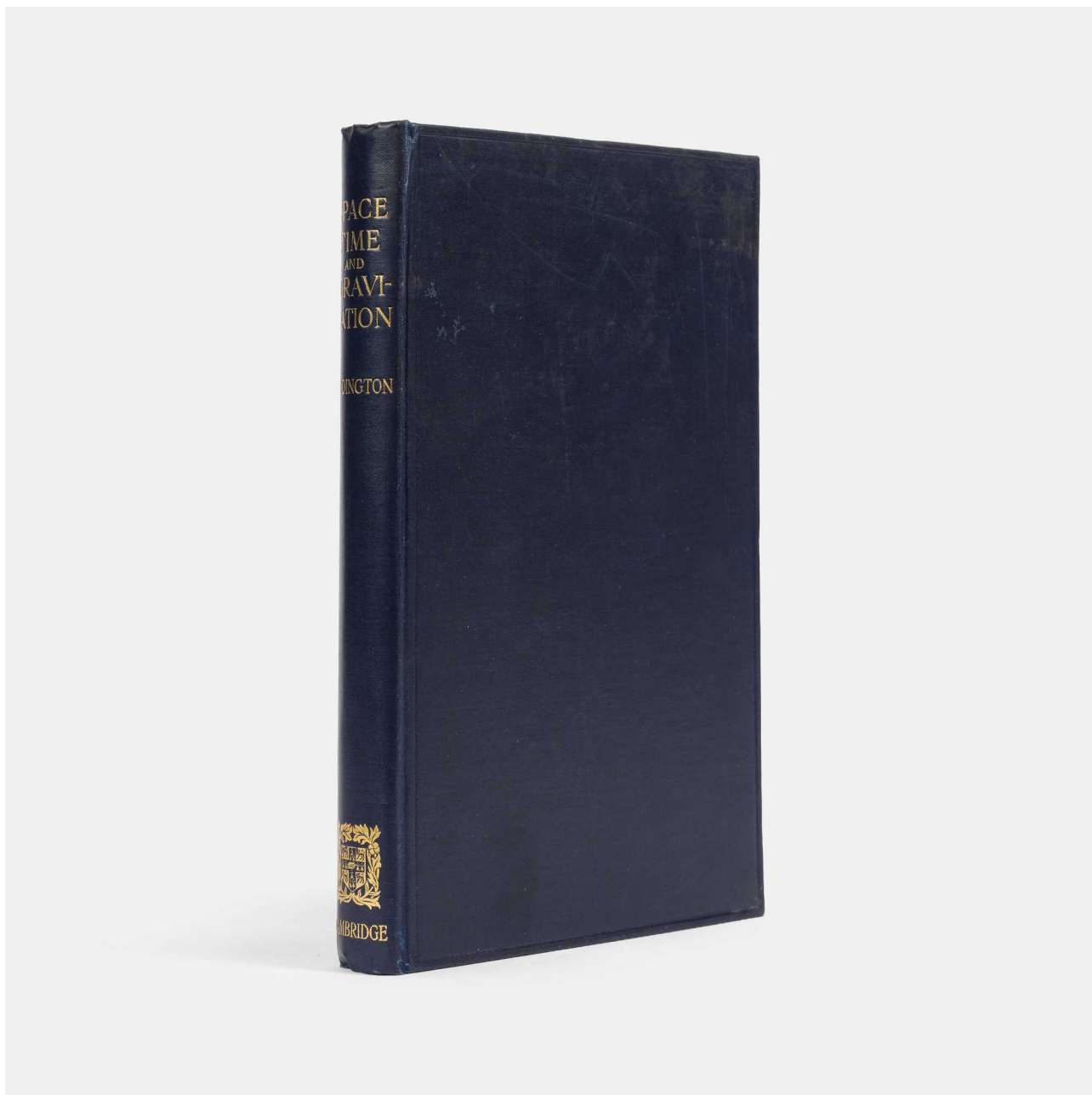
£350

First edition, first printing of this collection of lectures ‘On the Kinetic Theory of Matter and Electricity’ by Max Planck, Arnold Sommerfeld, Hendrik Lorentz and others, and with a forward by David Hilbert.

Kinetic theories seek to explain the properties of matter in terms of the interactions of the atoms and molecules of which they are comprised. These lectures, presented in April 1913, were organised by Planck on behalf of the Wolfskehl Foundation Commission of the Royal Society of Sciences in Gottingen.

First edition, first impression; 8vo; illustrations and diagrams within the text, 4 pages of integral publisher’s ads, ink shelf number and partially erased ownership stamps and inscription on the title, contents lightly toned; original black morocco-grained cloth, titles to spine and upper board gilt, marbled edges, remnants of library pocket to front pastedown offsetting to the front free endpaper as well, cloth a little rubbed with a few tiny worn spots, small mark to the edge of the spine, marbled edges faded, a very good copy; 196pp.

[ref: 115250]



The proof of special relativity

7. EDDINGTON, Sir Arthur Stanley.
Space, Time and Gravitation.
Cambridge, at the University Press, 1920.

£500

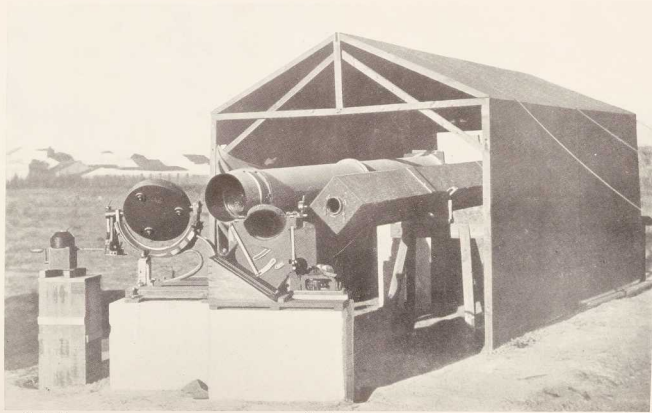
First edition and an unusually nice copy of 'the authoritative popularization of Einstein's theory' of relativity (Oxford Dictionary of National Biography).

Cambridge scientist Sir Arthur Eddington (1882-1944) made profound contributions to 20th century astrophysics. He proposed that it was radiation pressure which prevented stars from collapsing under their own gravity, and hypothesised that their energy came from the fusion of hydrogen into helium. But it was his verification of Einstein's special relativity that made him a household name.

'The solar eclipse of May 1919 would provide an exceptional opportunity to test one of the predictions of Einstein's bold new theory of gravitation which challenged Newton's laws... and it was natural to choose Eddington to prepare two expeditions, and lead one. Overcoming difficulties at the end of the war, his successful photographic observation from Principe in the Gulf of Guinea was "dramatic verification of Einstein's esoteric theory" (Gingerich, 282), shot the latter to fame, and overnight made Eddington a public figure. Like his rival Sir James Jeans he became a personality mentioned in the pages of *Punch*, and, following Jeans, he wrote highly successful popular scientific books. The best of them is perhaps *The Nature of the Physical World* (1928), while *Space, Time and Gravitation* (1920) was immensely important' (ODNB).

First edition; 8vo; frontispiece from photograph; light spotting and toning to front matter; original blue cloth, titles to spine gilt, cloth a little rubbed with some tiny bumps and scuffs, an excellent copy; 218 pp.

[ref: 125450]



C. Davidson Frontispiece See page 117

ECLIPSE INSTRUMENTS AT SOBRAL

CAMBRIDGE
AT THE UNIVERSITY PRESS
1920

A. A. EDWARDS, M.A., M.Sc., F.R.S.
WITH ILLUSTRATIONS BY THE AUTHOR

SPACE TIME
AND
GRAVITATION
AS OUTLINES OF THE GENERAL
RELATIVITY THEORY

Finally is the force of gravitation propagated instantaneously, or with the velocity of light, or some other velocity? Until comparatively recently it was thought that conclusive proof had been given that the speed of gravitation must be far higher than that of light. The argument was something like this. If the Sun attracts Jupiter towards its present position S , and Jupiter attracts the Sun towards its present position J , the two forces are in the same line and balance. But if the Sun attracts Jupiter towards its previous position S' , and Jupiter attracts the Sun towards its previous position J' , when the force of attraction started out to cross the gulf, then the two forces

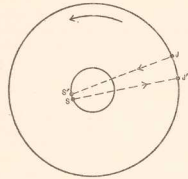


FIG. 15.

give a couple. This couple will tend to increase the angular momentum of the system, and, acting cumulatively, will soon cause an appreciable change of period, disagreeing with observation if the speed is at all comparable with that of light. The argument is fallacious, because the effect of propagation will not necessarily be that S is attracted in the direction towards J' . Indeed it is found that if S and J are two electric charges, S will be attracted very approximately towards J (not J') in spite of the electric influence being propagated with the velocity of light*. In the theory given in this book, gravitation is propagated with the speed of light, and there is no discordance with observation.

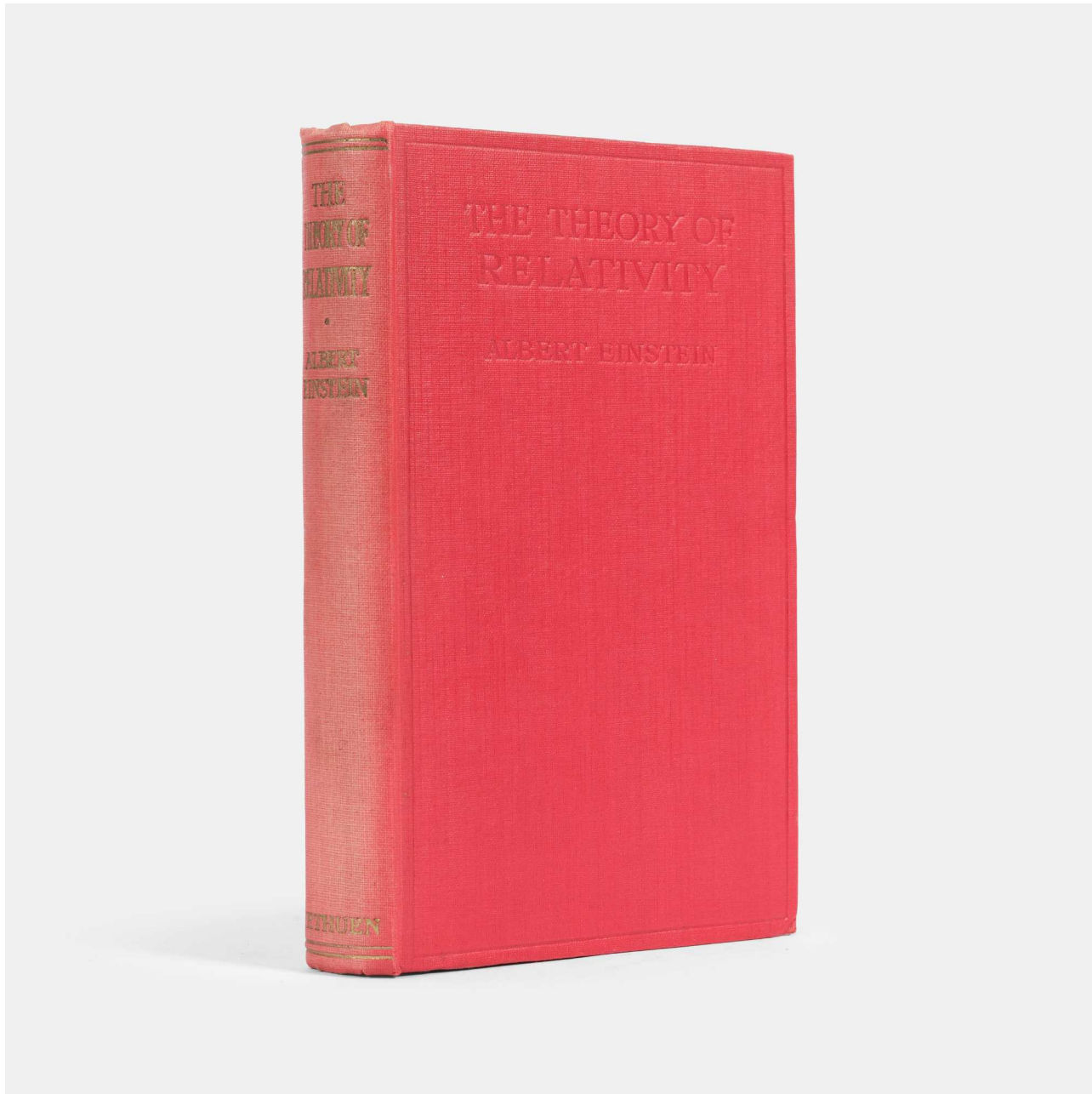
It is often urged that Newton's law of gravitation is much

* Appendix, Note 6.

simpler than Einstein's new law. That depends on the point of view; and from the point of view of the four-dimensional world Newton's law is far more complicated. Moreover, it will be seen that if the ambiguities are to be cleared up, the statement of Newton's law must be greatly expanded.

Some attempts have been made to expand Newton's law on the basis of the restricted principle of relativity (p. 20) alone. This was insufficient to determine a definite amendment. Using the principle of equivalence, or relativity of force, we have arrived at a definite law proposed in the last chapter. Probably the question has arisen in the reader's mind, why should it be called the law of gravitation? It may be plausible as a law of nature; but what has the degree of curvature of space-time to do with attractive forces, whether real or apparent?

A race of flat-fish once lived in an ocean in which there were only two dimensions. It was noticed that in general fishes swam in straight lines, unless there was something obviously interfering with their free courses. This seemed a very natural behaviour. But there was a certain region where all the fish seemed to be bewitched; some passed through the region but changed the direction of their swim, others swam round and round indefinitely. One fish invented a theory of vortices, and said that there were whirlpools in that region which carried everything round in curves. By-and-by a far better theory was proposed; it was said that the fishes were all attracted towards a particularly large fish—a sun-fish—which was lying asleep in the middle of the region; and that was what caused the deviation of their paths. The theory might not have sounded particularly plausible at first; but it was confirmed with marvellous exactitude by all kinds of experimental tests. All fish were found to possess this attractive power in proportion to their sizes; the law of attraction was extremely simple, and yet it was found to explain all the motions with an accuracy never approached before in any scientific investigations. Some fish grumbled that they did not see how there could be such an influence at a distance; but it was generally agreed that the influence was communicated through the ocean and might be better understood when more was known about the nature of water. Accordingly, nearly every fish who wanted to explain the attraction started by



Einstein's popular treatment of relativity theory

8. EINSTEIN, Albert.

Relativity. The Special & the General Theory. A popular exposition. Authorised translation by Robert W. Lawson. With five diagrams and a portrait of the author. London, Methuen & Co. Ltd., 1920.

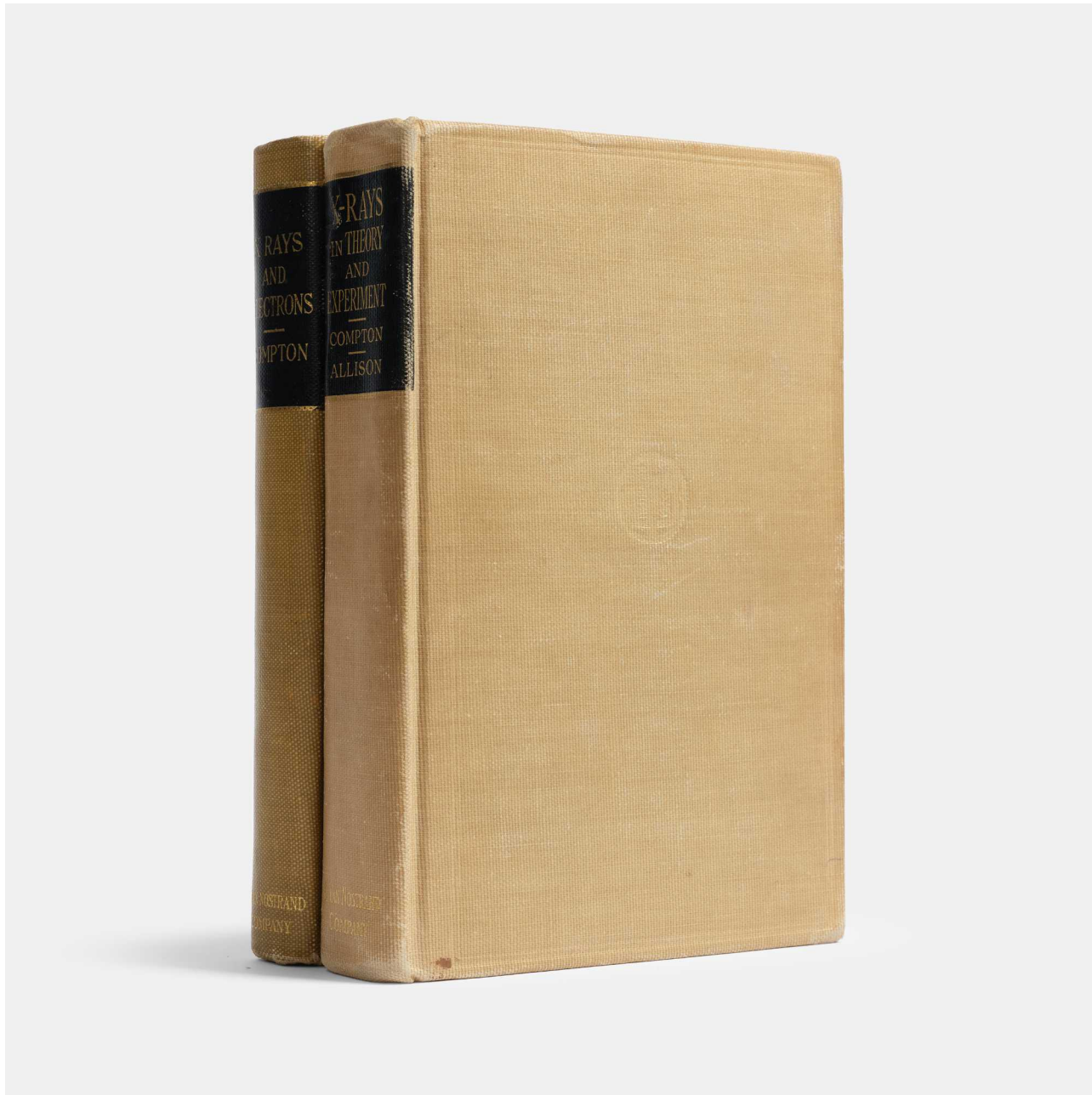
£2500

First English language edition, first impression of Einstein's first popular treatment of relativity. This copy from the library of British physicist Leslie Fleetwood Bates (1897-1978), who did his doctoral work under Ernest Rutherford at Cambridge and became a specialist in ferromagnetism.

Einstein's general theory of relativity, 'one of history's most imaginative and dramatic revisions of our concepts of the universe', was completed in a frenzy of work at the end of 1915 (Isaacson, *Einstein: His Life and Universe*, p. 223). The following year he published, in German, *Relativity: The Special and the General Theory*, an account intended to be accessible to the general public, and which he tested by reading drafts to his stepdaughter Margot. Einstein took the opportunity to publish the present English language edition when interest in general relativity exploded after the theory was confirmed by Arthur Eddington's eclipse observations in 1919. This edition includes an important new appendix on Eddington's work titled 'The Experimental Confirmation of the General Theory of Relativity' that was not present in the previous German edition.

First edition, first impression; 8vo; portrait frontispiece, equations and diagrams within the text, separately paginated 8-page publisher's ads at rear, occasional pencilled marks in the text, spotting to the edges of text block and occasionally the contents, free endpapers tanned; original red cloth, titles to spine in gilt and to upper board in blind, spine rolled and just a little faded, a few tiny bumps to the edges of the boards, a very good copy; 138pp.

[ref: 123594]



Annotated by a colleague

9. COMPTON, Arthur & ALLISON, Samuel K.
X-Rays and Electrons [with] X-Rays in Theory and Experiment.
New York, D. van Nostrand Company, Inc., 1926 & 1935.

£1250

Both the first and the second edition of Nobel laureate Arthur Holly Compton's first book, X-Rays and Electrons, from the library of Stanford physicist David Locke Webster, whose early work on x-rays was related to Compton's. With Webster's ownership inscriptions and extensive manuscript notes in the text.

Compton's most important contribution to physics was his 1923 discovery of Compton scattering, which demonstrated for the first time the particle nature of electromagnetic radiation. This was a shocking result given that light was already known to be a wave, and as Compton later explained, 'When I presented my results at a meeting of the American Physical Society in 1923 it initiated the most hotly contested scientific controversy that I have ever known' (Johnston, The Cosmos of Arthur Holly Compton, p. 36). He also studied x-ray diffraction, correctly identified cosmic rays as being charged particles, and was a leading figure on the Manhattan Project.

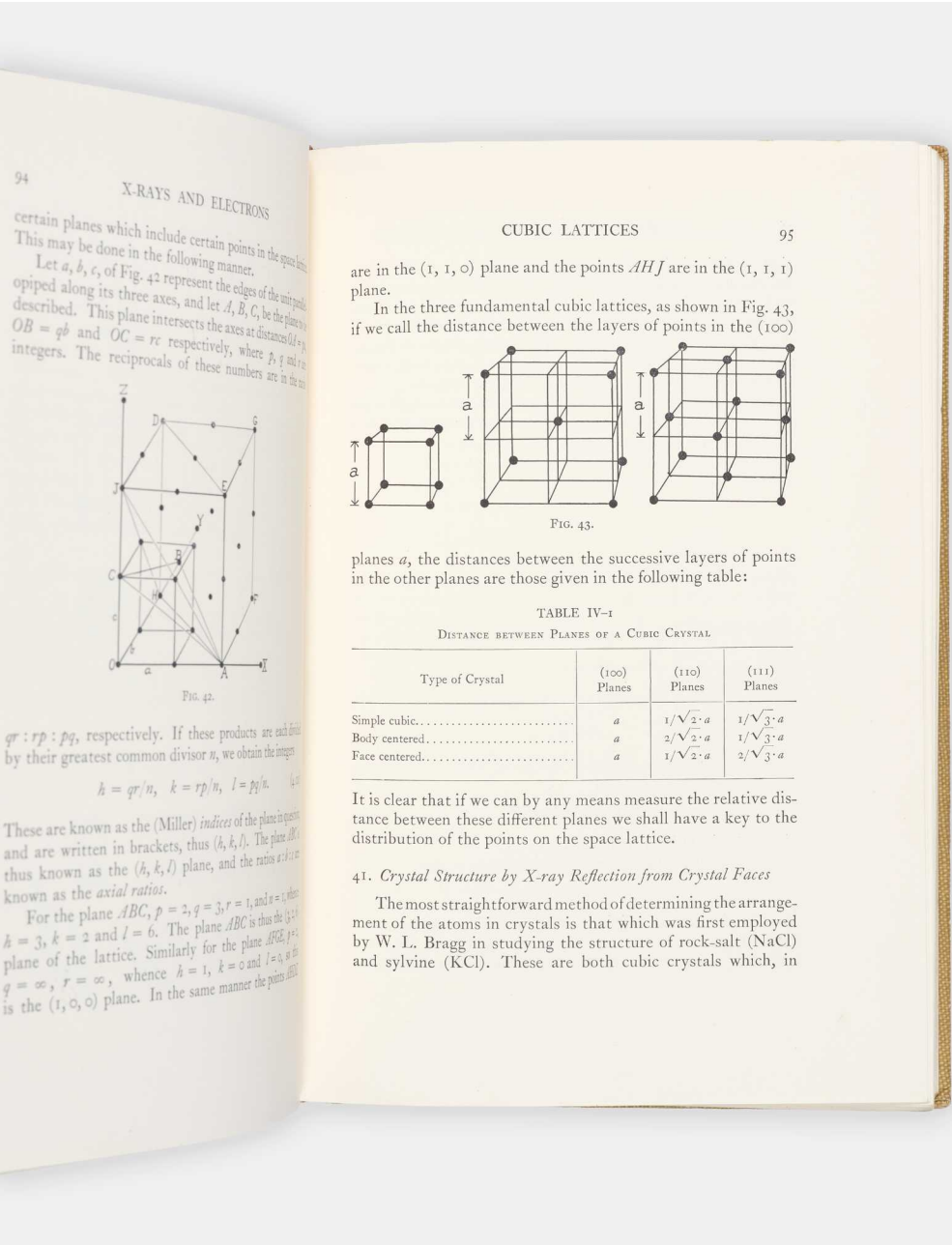
The owner of these volumes, David Locke Webster (1888-1976) was a professor of physics at Harvard, MIT, and Stanford. Early in his career, he conducted studies that supported the Parson magneton model of the electron, a subject that Compton also worked on.

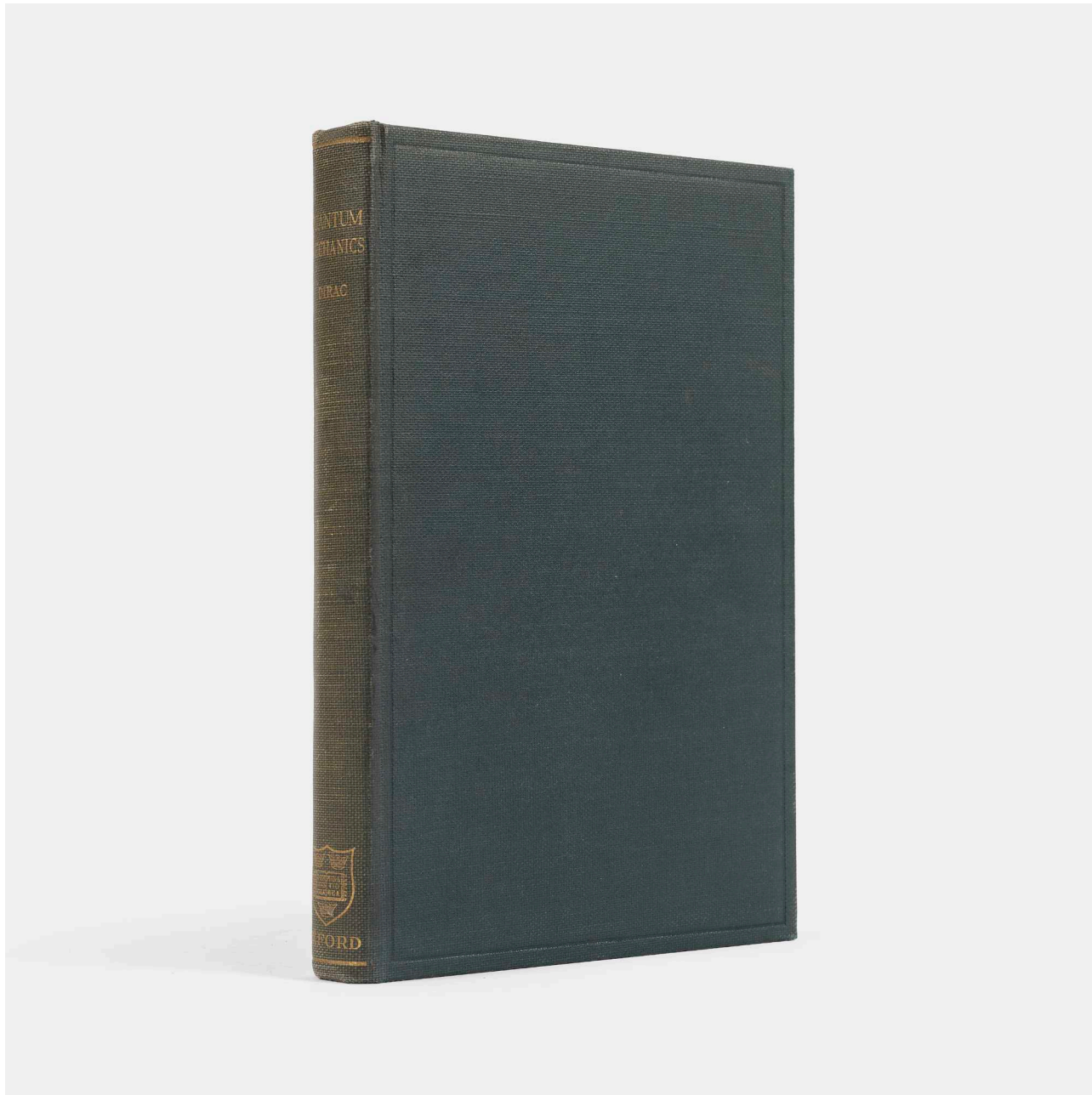
Webster has made significant manuscript notes of a scientific, mathematical, and editorial nature in this set. The second volume is particularly heavily annotated in preparation for a review, with Webster writing on page one, 'In the book review note that this chapter does a mighty good job for any student with a general knowledge of physics'. Next to a sentence about one of Schrödinger's equations on page 66 he states, 'Wrong! Simpler than saying it right but

puzzling to one who thinks'. And on page 97 there is the simple statement, 'A mighty good job'.

First and second edition; 8vo; illustrations throughout the texts, ownership inscriptions and manuscript notes to the contents, particularly the second volume, some loosely inserted manuscript notes; original buff cloth, titles to spines in gilt on black grounds, publisher's devices to upper boards in blind, cloth a little rubbed and marked with some wear at the extremities, a few small bumps, very good condition; 403 & 828pp.

[ref: 119481]





Codifying quantum mechanics

10. DIRAC, Paul.

The Principles of Quantum Mechanics.
Oxford: at the Clarendon Press, 1930.

£5750

First edition, first impression and a lovely copy of this landmark textbook on the principles of quantum mechanics which 'deeply influenced a generation of physicists' (ODNB).

Paul Dirac (1902-1984) was awarded the Nobel Prize in Physics in 1933 for his relativistic wave equation, which correctly described the spin of electrons and was the first theory to fully account for special relativity in the context of quantum mechanics. The equation implied the existence of antimatter, predicting electrons with a positive charge, a daring speculation that was unexpectedly confirmed in 1932 when positrons were discovered in cosmic radiation.

First edition, first impression; 8vo; a little spotting to title, half title, and endpapers, contents very faintly toned; original dark green cloth, titles to spine gilt, spine tanned, cloth a little rubbed, an excellent copy; 257pp.

[ref: 120415]

THE PRINCIPLES OF QUANTUM MECHANICS

BY
P. A. M. DIRAC
FELLOW OF ST. JOHN'S COLLEGE
CAMBRIDGE

OXFORD
AT THE CLARENDON PRESS
1930

102 EQUATIONS OF MOTION AND QUANTUM CONDITIONS 124
tion (23) of § 21, that π_r is a pure imaginary observable. The form
of (20) shows also that when π_r is multiplied into a ϕ -symbol, the
result is

$$\phi \pi_r = -i \hbar \phi / \partial q_r \quad (21)$$

in which $\partial \phi / \partial q_r$ is defined through its q -representative in the same
way as $\partial \psi / \partial q_r$ was.

The commutability relations connecting the π 's with each other
and with the q 's will now be obtained. For this purpose we use the
fact, which is easily verified, that the operators $\partial / \partial q_r$ applied to ϕ -
symbols obey the same laws as when applied to ordinary functions.
Thus

$$\frac{\partial^2 \phi}{\partial q_r \partial q_s} = \frac{\partial^2 \phi}{\partial q_s \partial q_r}$$

$$\pi_r \pi_s \phi = \pi_s \pi_r \phi,$$

$$\text{and hence } \pi_r \pi_s - \pi_s \pi_r = 0. \quad (22)$$

$$\text{Again } \frac{\partial}{\partial q_s} (q_r \phi) = q_r \frac{\partial \phi}{\partial q_s} + \delta_{rs} \phi$$

$$\text{or } \pi_s q_r \phi = q_r \pi_s \phi + \hbar \delta_{rs} \phi,$$

$$\text{and hence } q_r \pi_s - \pi_s q_r = -\hbar \delta_{rs}. \quad (23)$$

More generally, if f is any differentiable function of the q 's,

$$\frac{\partial}{\partial q_s} (f \phi) = f \frac{\partial \phi}{\partial q_s} + \frac{\partial f}{\partial q_s} \phi$$

$$\text{or } \pi_s f \phi = f \pi_s \phi + i \hbar \frac{\partial f}{\partial q_s} \phi,$$

$$\text{and hence } f \pi_s - \pi_s f = -i \hbar \frac{\partial f}{\partial q_s} \phi. \quad (24)$$

These relations (22), (23), (24) could have been obtained alternatively
directly from the representatives (20), with the help of properties of
the δ function given in § 22.

The relations (22), (23) for the π 's are, apart from a numerical
factor $-i \hbar$, just the same as the quantum conditions (12) for the p 's.
Thus the observables $-i \hbar \pi_r$ satisfy the same commutability relations
with each other and with the q 's as do the p_r . Equation (24) now corre-
sponds to (16), with the difference that (24) has been shown to be
valid for any differentiable function f , not merely for one expressible
as a power series. There exist many sets of observables π_r owing to
the indefiniteness in p/q , discussed above, but each such set must
satisfy (22) and (23) and thus give rise to a set of observables $-i \hbar \pi_r$
with the same commutability properties as the p_r 's. Any one of these

134 MOMENTUM AS A DIFFERENTIAL OPERATOR 163
sets, π_r , is connected with any other, π_{rs} , according to equation (19),
by the relation

$$\pi_r = \pi_{rs} + i \hbar F / \partial q_s. \quad (25)$$

It will now be shown that *there exists one set of π_r 's such that $-i \hbar \pi_r$*

is just equal to p_r .

If we take any set of π_r 's, π_{rs} say, then from (23) and (12), $p_r + i \hbar \pi_{rs}$
must commute with each q_r , and must therefore be a function of the
 q 's only, i.e.

$$p_r + i \hbar \pi_{rs} = f_r(q). \quad (26)$$

Each f_r must be a real function of the q 's, since both p_r and $-i \hbar \pi_{rs}$
are real observables. Again, from (12) and (22), we obtain

$$0 = p_r p_s - p_s p_r$$

$$= (-i \hbar \pi_{rs} + f_r) (-i \hbar \pi_{ss} + f_s) - (-i \hbar \pi_{ss} + f_s) (-i \hbar \pi_{rs} + f_r)$$

$$= -i \hbar [\pi_{rs} f_r + f_r \pi_{ss} - \pi_{ss} f_s - f_s \pi_{rs}].$$

$$\text{or } \pi_{rs} f_r - f_s \pi_{ss} = \pi_{ss} f_s - f_s \pi_{rs}.$$

With the help of (24) we now find

$$i \hbar f_r \partial q_s = i \hbar f_s \partial q_r,$$

which shows that the functions f_r are all of the form

$$f_r = \partial G / \partial q_r,$$

where G is a function of the q 's independent of r . Thus (26) becomes

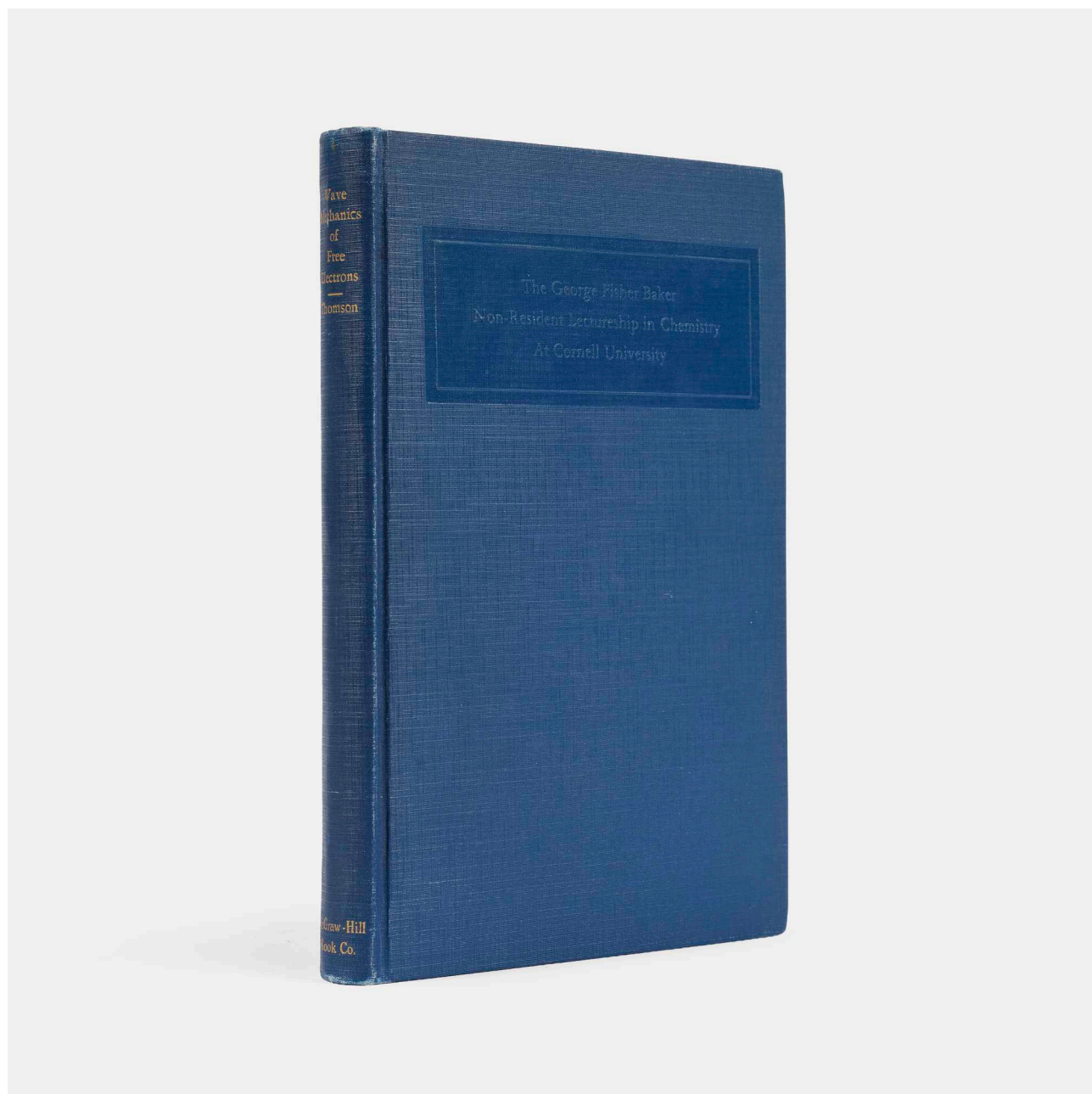
$$p_r = -i \hbar \pi_{rs} + \frac{\partial G}{\partial q_r} = -i \hbar \left(\pi_{rs} + \frac{1}{\hbar} \frac{\partial G}{\partial q_r} \right).$$

We can introduce a new set of π_r 's according to equation (25) taking

F equal to $G/\hbar$, since F is an arbitrary real function of the q 's and
 G is real. For these new π_r 's we shall then have

$$p_r = -i \hbar \pi_r. \quad (27)$$

Equation (27), which was discovered by Schrödinger, is a very
important one in applications of quantum mechanics. It is a con-
sequence only of the quantum conditions (12) and may be regarded
as a new form in which these quantum conditions may be expressed.
It shows that we can take a representation in which the q 's are
diagonal and in which each observable p_r , when multiplied into a
 ϕ -symbol, is represented by the operator $-i \hbar \partial / \partial q_r$, operating on the
representative (q) of this ϕ -symbol. When p_r is multiplied towards
the left into a ϕ -symbol, it is then represented by the operator $i \hbar \partial / \partial q_r$,
operating on the representative (q') of this ϕ -symbol. If $f(q_r, p_r)$ is



11. THOMSON, G.P.

The Wave Mechanics of Free Electrons. The George Fisher Baker Non-Resident Lectureship in Chemistry at Cornell University.

New York & London, McGraw-Hill Book Company, Inc., 1930.

£250

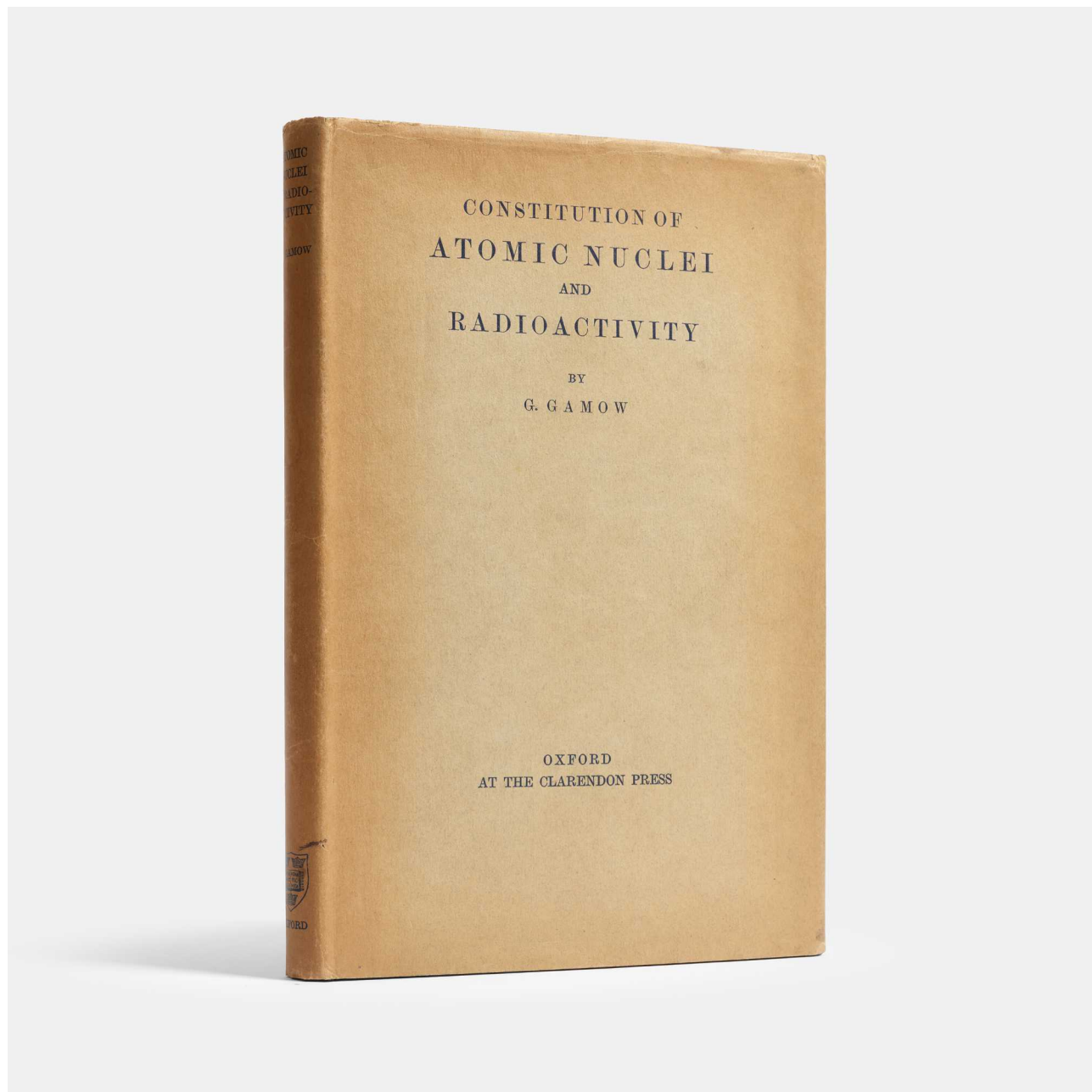
First edition, first printing of this collection of ten lectures on the wave nature of the electron by the scientist who demonstrated it experimentally. The talks were originally presented at Cornell University between October and December of 1929, and this copy contains the printed compliments card of Cornell chemistry professor L.M. Dennis, which is also inscribed 'and G.P. Thomson', though not in Thomson's hand. A very attractive copy.

George Paget Thomson (1892-1975) was the son of physicist J.J. Thomson, who had proved the existence of electrons as charged particles. The younger Thomson became professor of natural philosophy at Aberdeen in 1923, at the same time that wave theories of matter were being explored by de Broglie and others.

Looking to explore the idea, 'Thomson found that he had apparatus in his department that could be easily modified; he used a solid target, first celluloid, later thin films of gold, silver, and platinum, as scatterer, and as beam, the high energy electrons that could be produced in the tube used for experiments on positive rays. The emerging beams were captured on photographic plates as bright centres surrounded by haloes, clearly demonstrating the wave nature of the electrons' (Oxford Dictionary of National Biography).

First edition, with tipped-in inscribed card; 8vo; portrait frontispiece and four plates from photos, old tape repair to first leaf of index in the gutter, contents faintly toned in the margins, a little offsetting from the frontispiece; original blue cloth, titles to spine gilt and to upper board in blind, cloth lightly rubbed at the tips, spine slightly rolled, a very good copy; 172pp.

[ref: 124406]



The first textbook of nuclear physics

12. GAMOW, George.

Constitution of Atomic Nuclei and Radioactivity.
Oxford, at the Clarendon Press, 1931.

£1250

First edition, first impression of the author's first published book and the first textbook of modern nuclear physics (Kragh, *Quantum Generations*, p. 180). A very attractive copy in the rare dust jacket.

George Gamow (1904-1968) established himself as one of the leaders in the field of nuclear physics before the age of 25. Born in Odessa, he studied there and at the University of Leningrad, and then 'attended summer school in Göttingen, Germany, at that time the hotbed of the new quantum theory. There he succeeded in explaining nuclear radioactivity as a quantum-mechanical phenomenon. That insight explained experimental findings of scientists at the Cavendish Laboratory in Cambridge, England, led by the titan of nuclear physics, Ernest Rutherford. Gamow went on to apply quantum mechanics to a general theory of low-energy nuclear reactions, essentially founding that field of study'. This led to the offer of a fellowship in Copenhagen by Niels Bohr, and it was there that Gamow 'invented what was to become known as the liquid-drop model of the nucleus. Later, Bohr and the American theorist John A. Wheeler used the model to explain the phenomenon of nuclear fission' (Harper, *George Washington University Magazine*, Spring 2000).

First edition, first impression; 8vo; folding chart, graphs and diagrams throughout the text, partial toning to endpapers and half title, contents faintly toned; original green cloth, titles to spine gilt, spine slightly rolled, cloth fresh, a very good copy in the tanned jacket that is a little rubbed and creased at the extremities; 114pp.

[ref: 118185]



‘Happy childhood of science’

13. NEWTON, Isaac; EINSTEIN, Albert.
Opticks or a Treatise of the Reflections, Refractions, Inflections & Colours of Light. By Isaac Newton. Reprinted from the fourth edition with a foreword by Prof. Albert Einstein Nobel Laureate and an introduction by Prof. E.T. Whittaker. London, G. Bell & Sons, Ltd., 1931.

£650

The first edition with Einstein’s foreword, fifth overall. An unusually nice copy in the uncommon dust jacket. The 1730 fourth edition of the *Opticks* was the final one to appear with Newton’s revisions, and the text was not republished again until this edition.

Newton’s *Opticks* is notable for anticipating the gravitational lensing of light as predicted by Einstein’s General Relativity, with Newton writing in 1704, ‘Do not Bodies act upon Light at a distance, and by their action bend its Rays; and is not this action (*caeteris paribus*) strongest at the least distance?’

Einstein’s foreword begins, ‘Fortunate Newton, happy childhood of science! He who has time and tranquility can by reading this book live again the wonderful events which the great Newton experienced in his young days. Nature to him was an open book, whose letters he could read without effort... He stands before us strong, certain, and alone: his joy in creation and his minute precision are evident in every word and in every figure’.

Fifth edition, the first with Einstein’s foreword; 8vo; illustrations within the text, some spotting to the edges of the text block and endpapers, some light spotting in the gutter in a few places, spotting to pages 222 & 223 from previously inserted material; original blue cloth, titles to spine and upper board gilt, a very good copy in the rubbed and spotted jacket with some creasing at the extremities and a few short splits; 414pp.

[ref: 123466]



Scarce

14. TEMPLE, G.
An Introduction to Quantum Theory.
London, Williams & Norgate Ltd., 1931.

£500

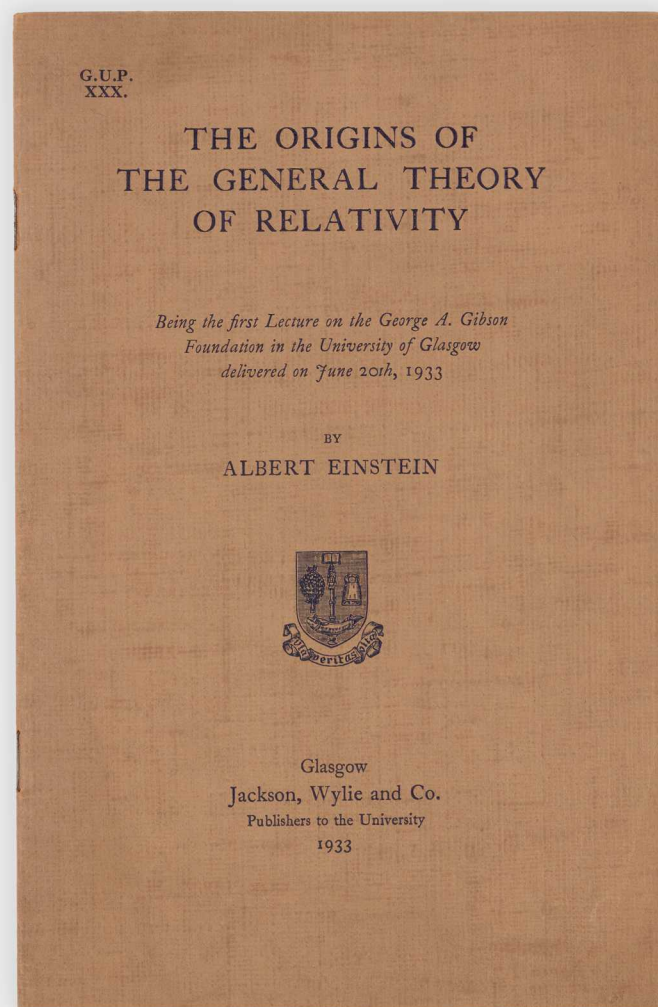
First edition, the uncommon first book by an English mathematician who made significant contributions to quantum mechanics. An attractive copy with the publisher's subscription slip loosely inserted, and from the library of Dutch physicist and mathematician E.M. Bruins (1909-1990), with his unobtrusive blind stamp on the title.

George Frederick James Temple (1901-1992) studied at Birkbeck and then Imperial College London, earning his PhD with three papers on general relativity in 1926 and staying on to study the wave mechanics of the atom. 'In 1928 Paul Dirac published his equation for the electron, which removed an unexplained anomaly in the fit of wave mechanics with experiment, conformed with the requirements of relativity, and yet was not of the expected mathematical form. Temple saw this as a challenge' which he answered 'by deriving Dirac's results in a more abstract algebraic way. Two highly original papers clarified the whole situation and established Temple as a first rank mathematician' (ODNB).

Provenance: Dr. E.M. Bruins (ownership stamp).

First edition, first impression; 8vo; publisher's subscription slip loosely inserted, diagrams within the text, light partial toning of the endpapers but overall contents clean; original alligator skin-patterned cloth, titles to spine and upper board gilt, spine rolled, cloth rubbed with a little wear at the extremities, scattered loss of size from the boards, a very good copy; 196pp.

[ref: 117202]



Einstein escaping the Nazis

15. EINSTEIN, Albert.

The Origins of the General Theory of Relativity. Being the first lecture on the George A. Gibson Foundation in the University of Glasgow delivered on June 20th, 1933.

Glasgow, Jackson, Wylie and Co., 1933.

£1750

First edition, the rare offprint of a talk given by Einstein at the University of Glasgow during his peripatetic summer after the Nazi take-over of Germany.

Einstein spent much of the early 1930s on extended visits to the United States, and the first Gestapo raid of his Berlin flat occurred in February, 1933 while he was a visiting professor at Caltech. The Nazi Enabling Act was passed in March as Einstein travelled back to Europe, and on arriving in Antwerp he officially renounced his German citizenship. After a short stay in Belgium he toured the UK, during which time he was presented with an honorary doctorate by the University of Glasgow, where he gave this non-technical talk on the 20th of June. In October Einstein returned to the US and joined Princeton's Institute for Advanced Study, where he spent the remainder of his career.

12-page wire-stitched pamphlet; ink ownership signature to title, a little light spotting to the contents, minor crease affecting the wrappers and contents, staples a little rusty, excellent condition.

[ref: 124211]

THE ORIGINS OF THE GENERAL THEORY OF RELATIVITY

*Being the first Lecture on the George A. Gibson
Foundation in the University of Glasgow
delivered on June 20th, 1933*

BY
ALBERT EINSTEIN



Glasgow
Jackson, Wylie and Co.
Publishers to the University
1933

6

I was, of course, familiar with Mach's idea that inertia might not represent a resistance to acceleration as such, so much as a resistance to acceleration relative to the mass of all the other bodies in the world. This idea fascinated me; but it did not provide a basis for a new theory. I made the first step towards the solution of this problem when I endeavoured to include the law of gravity in the framework of the special theory of relativity. Like most physicists, at this period I endeavoured to find a "field law," since, of course, the introduction of action at a distance was no longer feasible in any plausible form once the idea of simultaneity had been abolished.

The simplest way was, of course, to keep the Laplace scalar potential of gravity and to extend the Poisson equation by adding, in such a way as to comply with the special theory of relativity, a term differentiated with respect to the time. The law of motion of the particle in a gravitational field, of course, also had to be made to conform to the special theory of relativity. The way to do this was not unambiguously evident, since clearly the inertial mass of a body might depend upon the gravitational potential. Indeed, this was to be expected on account of the inertia of energy.

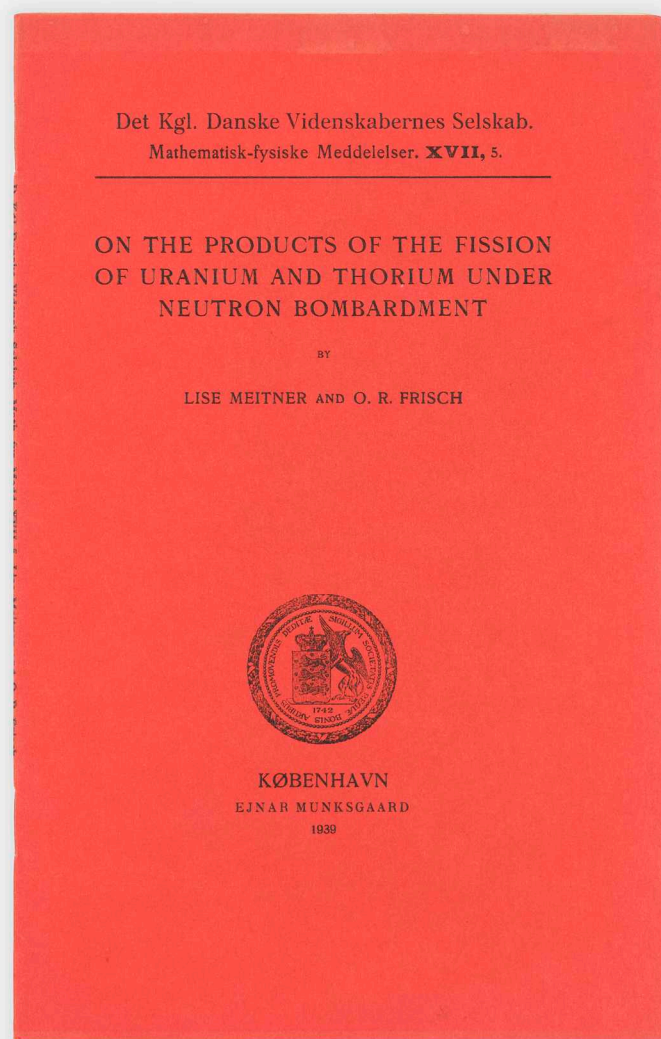
Investigations on these lines, however, led to a result that caused me grave misgivings. According to the classical mechanics, the vertical acceleration of a body in a vertical field of gravitation was in-

7

dependent of the horizontal component of the velocity. It follows from this that the vertical acceleration of a mechanical system (or of its centre of gravity) in such a field should be independent of its internal kinetic energy. According to the theory I was investigating, however, the vertical acceleration was not independent of the horizontal velocity, and consequently, was not independent of the internal energy of the system.

This did not agree with the old well-known empirical result that all bodies in a gravitational field are subject to the same acceleration. This principle, which can also be stated as the law of the equivalence of inertial and gravitational mass, impressed me as being of fundamental importance. I wondered how this law could exist, and believed that it held the key to the real understanding of inertia and gravitation. I never seriously doubted its exact validity, even though I did not know about the beautiful experiments of Eötvös, which, if I remember aright, were not known to me until a later date.

I gave up, therefore, the attempt, which I have sketched above, to treat the problem of gravitation within the framework of the special theory of relativity; it was clearly inadequate, since it failed to take into account just the most fundamental property of gravitation. The principle of the equivalence of inertial and gravitational mass could now be formulated in a very simple and intelligible manner—



16. MEITNER, Lise & FRISCH, Otto Robert.
On the Products of the Fission of Uranium and Thorium under Neutron Bombardment.
Copenhagen, Ejnar Munksgaard, 1939.

£750

First edition, the offprint issue of this significant paper following immediately from Meitner and Frisch's discovery of fission, which had been announced in *Nature* in January of the same year. A lovely copy.

Here, Meitner and Frisch investigate the unstable transuranic elements (those with atomic numbers greater than 92), confirming that they are indeed the products of the fission of uranium and thorium.

14-page offprint, wire-stitched; graphs within the text, contents unopened, red offsetting from wrappers to title; original red wrappers printed in black, a little fading at the edges, an excellent copy.

[ref: 120645]

In connection with experiments by BJERGE, BROSTRÖM and KOCH (12), it has been shown by one of us (13) that the decay curve of a mixture of many components with different decay times, such as results from the fission of uranium or thorium, has very nearly a "standard shape" which can be calculated from purely statistical assumptions

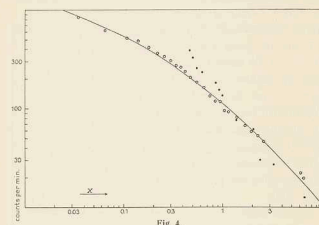


Fig. 4.

on the distribution of periods. For the intensity at a time t reckoned from the end of an irradiation of duration T the calculation gives the expression

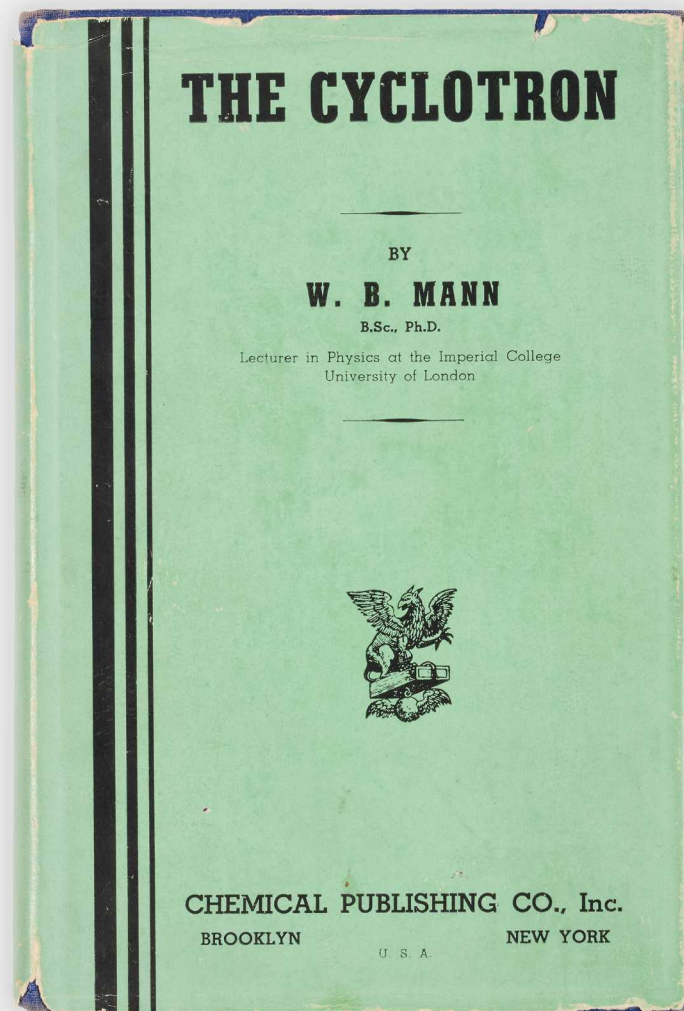
$$J_T(t) = \text{const.} \left[x^{-\frac{1}{n}} - (1+x)^{-\frac{1}{n}} \right] x = \frac{t}{T}$$

where n is the exponent in SARGENT's rule, $\lambda = \text{const. } E^n$ connecting the decay constant λ and the upper limit E of the β -ray spectrum. In fig. 4 this expression is plotted (as full line) on a double-logarithmic scale. The circles represent the results of an experiment (12) in which a uranium

layer was irradiated for 100 minutes and the activity of the recoil was measured without previous chemical treatment. A very similar decay was found with a thorium layer and it was pointed out that this similarity need not imply any similarity in the distribution of individual periods, but can be explained entirely on the basis of the statistical argument. The dots, representing our own measurements with H_2S -precipitates, do not, however, fit the standard curve. Therefore the similarity of our curves with the "transuranium curves" obtained by HAHN, MERTNER and STRASSMANN cannot be explained on the basis of the statistical argument but must be taken as evidence for the identity of the corresponding products.

Similar experiments with thorium have been reported by one of us (14). It was shown that the fission of thorium gave rise to active elements chemically analogous to the "transuranium elements", but that different periods occur. Since these periods are not mentioned in the account of the investigation of the uranium and thorium fission products, which have been published in the meantime by BRIDGEMAN and COOK (15), it may be worth while also to describe these experiments somewhat more closely and to discuss the decay curves in detail.

A "thick" layer of thorium oxide on a glass plate was irradiated with neutrons ($\text{Li} + \text{D}$) and the fission products were collected on a water surface, the chemical treatment of the water being the same as in the uranium experiment. The thorium layer was covered with a celluloid foil of about 0.3 mm air equivalent in order to avoid contamination of the water through α -recoil or traces of emanating thoron. After an irradiation of about $2\frac{1}{2}$ hours, the decay curves of fig. 5 were obtained. Curve a shows the decay of the sulfide precipitate, and curve b shows the decay of



Inscribed to a colleague

17. MANN, W.B.

The Cyclotron. With a foreword by E. O. Lawrence.
With a frontispiece and 31 diagrams.
New York, Chemical Publishing Co., 1940

£1250

First edition, first printing, of what is likely the first conventionally published book on the Berkeley cyclotron. Presentation copy inscribed from the author on the front free endpaper, 'Arnold Kramish, with warmest good wishes from a very old friend, Wilfrid Mann'. Rare inscribed and with the jacket.

Wilfrid B. Mann (1908-2001) was an eminent radionuclide physicist. Having earned his bachelor's degree at Imperial College London, in 1930, he carried out graduate research with Ernest O. Lawrence at the cyclotron in Berkeley, where he discovered the medically important radionuclide gallium-67. In the preface to the present volume he writes warmly of his time there, 'Stranded without a cyclotron to play with, I have felt compelled to reminisce, and this monograph is essentially in memory of very happy days spent in the laboratory of Professor Ernest Lawrence during two years of sojourn in Berkeley'.

Mann's thesis advisor, G.P. Thompson, was in charge of the Tube Alloys project, the British nuclear program that was incorporated into the Manhattan Project. Mann was assigned 'as the physicist to the British Central Scientific Office at the British Embassy in Washington, DC. At the embassy, Mann's interactions with his coworkers Kim Philby and Guy Burgess gained him considerable notoriety when Philby and Burgess were implicated in the biggest spy scandal of mid-century' (Coursey, *Physics Today* obituary, American Institute of Physics, October 1, 2001). Mann was able to conclusively prove that he was not 'the fifth man' and was further exonerated by the US government.

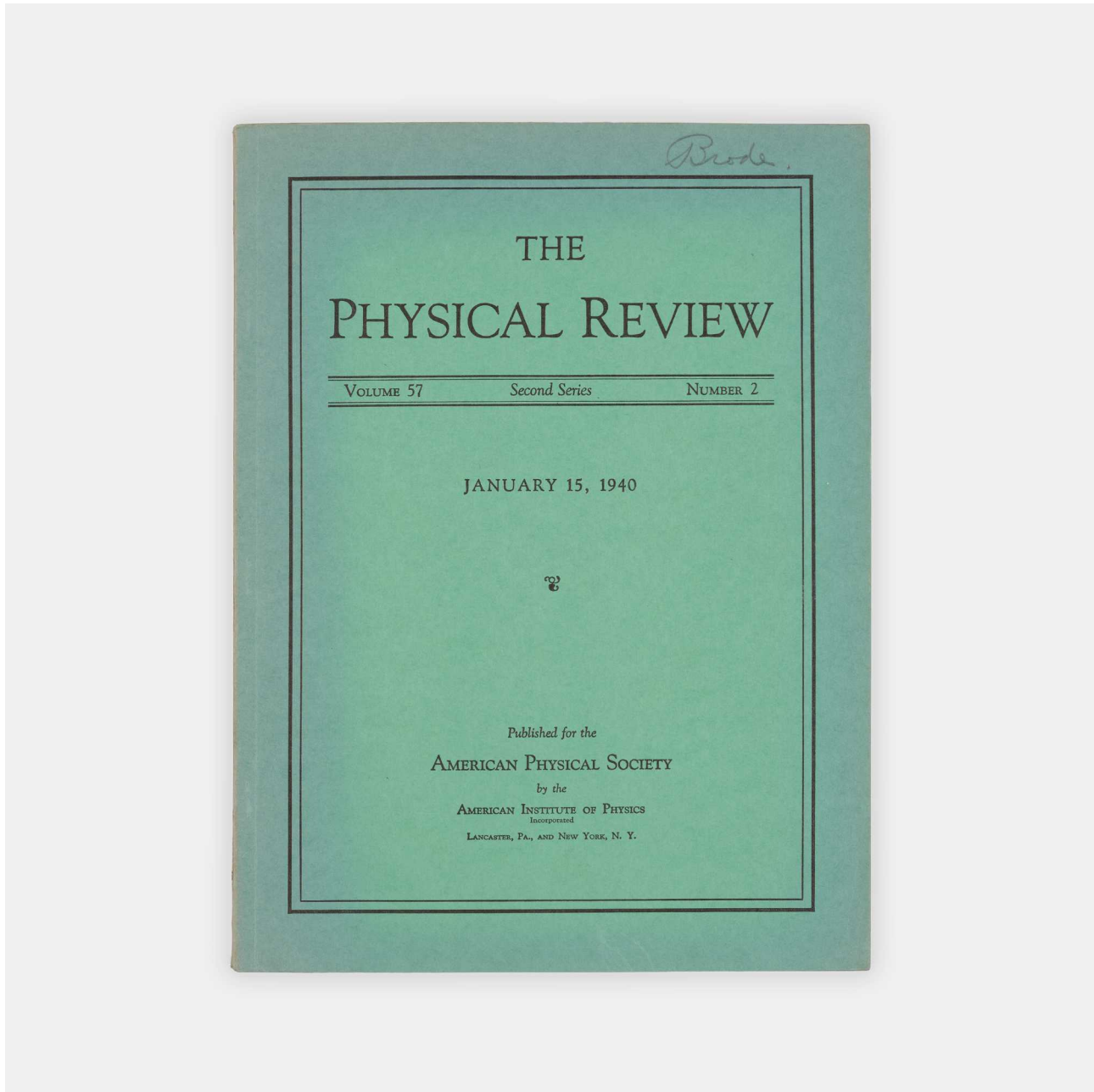
After the war he served as British delegate to the UN's Atomic Energy Commission and was head of the radioactivity department at the US National Bureau of

Standards. 'For 40 years, Mann was one of the most influential researchers in his field. At NBS, he developed a full suite of experimental techniques for standardization of nuclides... He made early, definitive measurements of the half-lives of tritium and carbon-14, and built an isotope separator to prepare isotopically pure standards of krypton-85 and xenon-133' (Coursey).

The recipient of this copy, Arnold Kramish (1923-2010), was a fellow physicist and employee of the Manhattan Project. He later worked at the Atomic Energy Commission as a CIA liaison, assisted in the design of the hydrogen bomb, and advised the State Department and UNESCO.

First edition, first printing, inscribed presentation copy; 8vo; photographic frontispiece, diagrams within the text, contents fresh; original blue cloth, titles to spine gilt, publisher's device to upper board in blind, an excellent copy in the lightly rubbed jacket with some small chips from the corners and edges; 92pp.

[ref: 123467]



Early particle physics

18. OPPENHEIMER, Robert; SERBER, Robert; SNYDER, Hartland.

‘The Production of Soft Secondaries by Mesotrons’ in The Physical Review second series, volume 57, number 2. Lancaster, PA, The American Physical Society, January 15, 1940.

£500

First edition, the journal issue in the original wrappers. This early and significant particle physics paper was part of the attempt to explain the make-up of cosmic rays and align their behaviour with the contemporary model of quantum electrodynamics. This copy from the library of Manhattan project physicist Robert Brode, head of the team that designed the bomb fuses at Los Alamos, with his pencilled ownership signature on the upper cover.

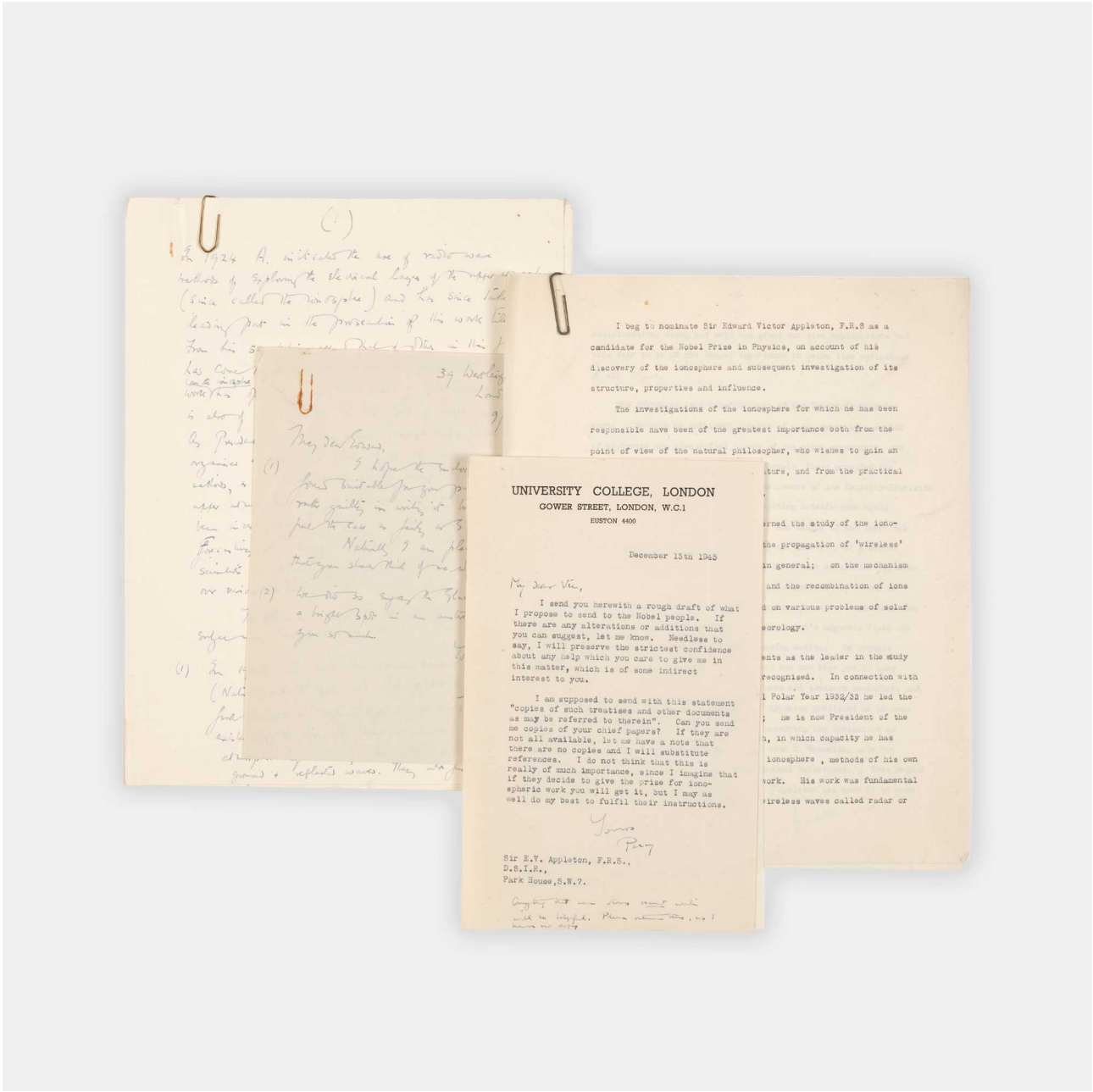
During the 1930s it became clear that there was at least one previously unknown particle bigger than an electron but smaller than a proton. Initially termed mesotrons, it was eventually determined that they were two different particles, the muon and the pion.

‘Playing a leading role in both the creation and the clearing up of these confusions, and thus being there at the birth of what has grown into the (for most people) utterly bewildering new discipline of particle physics, were Oppenheimer and his students’ (Monk, *Inside the Center*, p. 227). The present paper ‘analysed the “soft component” of cosmic rays as being made up of electrons and gamma rays that were released in mesotron “showers”’ (Monk, p. 288).

Provenance: Robert Brode (signature).

First edition, complete number; illustrations within the text; original green wrappers printed in black, pencilled ownership signature of Robert Brode to the upper cover, toned along the spine and edges and lightly rubbed, an excellent copy.

[ref: 122494]



‘which is of some indirect interest to you’

19. [APPLETON, Edward] ANDRADE, [Percy] Edward Neville da Costa.

Successful Nobel Prize nomination for Edward Appleton.
London, 1945.

£4750

A set of letters and drafts for the nomination of Edward Appleton for the Nobel Prize in Physics, from the files of nominator Edward Neville da Costa Andrade. Nobel Prize application materials are rare, and we are unaware of any other examples having come on the market. This one is particularly interesting for showing cooperation between nominator and nominee, as Andrade requests Appleton’s comments on the nomination statement, noting with deadpan humour that the matter is ‘of some indirect interest to you’.

Edward Victor Appleton (1892-1965) earned his degree at Cambridge and then joined the Cavendish laboratory under Ernest Rutherford. There he ‘commenced a lifelong systematic investigation of the structure and electrical properties of the upper atmosphere’, in particular the relationship between radio waves, the layers of the atmosphere, and magnetic variation caused by the sun. ‘These researches, the first distance measurements by radio, were of great technological significance for radio communication, and his experimental methods were used later by Robert Watson-Watt in the development of radar’ (Oxford Dictionary of National Biography).

Edward Neville da Costa Andrade (1887-1971, known as Percy by his colleagues), was appointed Quain professor of Physics at University College, London in 1928. There, ‘he built up and sustained for many years an outstanding research school in the physics of solids and liquids, which produced many classic papers on the growth and plastic glide of metal single crystals, on the origin of cracks in glass, and on the viscosity of liquids (ODNB).

The earliest material in this file is the printed invitation to Andrade to submit a nomination, dated September, 1945. This is accompanied by two copies of the Nobel Code of Statutes (one first edition published in 1901, and the other published in 1946) and two lists of previous winners (published in 1945 and 1947).

Next, a manuscript letter from Appleton dated December 9, 1945, apparently replying to a request from Andrade that is not included here. 'My dear Edward, I hope the enclosed will be suitable for your purpose. I've felt guilty in writing it but I've had to put the case as fairly as I can. Naturally I am pleased - very pleased - that you should think of me whatever happens!...' This is accompanied by a manuscript in Appleton's hand which describes the primary steps in his research programme and his findings: 'A. initiated the use of radio wave methods of explaining the electrical layers of the upper atmosphere (since called the ionosphere) and has since taken the leading part in the prosecution of this work till today. From his scientific work and that of others in this field has come the practical technique of radar... The work on the ionosphere has opened up a new field of geophysics...'

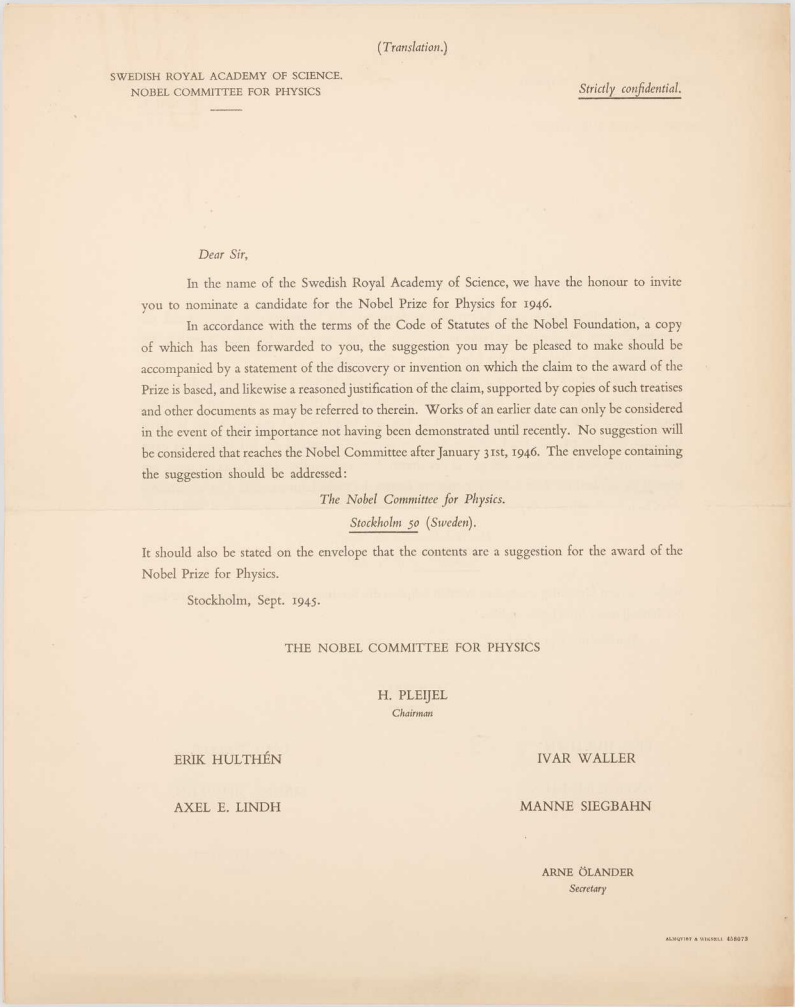
Andrade replies with a typed letter signed on December 13th, 'My dear Vic, I send you herewith a rough draft of what I propose to send to the Nobel people. If there are any alterations or additions that you can suggest, let me know. Needless to say, I will preserve the strictest confidence about any help which you care to give me in this matter, which is of some indirect interest to you', followed by a request for copies of papers and a handwritten note asking that he 'please return this, as I have no copy'.

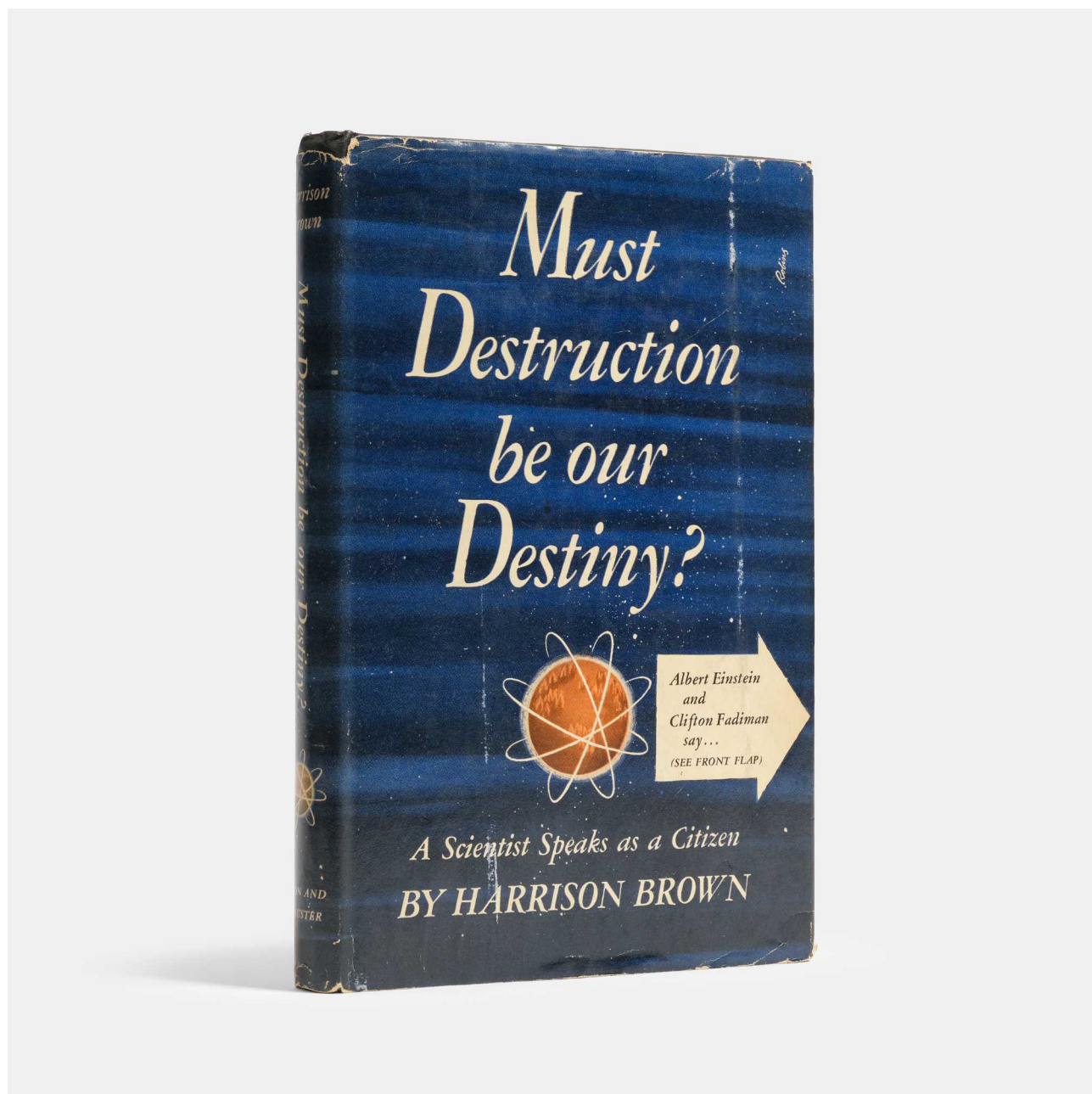
The typescript copy of the nomination includes small pencilled corrections in Appleton's hand and ink corrections in Andrade's. These were incorporated into the finished nomination, of which there are two carbon copies, as well as a carbon of Andrade's covering letter to the Nobel Committee Chairman, dated December 21st, 1945.

Andrade's nomination was successful, and Appleton was awarded the Nobel Prize in 1947.

Official printed invitation from the Nobel Committee with typed and manuscript additions; 3-page manuscript by Appleton on the backs of 4 printed pages, with accompanying manuscript letter on a single leaf of plain paper; typed letter signed from Andrade to Appleton on University College London letterhead with duplicate; 1 typed and 2 duplicated copies of Andrade's nomination, the typed copy with pencil and ink corrections; official Nobel Prize Code of Statutes published in 1901, and the same published in 1946; lists of previous award winners published in 1945 and 1947. Occasional toning and small spots, some rust marks from paperclips, very good condition.

[ref: 120768]





Manhattan Project scientist against nuclear weapons

20. BROWN, Harrison.

Must Destruction Be Our Destiny? A scientist speaks as a citizen.

New York, Simon and Schuster, 1946.

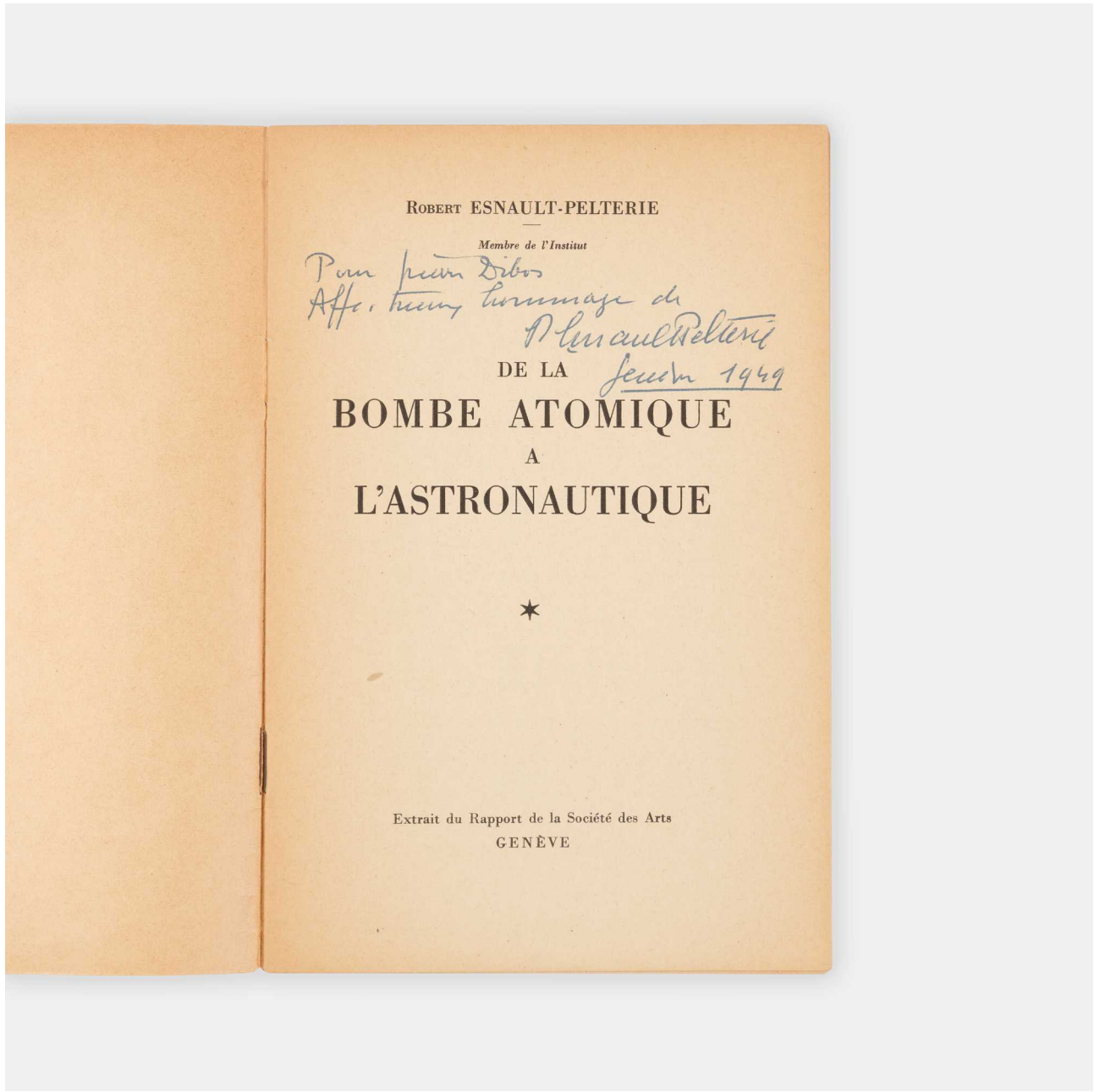
£600

First edition, first printing, presentation copy inscribed by the author on the front free endpaper, 'To Bob - my first boss and by far my best one. Sincerely, Harrison'. The identity of the recipient is unclear.

Nuclear chemist Harrison Brown (1917-1986) was one of the pioneers of the isolation of gaseous uranium and plutonium compounds. The techniques he developed were used during the Manhattan Project to produce nuclear material for the cores of fission bombs. But Brown opposed the deployment of atomic weapons against civilians and signed an early petition asking that the bomb be demonstrated before it was used in Japan. After the war he remained a strong advocate for limiting nuclear weapons, and gave 102 lectures on the topic within three months of the publication of this book (Atomic Heritage Foundation biography).

First edition, first printing, inscribed presentation copy; 8vo; contents faintly toned, partial tanning to endpapers; original black cloth, titles to spine and upper board gilt, top edge dyed red, cloth lightly rubbed at the tips, an excellent copy in the rubbed jacket with some small chips and toned lower panel; 158pp.

[ref: 122779]



Atomic space travel

21. ESNAULT-PELTERIE, Robert.
De la Bombe Atomique a l'Astronautique.
Genève [Geneva], Société des Arts, 1946.

£500

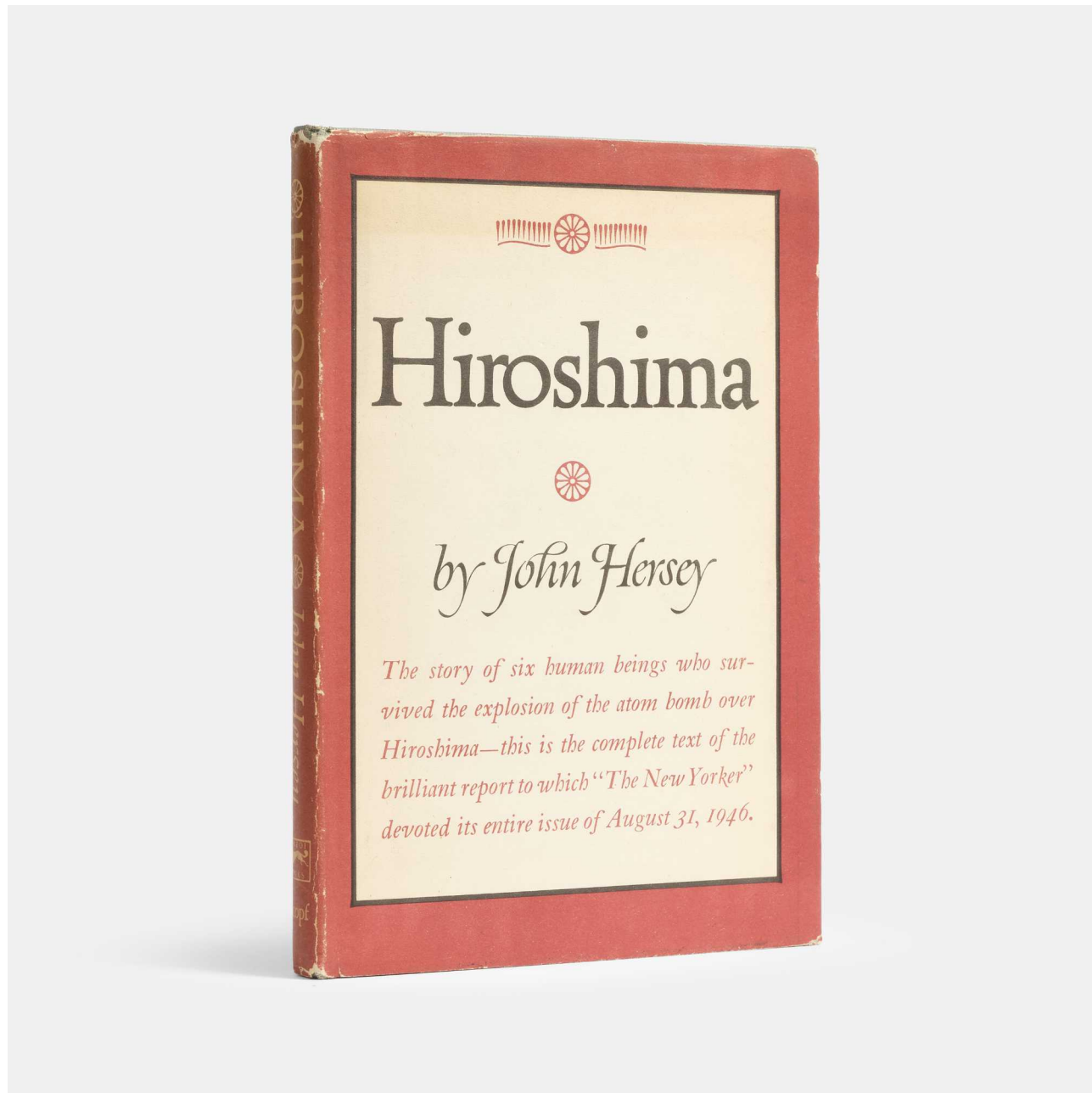
First edition of this rare pamphlet, presentation copy inscribed by the author on the title page, ‘Pour Pierre Dibos, Affectueux hommage de R. Esnault-Pelterie, Juillet 1949’. With a few small corrections to the text in the author’s hand.

French aircraft designer Robert Esnault-Pelterie (1881-1957) was responsible for the Vickers R.E.P. Type Monoplane and a number of advances in engines and flight control systems. A leader in the rocketry movement, by 1913 he had already proposed nuclear powered interplanetary travel. ‘In 1930, he published a book, *L’Astronautique*, which essentially recognized all the problems faced by designers of rockets and most of the possible solutions - the book not only defined the field, but the book’s title gave it a name: astronautics’ (Ashworth, Scientists of the Day, Linda Hall Library, November 17, 2007).

The present talk was given at the Société des arts de Genève on November 29, 1946, and in it Esnault-Pelterie returns to the idea of nuclear-powered space flight, discussing problems such as temperature control and reaction moderation, and proposing voyages to Venus, Mars, and Mercury.

First edition; 14-page pamphlet, wire-stitched (21 x 14 cm); a few ink corrections in the text, contents tanned; original buff wrappers printed in black, wrappers tanned, very good condition.

[ref: 116691]



With original letter

22. HERSEY, John.
Hiroshima.
New York, Alfred A. Knopf, 1946.

£2750

First book edition, first printing, originally published in *The New Yorker* in the same year. Loosely inserted is an autograph letter signed from Hersey: 'Dear Fred Fussell: I'm glad you alert your students to the hazards of nuclear war, and I hope that, beyond their understanding the precautions they might take, it may arm some of them to act as citizens to try to make sure we never have such a war. Sincerely, John Hersey. July 27, '80'.

Hiroshima was one of the most significant pieces of journalism to emerge from the Second World War, and one of the first examples of the 'New Journalism'. Reporting from Hiroshima and Nagasaki was heavily managed by the US government, and most Americans and Europeans had little understanding of the effects of the atomic bombs. *The New Yorker* therefore commissioned war correspondent John Hersey (1914-1993) to travel to Japan - still difficult under military occupation - and interview survivors. 'He stayed for just three weeks, wrote nothing on-site and didn't submit anything to MacArthur's office as he should have done, instead smuggling his notes back home in June' (Hersey, John Hersey's *Hiroshima* is Still Essential Reading, *Esquire*, April 2021).

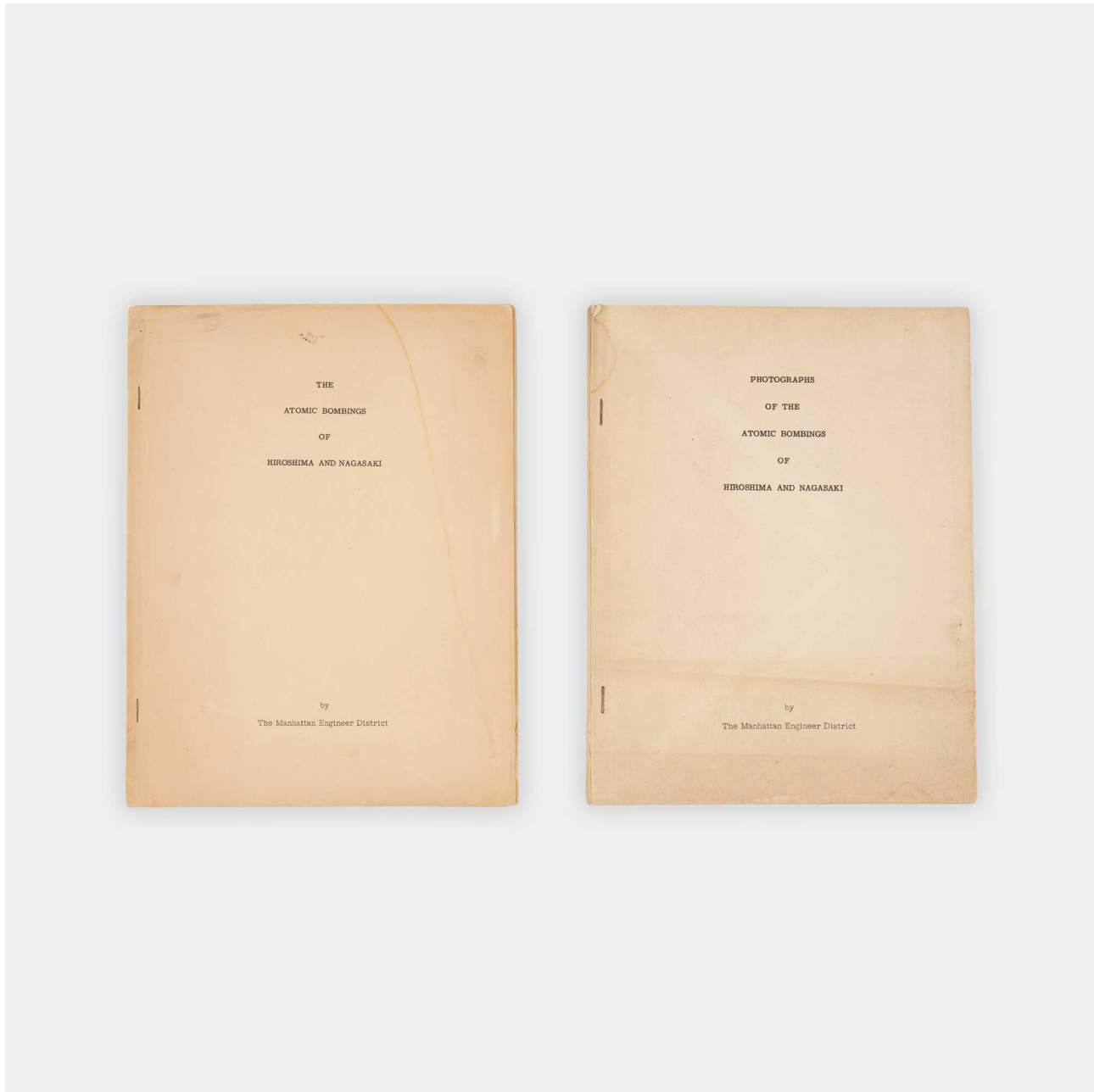
The stories of six individuals were chosen for the piece, and readers were not spared the horrifying details. This was the first time that victims had spoken for themselves in the international press, and Hersey's 'reporting was so meticulous, his sentences and paragraphs were so clear, calm and restrained, that the horror of the story he had to tell came through all the more chillingly' (Hertzberg, *New Yorker* obituary, March 1993).

'The impact of this *New Yorker* was extraordinary. The edition sold out 300,000 copies within hours of

publication, inspiring a storm of commentary across the US, and abroad... Albert Einstein, an outspoken opponent of the bomb, who tried to buy a thousand copies of *The New Yorker* to send to fellow scientists, had to settle for a facsimile version' (McCrum, 'The 100 best Non-Fiction Books', no 34, the *Guardian*, September 2016). The present book edition was first published two months later by Alfred A. Knopf, and has never been out of print.

First edition, with autograph letter from the author loosely inserted; 8vo; light ink stamp of Central Book Shop, Mexico City to the rear free endpaper, contents very faintly toned; original grey-blue cloth, titles to spine gilt and to upper board in blind, spine slightly toned, cloth lightly rubbed at extremities, a very good copy in the jacket with toning of the spine panel and edges, a few tiny chips, and some rubbing at the extremities; 118pp.

[ref: 118777]



One of the earliest scientific reports

23. [MANHATTAN PROJECT]. Manhattan Engineer District. The Atomic Bombings of Hiroshima and Nagasaki [and] Photographs of the Atomic Bombings of Hiroshima and Nagasaki. [Los Alamos, NV], Manhattan Engineer District, [June 29, 1946].

£5700

The rare first edition of one of the first scientific reports on the atomic bombings of Hiroshima and Nagasaki, produced in the immediate aftermath by representatives of the Manhattan Project. The complete set, comprising both the text and photographic volumes. Preceded only by the US Strategic Bombing Survey's report published ten days earlier on June 19th.

The Special Manhattan Engineer District Investigating Group - three teams of scientists, medical doctors, and radiation experts led by Leslie Groves's deputy, General Thomas Farrell - arrived in Tokyo on September 1st, 1945. Joined by members of the International Red Cross, Army Medical Corps, and General Douglas MacArthur's staff, they made radiation measurements, surveyed infrastructure damage, categorised injuries, and took numerous photographs.

'Significantly, the report concluded that the cities did not possess harmful levels of persistent radioactivity after the explosions' and they 'also noted the observed psychological effects on survivors and demonstrated this feeling of terror by including an eye-witness account in the appendix' ('Surveys of Hiroshima and Nagasaki', The Atomic Heritage Foundation, June 2, 2017).

First edition. First volume a 24-leaf booklet, wire-stitched (26.5 x 20 cm); 2 folding maps, second map with a short tear at the lower gutter; original cream wrappers printed in black, thin streak and some scuffs to the upper cover, two small, closed chips to the upper cover, wrappers toned, a very good copy.

Second volume a 101-leaf booklet, wire-stitched (26 x 19 cm); 2 folding maps, diagram, 98 illustrations from photographs (1 per page, plus a duplicate of number 57), small tear in map 1 without loss, minor misfolding of map 2, a little uneven toning of the contents; original buff wrappers printed in black, partial toning of the upper cover, lightly rubbed, some dulling and small spots, very good condition.

[ref: 122495]



Figure 51

The Nagasaki Medical School and Hospital, from 0.4 to 0.55 mile southeast of X. This view shows one of the court yards, and several of the buildings of modern construction. The first building on the left (far end - second story) was hit by a bomb eight days before the atomic bomb hit Nagasaki.

losions.
collapse of buildings, flying debris, etc.
blast pressure, i.e., straight compression
instantaneous emission of gamma rays and

percentages of casualties to each of the
time were injured by more than one effect
tain that the greater part of the casual-
tical injuries. Col. Warren, one of
ed it is probable that 7 per cent or less
radiation disease.

encing the occurrence of casualties was
from the center of explosion.

a selected group of 900 patients initiated
out as 14,000 feet at Nagasaki and 12,000

able greater distance from X than any
injuries farther out than radiation effects.

son was injured by radioactivity who was
the bombs. No injuries resulted from

BURNS

These are generally differentiated as
burn.

burn as reported by the Japanese, and
not unusual.

distinctive features. Marked redness of
t immediately, according to the Japanese,
aking place over a period of a few hours.
inactive feature of these burns was their
facing the center of the explosion. They
ng in a direction at right angles to the
on, and whose arms were swinging, right
arm nearest the center and on the inside

protected the skin against flash burns,
occasionally more, layers of clothing did
such cases, it was not unusual to find
its clothing, on the same patient.

Flash burns also tended to involve areas where the clothes were tightly drawn
over the skin, such as at the elbows and shoulders.

The Japanese report the incidence of burns in patients surviving more
than a few hours after the explosion, and seeking medical attention, as high
as 95%. The total mortalities due to burns alone cannot be estimated with any
degree of accuracy. As mentioned already, it is believed that the majority of
all the deaths occurred immediately. Of these, the Japanese estimate that 75%
and most of the reports estimate that over 50% of the deaths were due to
burns.

In general, the incidence of burns was in direct proportion to the dis-
tance from X. However, certain irregularities in this relationship result in
the medical studies because of variations in the amount of shielding from
flash burn, and because of the lack of complete data on persons killed out-
right close to X.

The maximum distance from X at which flash burns were observed is of
paramount interest. It has been estimated that patients with burns at
Hiroshima were all less than 7,500 feet from the center of the explosion at
the time of the bombing. At Nagasaki, patients with burns were observed out
to the remarkable distance of 15,800 feet.

MECHANICAL INJURIES

The mechanical injuries included fractures, lacerations, contusions,
abrasions, and other effects to be expected from falling roofs, crumbling
walls, flying debris and glass, and other indirect blast effects. The ap-
pearance of these various types of mechanical injuries was not remarkable to
the medical authorities who studied them.

It was estimated that patients with lacerations at Hiroshima were less
than 10,600 feet from X, whereas at Nagasaki they extended as far as 12,200
feet.

The tremendous drag of wind, even as far as 1 mile from X, must have re-
sulted in many injuries and deaths. Some large pieces of a prison wall, for
example, were flung 80 feet, and many have gone 30 feet high before falling.
The same fate must have befallen many persons, and the chances of a human
being surviving such treatment are probably small.

BLAST INJURIES

No estimate of the number of deaths or early symptoms due to blast
pressure can be made. The pressures developed on the ground under the ex-
plosions were not sufficient to kill more than those people very near the
center of damage (within a few hundred feet at most). Very few cases of
ruptured ear drums were noted, and it is the general feeling of the medical
authorities that the direct blast effects were not great. Many of the
Japanese reports, which are believed to be false, describe immediate effects
such as ruptured abdomens with protruding intestines and protruding eyes, but
no such results were actually traced to the effect of air pressure alone.



Figure 33

Bridge 0.6 mile southwest of X in Hiroshima. This view shows asphalt pavement darkened by flash burns, except where shielded by bridge posts or railing. The soldier is pointing toward X.



Rare

24. SEABORG, Glenn, et al.

An Introduction to Nuclear Chemistry. Lecture series, May 19 to July 16, 1942. Notes by C.D. Coryell. Index by R.A. James. This document consists of 48 pages. Date declassified: December 19, 1946. United States Atomic Energy Division MDDC-763. Oak Ridge, TN, Technical Information Division, Oak Ridge Directed Operations, 1946.

£4500

A rare US Atomic Energy Division lecture series originally presented to Manhattan Project participants in 1942, headed by Nobel Laureate Glenn Seaborg (1912-1999). Worldcat locates only eleven copies.

Seaborg was the discoverer of ten transuranic elements, those with an atomic number greater than 92. During the Second World War he worked with Enrico Fermi in the Metallurgical Laboratory at the University of Chicago, where he investigated the chemistry of plutonium.

‘In February 1941, Seaborg and his colleagues produced plutonium-239 through the bombardment of uranium. This experimental achievement proved to be a major contribution in physicists’ understanding of atomic fission. On March 28, 1941, Seaborg, physicist Emilio Segre and Berkeley chemist Joseph W. Kennedy were able to demonstrate that plutonium underwent fission with slow neutrons, an important distinction that was crucial to the decisions made in directing Manhattan Project research. Seaborg also helped to develop the extraction process used to isolate the plutonium fuel for the “Fat Man” bomb’ (Atomic Heritage Foundation biography).

48-page booklet, wire-stitched; diagrams within the text, contents a little toned; original white wrappers, slightly rubbed and toned, spine tanned, excellent condition.

[ref: 122721]

AN INTRODUCTION TO NUCLEAR CHEMISTRY LECTURE SERIES

Lecture I. (First Meeting, May 19, 1942)

By G. T. Seaborg
Notes by C. D. Coryell

Nuclear chemistry embraces the study of nuclear reactions and the study of the methods of radiochemistry. Attention is given to methods of production and of detection and to the techniques of handling small amounts of radioactive material.

Recommended books and articles with brief comments are:

- 1) Hevesy and Paneth, Manual of Radioactivity, 2nd ed., 1938. Detailed experimental treatment; classical and some artificial radioactivity.
- 2) Hahn, Applied Radiochemistry, 1936. Entirely classical, artificial techniques barely mentioned.
- 3) Rasetti, Elements of Nuclear Physics, 1936. Best elementary book, good on artificial radioactivity, almost ahead of time.
- 4) Lind, Chemical effects of Alpha Particles and Electrons, 1928. Early material.
- 5) Rutherford, Chadwick, and Ellis, Radiations from Radioactive Substances, 1930. Excellent classical handbook.
- 6) Feather, An Introduction to Nuclear Physics, 1936.
- 7) Gamow, Structure of Atomic Nuclei and Nuclear Transformations, 1938. Quite advanced.
- 8) Bethe, articles on Nuclear Physics in Rev. Mod. Physics: (a) Stationary states of the nuclei, 8:82-229 (1936); (b) Nuclear dynamics, theoretical, 9:69-244 (1937); (c) Nuclear dynamics, experimental, 9:245-390 (1937). Part chemical.
- 9) Seaborg, Artificial radioactivity, Chem. Rev. 27:199-285 (1940). Includes complete table of natural isotopes and of all artificial isotopes recorded to Aug. 1940.
- 10) Conference on applied nuclear physics, J. App. Phys. 12:259 (1941). Specialized research papers.
- 11) Nuclear fission: (a) Bohr and Wheeler, Phys. Rev. 56:420 (1939). Mechanism; (b) Turner, Rev. Mod. Phys. 12:1 (1940). Review with complete literature coverage to Dec. 6, 1939.
- 12) Theory of compound nucleus, (Bohr): (a) Science 86:161 (1937); (b) Nature 137:344, 351 (1936).
- 13) Theory of nuclear reactions: Morrison, Amer. J. Phys. 9:135 (1940).

in Radioactive Substances, MacMillan, 1930.

(1925).

(1927).

(1929) (1937).

A139:638 (1933).

Phys. Soc. (Lond.) 50:185 (1938).

1938).

rev. 48:7 (1935).

London Press, 1936.

(i); (b) Phys. Zeit. 38:836 (1937).

Rosen, Phys. Rev. 51:391 (1937).

Alta, ibid., 59:688 (A) (1941).

periment, Van Nostrand, 1935.

1931).

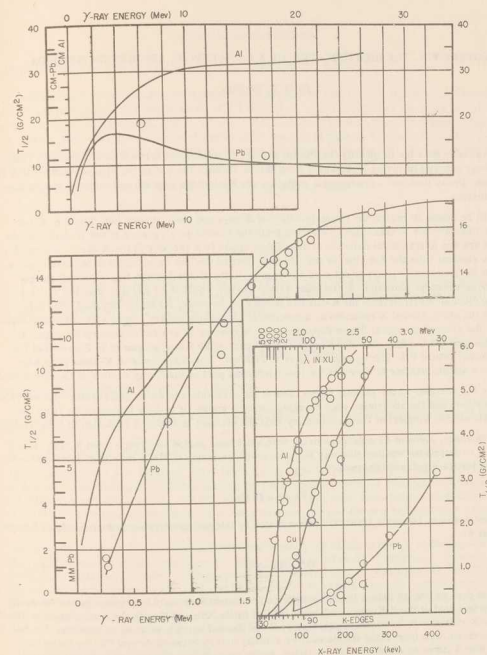
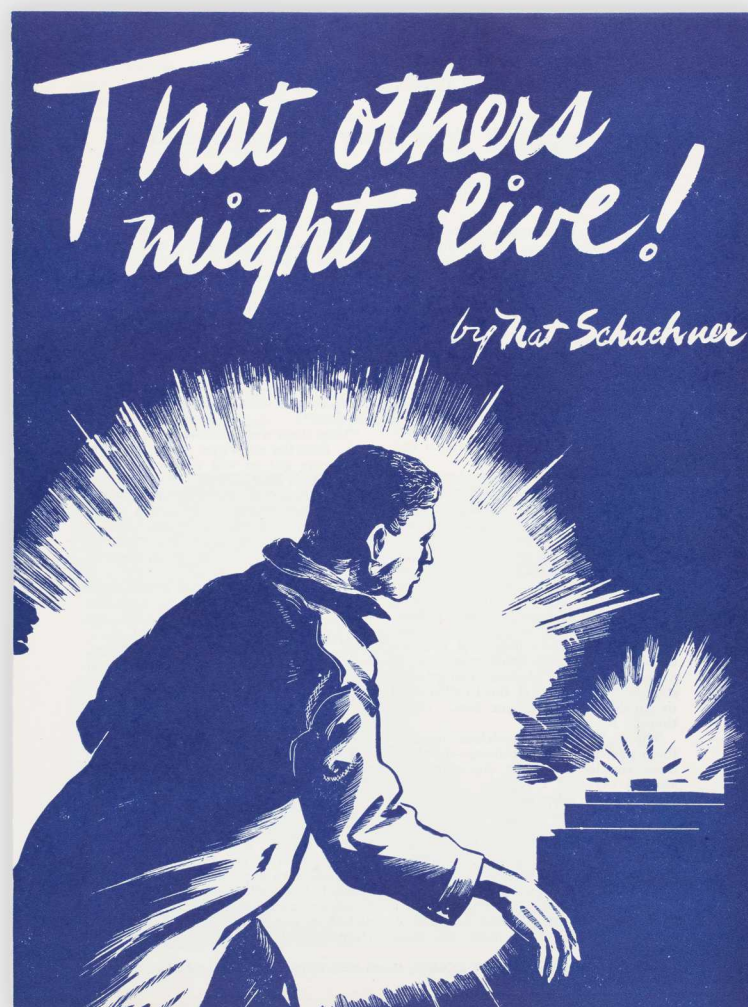


Figure B. Half-thickness values for γ rays and X rays.



25. [SLOTIN, Louis]; SCHACHNER, Nat.
That Others Might Live!
New York, Community Relations Service, [circa 1947].

£250

A rare pamphlet telling the story of physicist Louis Slotin (1910-1946), who saved the lives of his colleagues during a nuclear accident at Los Alamos. Published by the Community Relations Service of the US Department of Justice and reprinted from Real Life Comics, though presented in textual rather than comic book format. OCLC locates no copies of this standalone format.

Slotin was a Canadian physicist who participated in the Manhattan Project and continued doing nuclear criticality research at Los Alamos when the war ended. These experiments were performed by hand in an extremely dangerous process that Richard Feynman called 'tickling the tail of a sleeping dragon'. Slotin was known for his bravado and lack of attention to safety protocols. In March of 1946 the screwdriver he was using in an experiment slipped, and a chain reaction was initiated. Slotin's quick reaction likely saved the seven others in the room, but he had already received a fatal dose of radiation and died ten days later.

This pamphlet on the event was published by the Community Relations Service, an office of the US Justice Department that was created by the 1964 Civil Rights Act to prevent 'community conflicts' arising from racial and religious tension. As Slotin was Jewish, this publication was likely designed to counter antisemitism. In line with the government's public statements after the accident, Slotin is hailed as a hero, and the event is described in a way that elides his responsibility. The pamphlet's author, Nat Schachner (1895-1955), was a prominent author of science fiction and historical non-fiction for pulp magazines, and a founder of the American Interplanetary Society.

Single sheet, folded once (23.5 x 17.7), printed in blue ink on white, illustration on the cover and one in the interior, fine condition.

[ref: 122720]



Seminars by Nobel Prize winners

26. [BERKELEY RADIATION LABORATORY].

ALVAREZ, Luis; SEGRÉ, Emilio, et al.

Mimeographed Experimental Physics 290(f) Lectures.
Berkeley, CA, University of California at Berkeley,
[circa 1950].

£5000

A rare set of mimeographed lecture notes from an experimental physics course connected with Berkeley's Radiation Laboratory, with chapters by three Nobel Prize winners. Mimeographed lecture notes of this kind were made by students for themselves and their colleagues, and exist in very small numbers. We have located only two auction records for this title.

Berkeley's '290' physics courses are 'graduate level courses that feature a weekly seminar on physics topics... many of which are open to the public', generally meaning the research community (Berkeley website). The present lectures are all labelled '290(f)', what was then a course in experimental physics connected with the Berkeley Radiation Laboratory. Now known as the Lawrence Berkeley National Laboratory, this research centre was established in 1931 by Ernest Lawrence and centred around his development of the cyclotron, a new and more powerful type of particle accelerator for which he was awarded the Nobel Prize. The laboratory has remained a leader in physics research up to the present day, and was responsible for numerous twentieth century breakthroughs, including electronic enrichment of uranium for the Manhattan Project, the discovery of the transuranic elements and the anti-proton, and measurement of the cosmic microwave background radiation.

Taking place around 1950 (none of the reference sources listed in the text have publication dates past 1949), the present course begins with relatively basic concepts in electrical engineering and proceeds to linear accelerators, the cyclotron, and beta ray spectrographs. Of the fourteen lectures, three were presented by Nobel Prize winners:

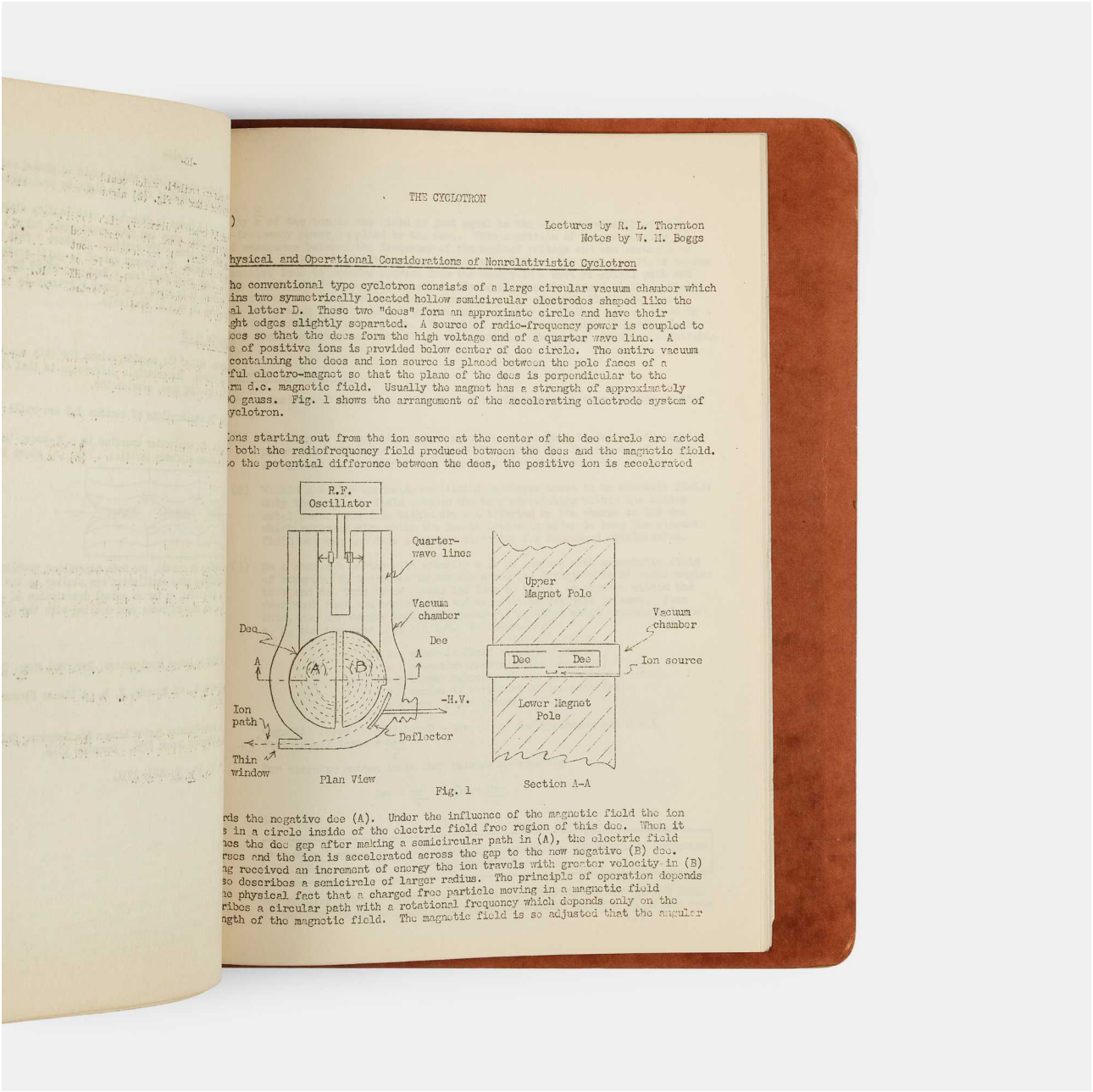
Chapter 7, Ionization: Emilio Segré (1905-1989).

Chapter 10, General Accelerator Considerations: Edwin McMillan (1907-1991).

Chapter 12, Linear Accelerators: Louis Alvarez (1911-1988).

14 mimeographed typescript lectures on 144 leaves, rectos only; diagrams throughout the text, some pencilled notes, contents a little toned; brown pressboard binder, housed in a custom brown cloth folding case, later manuscript title to upper cover, some sticker residue, edges a little rubbed, corners bumped, very good condition.

[ref: 115600]

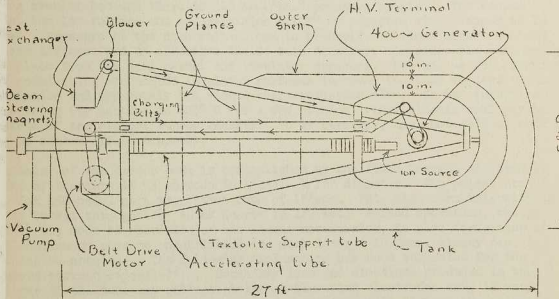


a much larger destructive spark elsewhere!

showers are prevented along the hexaped legs by rings of 1/2" dural rod fitted both inside and outside the Textolite tubing and lying in the plane loop to which they are electrically connected.

ally, there is the matter of the potential gradient between the high voltage and tank. As with any concentric geometry, the gradient is greatest at the conductor. Following the method first used at Wisconsin, an intermediate shell surrounds the high voltage electrode and divides the 20-inch gap into two smaller 10 inch intervals. This shell is supported from the one end where it is fastened at a point half way down. Here it is also electrically connected to the mid- or 2 Mev-point of the corona gap voltage divider system. Provision was originally made for shells at 1 Mev and 3 Mev, respectively. They were not found necessary.

stored electrical energy in the UCRL generator is tremendous. The between outer shell and tank is 1100 μfd and between outer and inner shell



General Schematic of UCRL Machine

μfd. At 2 Mev each, there is around 3000 joules of energy stored - enough to bang!

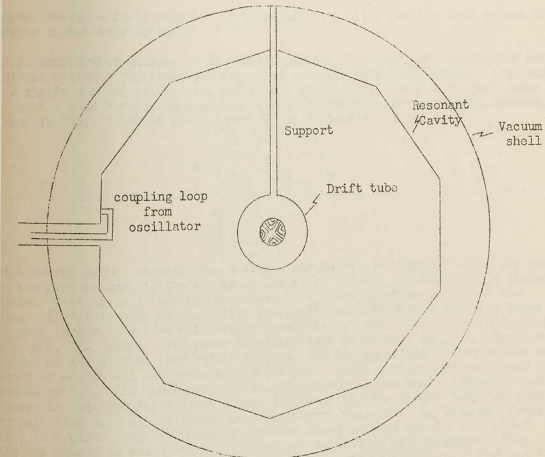
Accelerating Tube

The accelerating tubes used with electrostatic generators are descendants of the hot cathode high vacuum x-ray tube³. Cold emission at the cathode, bombardment of the glass tube walls which tended to puncture them, and are discharges brought about by bombardment of the anode placed a practical limit of 250,000 to 300,000 volts on his early tubes. By subdividing a tube into three sections and dividing the total potential difference equally between the sections and dividing the total potential difference equally between the sections and dividing the total potential difference equally between the sections, the use of a divider for equalizing potentials between sections, and the use of

enough to avoid this effect.

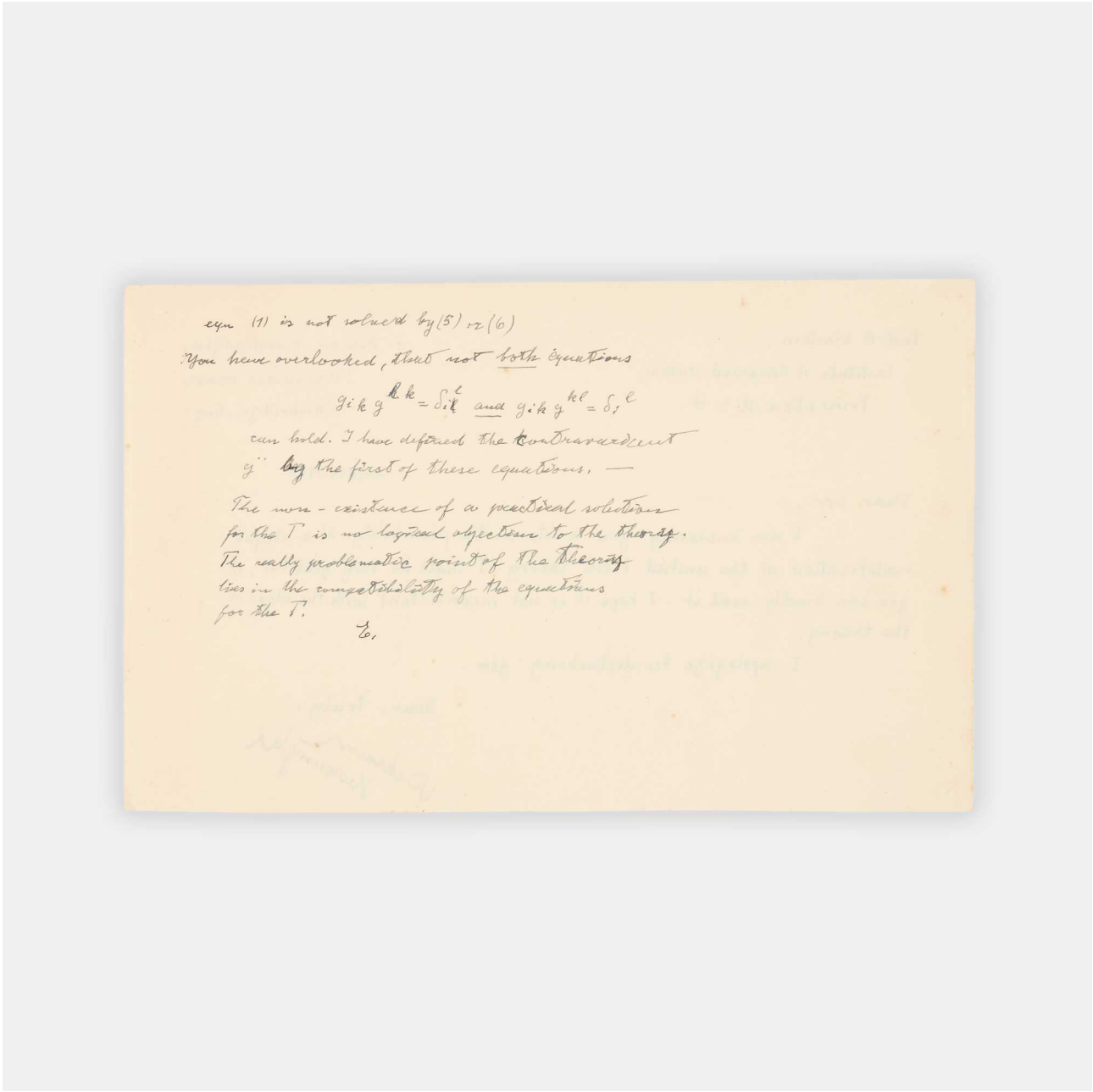
2.7 Power system. A pulse network providing a 5 megawatt 300 microsecond pulse was constructed in a more or less standard fashion. A smaller pulse for the triggers is triggered 100 microseconds before the main pulse. The triggers for the two pulsing operations above and for various monitoring devices are provided by a separate trigger supply. The power supplies have various interlocks for the safety of personnel and equipment.

2.8 Performance. A deflecting magnet is provided at the output to deflect the beam to any one of the 3 experimental setups. The current output is about 9 amperes, accounted for as follows: (a) injection current 50 microamperes; (b) space angle loss, 15; (c) focussing grid loss, 2.5; (d) effective duty cycle, 1. It is expected that the current can be increased by (1) ion source improvements; (2) focussing grid redesign; (3) bunching of the ion beam prior to entering the accelerator. This will speed up the particles due to arrive too late for the cycle and slow down the ones due to arrive too early for the acceleration cycle; improved duty cycle. About 85 percent of the beam will pass through a hole 1/8 inch in diameter; the beam has a divergence of about 10⁻³ radians. Below is a schematic cross section diagram of the cavity and drift tubes.



Electron Linear Accelerator at Stanford

3.1 General description. The accelerator is a wave guide loaded so that one of the waves has a phase velocity less than the velocity of light. It uses a



Einstein letter

27. EINSTEIN, Albert; KURŞUNOĞLU, Behram.

Initialled autograph letter correcting a young colleague's work.

Princeton, NJ, early December 1950.

£18,500

Initialled autograph letter by Albert Einstein correcting the work of a graduate student who would become a prominent member of the theoretical physics community.

Turkish physicist Behram Kurşunoğlu (1922-2003) studied in Edinburgh and completed his doctoral work at Cambridge under Paul Dirac during the late 1940s and early 1950s. He specialised in relativity and unified field theories, participated in the discovery of two neutrinos, and founded the Center for Theoretical Studies at the University of Miami.

In his initial letter to Einstein written on November 24th, 1950, Kurşunoğlu writes that he is ‘enclosing you a note on the possibility of a slight modification of the unified field theory. I shall be very grateful, if you can kindly read it. I hope it is not inconsistent with the ideas of the theory. I apologise for disturbing you’.

Einstein replies in detail on the verso of Kurşunoğlu’s letter, returning it and the accompanying manuscript (no longer together with the letter) with a covering note by his secretary Helen Dukas. Einstein writes,

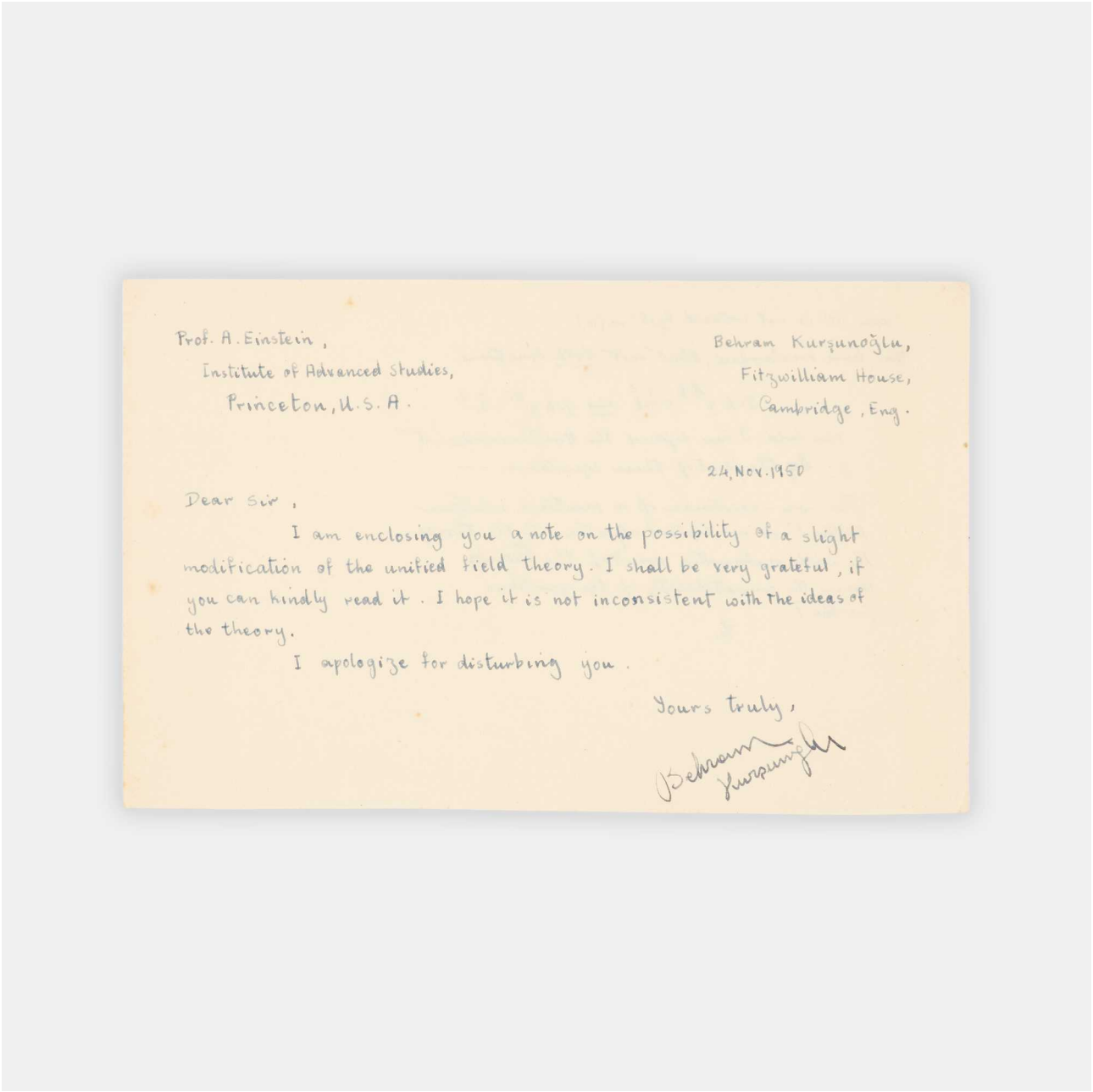
‘Equ (1) is not solved by (5) or (6). You have overlooked, that not both equations... can hold. I have defined the contravariant y by the first of these equations - The non-existence of a practical solution for the T is no logical objection to the theory. The really problematic point of the theory lies in the compatibility of the equations for the T. E.’

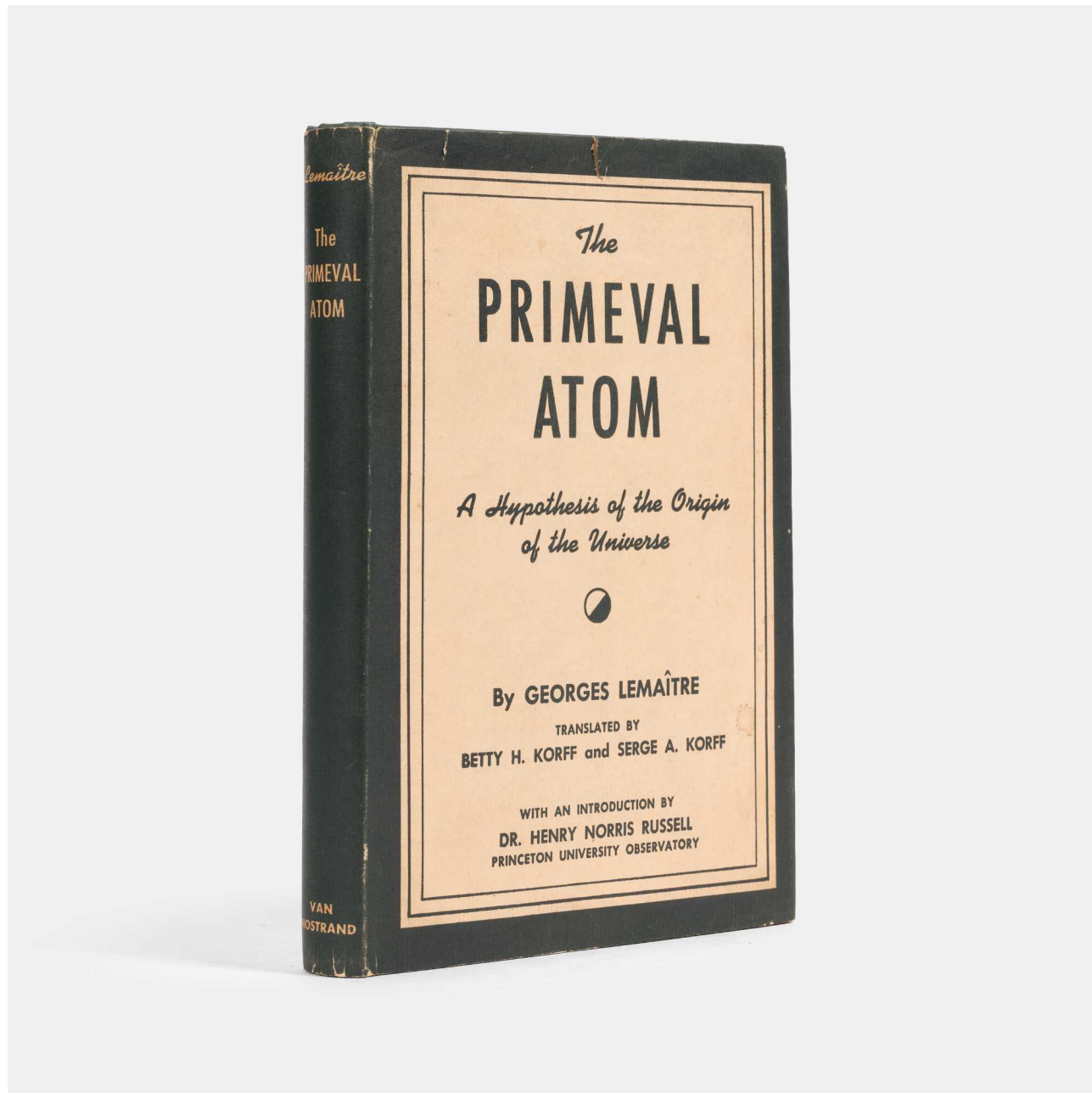
In 1952 Kurşunoğlu published a paper in the *Physical Review*, ‘Gravitation and Electrodynamics’, in which ‘Einstein’s unified field theory is modified, and some

of the physical implications of the new theory are examined' (*Physical Review* volume 88, number 1369, December 15th, 1952).

Ten-line autograph letter with initial on cream laid paper (14 x 22.5 cm), on the verso of an autograph letter by Behram Kurşunoğlu, together with a typed letter signed by Helen Dukas on Institute for Advanced Study stationery (16.5 x 14 cm) and a later letter from Dukas dated 1979; a few tiny spots, excellent condition.

[ref: 123093]





The big bang theory

28. LEMAÎTRE, Georges.

The Primeval Atom. An Essay on Cosmogony.

Translated by Betty H. and Serge A. Korff.

New York, D. Van Nostrand Company, Inc., 1950.

£1250

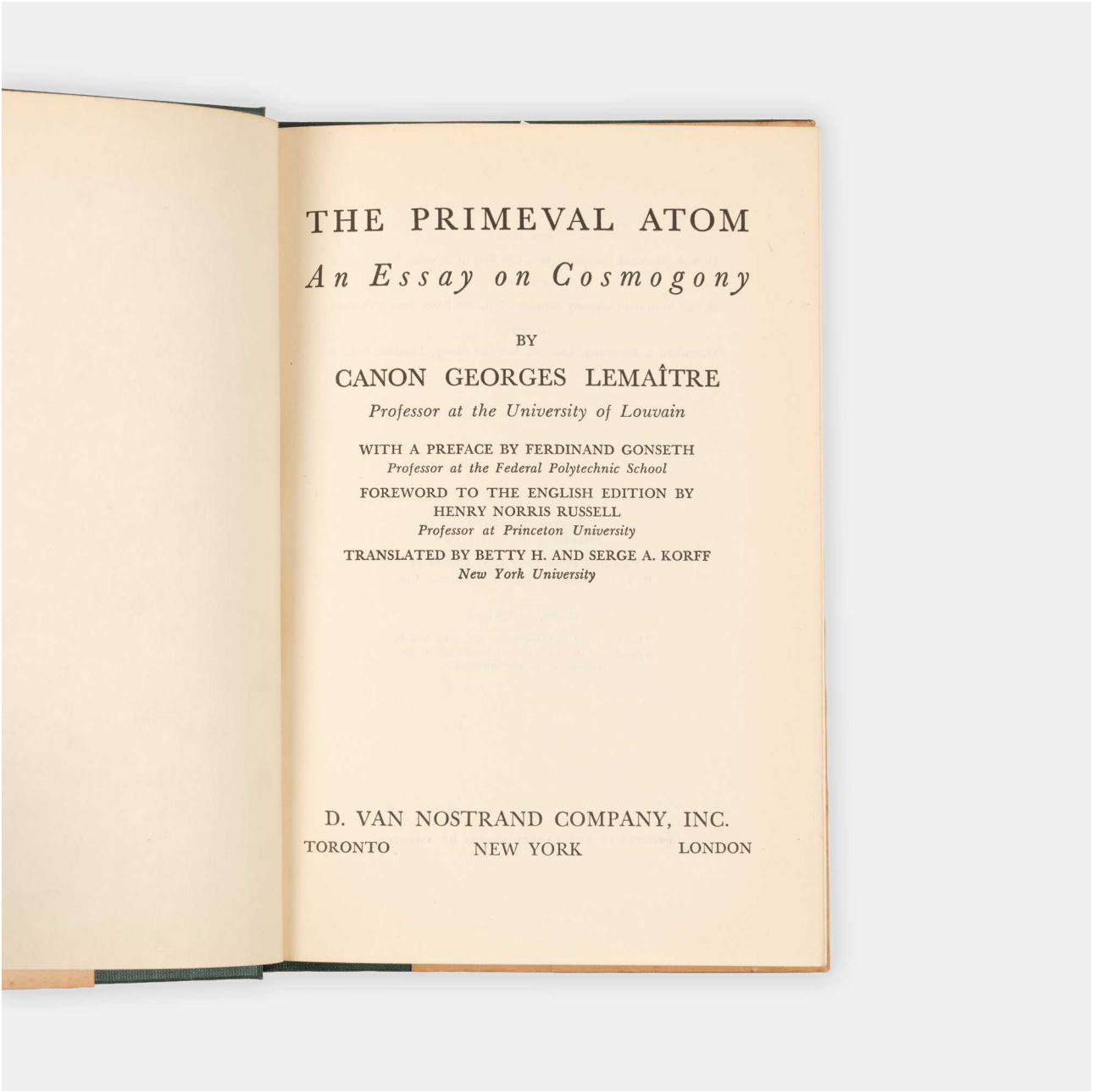
First English language edition, first impression, of Lemaître's popular book on what would become known as the Big Bang theory. First published as *L'Hypothèse de l'Atome Primitif* in the same year. A very attractive copy, uncommon in the dust jacket.

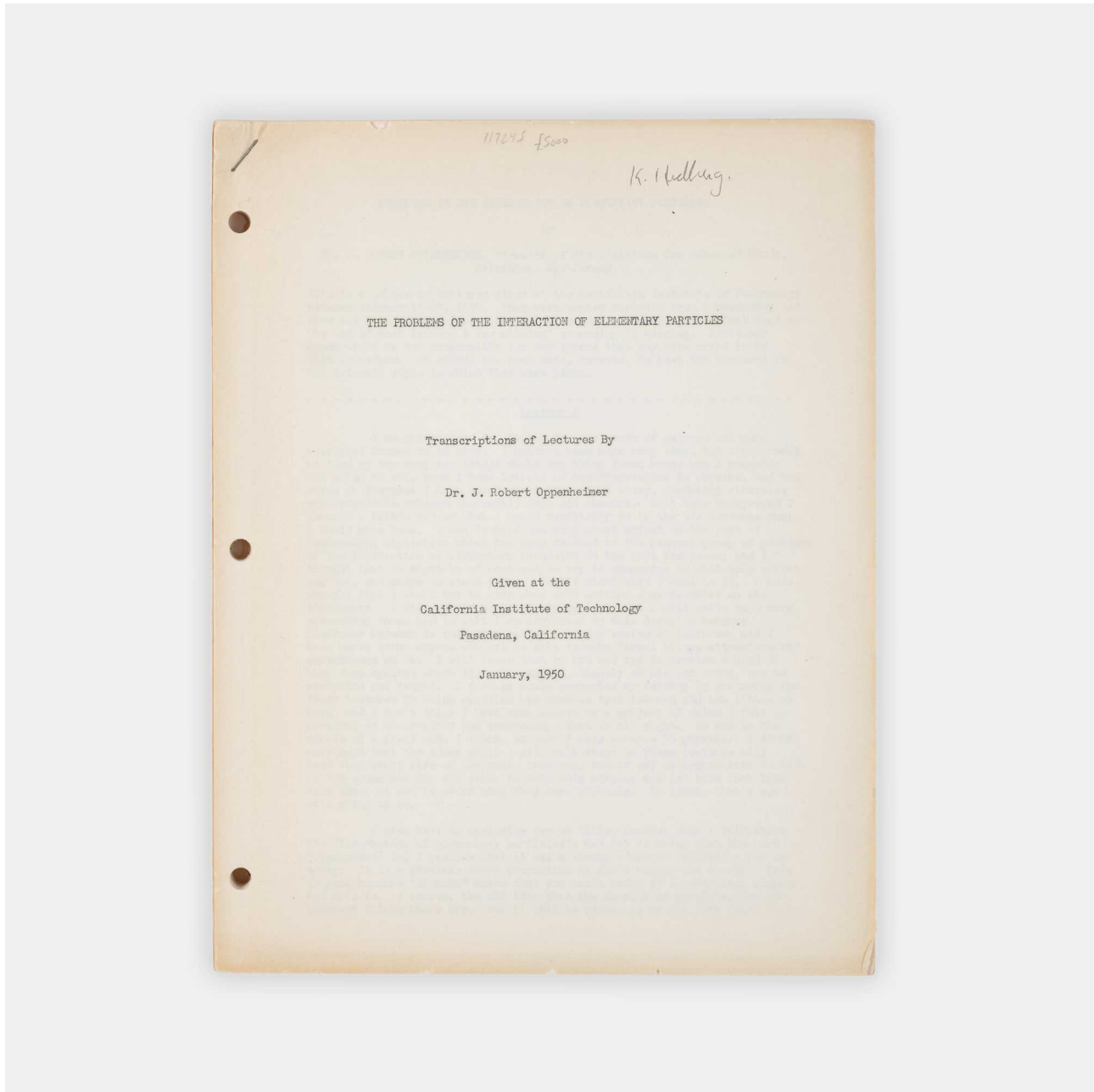
Georges Lemaître (1894-1966) was a Belgian Catholic priest who earned his PhD in physics at MIT in 1927 and worked with Arthur Eddington and Harlow Shapley. That same year he published a paper in the *Proceedings of the Scientific Society of Brussels* positing a solution to Einstein's equations of general relativity that predicted an expanding universe. Though the paper initially received little attention, Lemaître realised that his solution tallied with Edwin Hubble's new discoveries about galaxies, and in 1930 he and Eddington had an English translation published.

'Together with Hubble's observations, Lemaître's paper convinced the majority of astronomers that the universe was indeed expanding, and this revolutionized the study of cosmology. A year later, Lemaître explored the logical consequences of an expanding universe and boldly proposed that it must have originated at a finite point in time. If the universe is expanding, he reasoned, it was smaller in the past, and extrapolation back in time should lead to an epoch when all the matter in the universe was packed together in an extremely dense state. Appealing to the new quantum theory of matter, Lemaître argued that the physical universe was initially a single particle - the "primeval atom" as he called it - which disintegrated in an explosion, giving rise to space and time and the expansion of the universe that continues to this day. This idea marked the birth of what we now know as Big Bang cosmology' (Sothor & deGrasse Tyson, *Cosmic Horizons*, American Museum of Natural History).

First edition; 8vo; later pencilled note to the rear free endpaper, very light spotting to the edges of the text block, contents faintly toned; original green cloth, titles to spine in silver, spine a little rolled, cloth fresh, an excellent copy in the price-clipped, lightly rubbed, and toned jacket with a few small spots and nicks, and two very short closed tears; 186 pp.

[ref: 124848]





The midwife of QED

29. OPPENHEIMER, Robert.

The Problems of the Interaction of Elementary Particles. Transcriptions of lectures by Dr. J. Robert Oppenheimer. Given at the California Institute of Technology. Pasadena, CA, January, 1950.

£5000

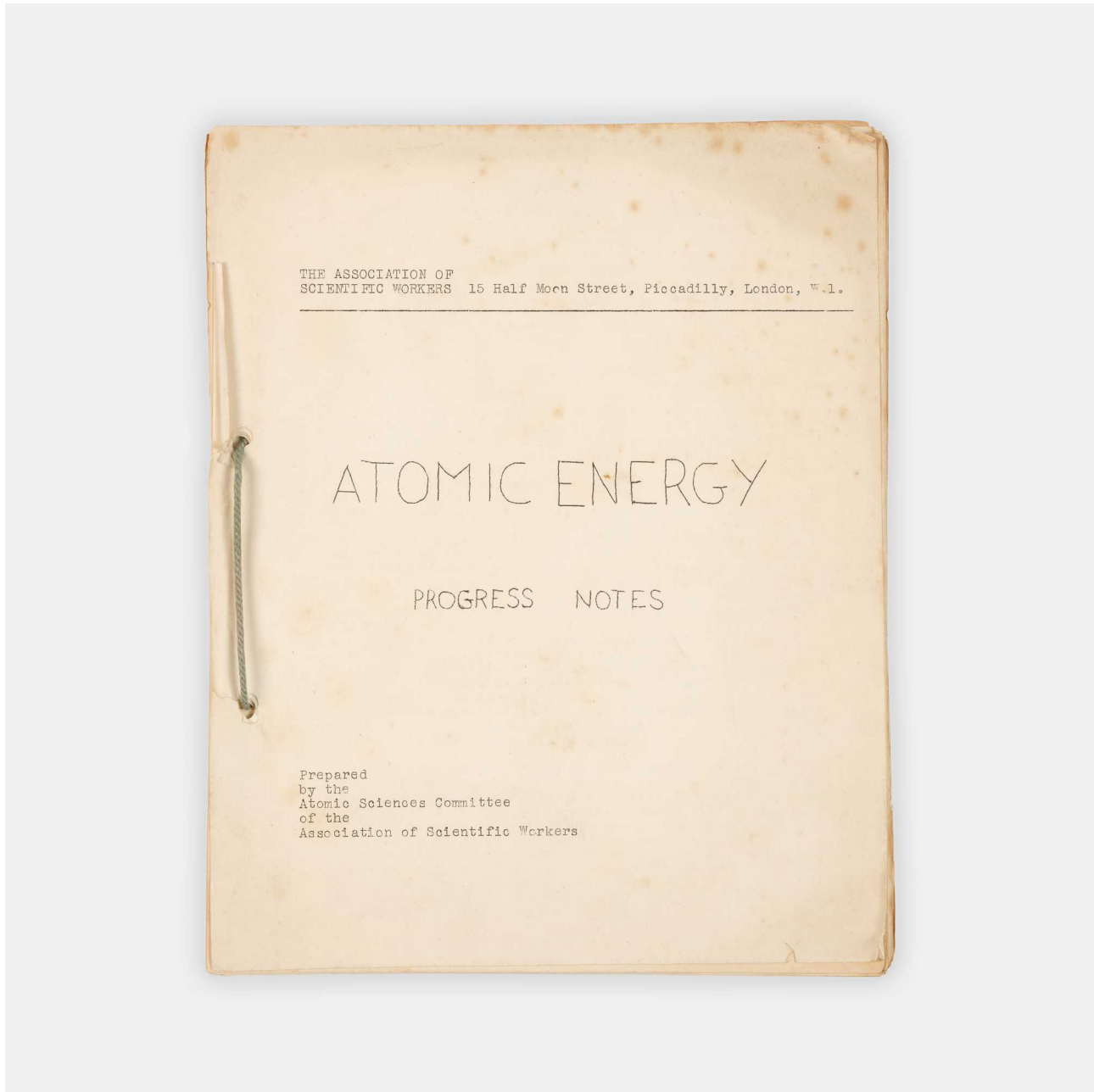
The rare, mimeographed text of Oppenheimer's precursor lectures to Richard Feynman's *Quantum Electrodynamics and Meson Theories*, presented at Caltech between January 16th and 27th, 1950. WorldCat locates only one institutional copy, at Caltech, and none appear in auction records.

Though best known for leading the Manhattan Project, Oppenheimer made important contributions to theoretical physics. He predicted the existence of the positron and served as 'midwife' to the Tomonaga-Schwinger-Feynman construction of quantum electrodynamics, the first theory to reconcile special relativity with quantum mechanics. The present talks were presented at the moment of QED's formalisation and the physics community's collective turn towards particle physics as the new frontier (Monk, *Inside the Center: The Life of J. Robert Oppenheimer*, p. 540).

As Oppenheimer explains in the first lecture, this course is relatively introductory and non-mathematical, in part because it will be followed immediately by a more technical series by Feynman, the important *Quantum Electrodynamics and Meson Theories* talks given in February and March the same year. Though both series were made available as mimeographs, Oppenheimer's is somewhat scarcer institutionally and within the trade than Feynman's.

86-page wire-stitched mimeographed text, rectos only, three punched holes, contemporary ownership signature on the title, faintly toned along the edges, final leaf detached, housed in a blue cloth folding case, very good condition.

[ref: 117245]



30. Atomic Sciences Committee, Association of Scientific Workers.

Atomic Energy Progress Notes. Volume II (Military). London, Association of Scientific Workers, July 1952.

£1250

A rare, mimeographed report on the effects of nuclear weapons produced by the Association of Scientific Workers, a British trade union, for members 'who have to speak, write about or in any way concern themselves with the subject'.

According to the introduction, the union aimed to publish three volumes on nuclear issues, the first on scientific and industrial concerns, the second on military uses, and the third on international control of weapons and substances, but 'to date, only vol. II is completed'. The contents provide detailed information about the different types of weapons, their uses and effects, and mitigation strategies. Included are thermonuclear devices and what are now known as 'dirty bombs', weapons that are not fissile but can spread radioactive substances.

It is likely that the Australian nuclear physicist Eric Burhop (1911-1980) was involved in the production of this document. Burhop was born and educated in Australia and completed his graduate training at Cambridge. He was 'one of the many Manhattan Project veterans who became troubled by the proliferation of increasingly powerful nuclear weapons. He became the Chairman of the Atomic Science Committee of the Association of Scientific Workers in an effort to speak out in favor of global disarmament after the war' (Atomic Heritage Foundation biography).

29-page mimeographed document, string bound (25 x 20 cm); short pencilled note to leaf M.4, a little spotting primarily to the early and late leaves, some creasing, upper leaves torn through one of the punch holes, very good condition.

[ref: 125591]

Sr-90(half-life 53d); Y-91 (57d); Zr-95 (65d); Gb-95 (35d); Ru-103 (42d); I-131 (8d); Ba-140 (13d); La-140 (40 hrs); Ce-141 (28d); Ce-144 (275d); P4-143 (14d); Nd-147 (11d).

Fission-products once disseminated would decay rapidly with a mean half-life of about 1 month. (29) Conclusion is that weapon is probably advantageous, but can only be employed on relatively limited scale.

Fusion (thermonuclear) bombs: The hydrogen bomb. Depend on nuclear reactions in which lightest nuclei fuse to give heavier ones with release of energy. One of, or combination of the following considered most probable (13, 21): -

He-2 + H-2 = He-3 + n + 4 Mev.
H-3 + H-2 = He-4 + n + 17.6 Mev.
H-3 + H-3 = He-4 + 2n + 11.4 Mev.

Half-life of H-3 is 12.1 yrs. Can be stockpiled. Theory developed during war. Realisation considered, in 1950, between possible and probable(25). Has also been suggested that, given same intensive effort as during war, USA could have made H-bomb within 2 years of end of war (23)

Differences from fission bombs: -

1. Reactions will not "go" at ordinary temperatures. Temperatures of millions of degrees are necessary, hence conventional fission bomb is used as fuse.
2. Does not depend on spontaneous neutron-emission.
3. For both these reasons there is no critical size or upper limit to power.

The Russian explosions: Stalin has confirmed that USSR is testing bombs (44). Very many non-factual reactions to the 1949 explosions are available (e.g.31). Use of rare fissile material for blasting would seem highly wasteful and thus unlikely.(32)

General effects: following applies to 1945-type bombs. (4,8,1,2,10). 5 main effects, as follows: -

Blast: nominally equivalent to 20,000 tons TNT; effectively 2,000 tons only. Due to waste of energy at centre producing "over-destruction". (4) This is maximum blast effect, achieved by detonation 2000 feet up. Either higher or lower would reduce effective power, though nominal power of course unaltered.(10)

Effect on property: ordinary brick buildings destroyed or severely damaged out to $\frac{1}{2}$ mile-radius from centre; steel-framed buildings to $\frac{3}{4}$ -mile; reinforced concrete to $\frac{1}{2}$ -mile. Direct effect on persons not important; indirect effect (through collapsing buildings) is a major cause of casualties.(1)

SECTION 2.

DETAILED PHYSICAL EFFECTS OF JAPANESE BOMBS.

Blast: differences from conventional picture due to large size of blast-wave and height of detonation. Whole buildings were pushed askew (mass-distortion) and, nearer centre, flat roofs were staved in (downward thrust).

Effect on buildings: (see also M.2) At Hiroshima, 55,000 out of 90,000 buildings rendered unusable and most of remainder damaged. Big factories on periphery were largely undamaged. At Nagasaki, 20,000 out of 57,000 houses were destroyed or badly damaged.

Smaller overall effect at Nagasaki due to partial screening by hills.(8) In both places, light damage occurred out to 8 miles, and in freak conditions, out to 50 miles (1)

Steel-framed single-storey factory buildings with saw-tooth roofs especially vulnerable. Machines in them, in absence of fire, did not suffer severely; many became unserviceable due to weathering. Combination of all factors destroyed 50% of machines at Nagasaki.(8)

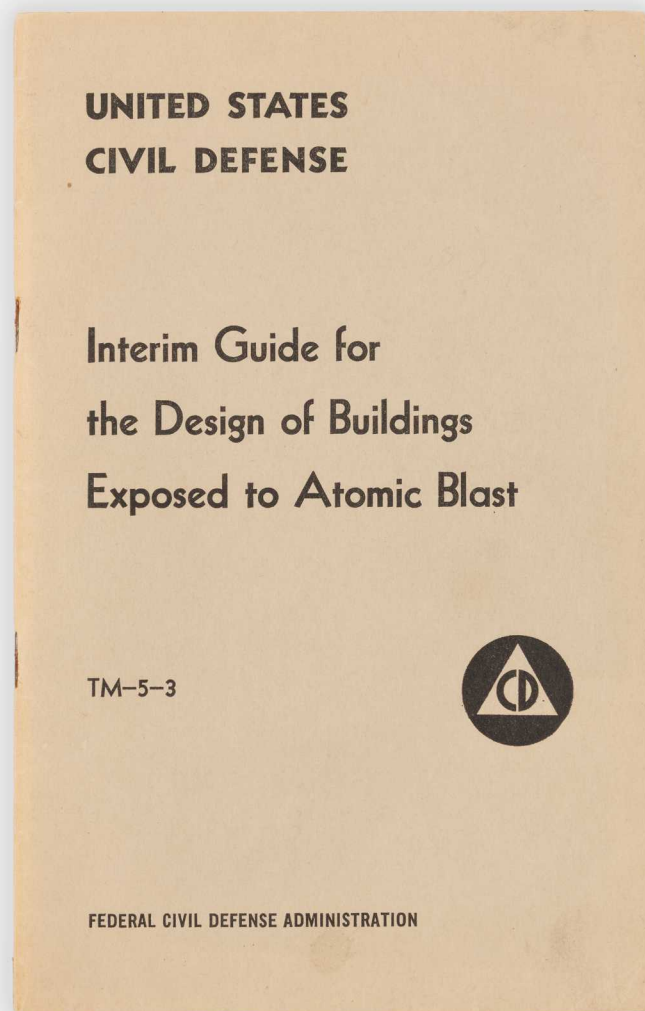
USSS considered that, at Nagasaki, steelworks could have resumed substantial production within 12 months; armament works within 15 months; electrical works, full capacity, 6 months; dockyard could have worked to 80% capacity within 3 months. (2) None of these were directly beneath centre of explosion, but most were in damaged area: steel works was $\frac{1}{2}$ -mile from centre; dockyard 2 miles, and scarcely damaged (8).

Effect on public services: city life brought to standstill through breakdown of communications, loss of records and numerous deaths of public servants (8). Water-mains badly damaged; underground electric conduits and gas-mains little affected, but gas-holders very vulnerable. Overhead utilities (e.g. telegraphs) severely damaged out to 2 miles. Rail-tracks resistant, though blocked by debris. (1,8,111) At Hiroshima, they ran again 2 days after (2). Bridges often displaced bodily.

At Hiroshima, 70% of fire-service destroyed and 80% of its personnel dead or immobilised(1). Clearance of debris and cremation of the dead did not begin for 1 month (8).

Fire-effects:(see also M.3) Duration of heatflash something over 3 seconds. Since heat-radiation travels in straight lines, shielding effects are seen: un-charred "shadows" of shielding objects found on charred surfaces behind.(8)

Heatflash is due to infra-red rather than ultra-violet outside most central zone (1).



31. Federal Civil Defense Administration.

Interim Guide for the Design of Buildings Exposed to Atomic Blast. TM-5-3.

Washington D.C. United States Government Printing Office, June 1952.

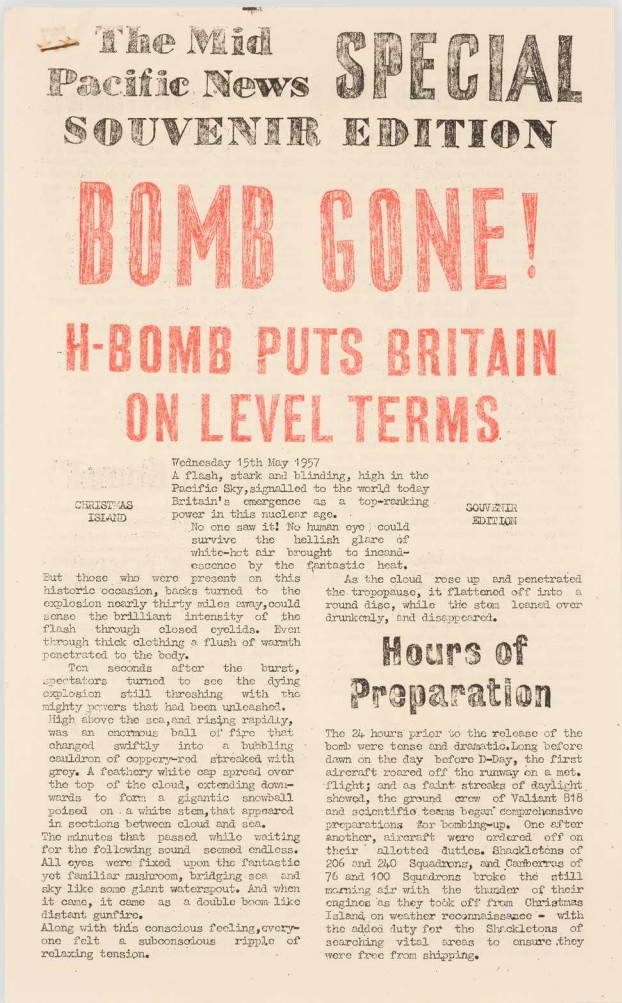
£100

First edition. A very attractive copy of this rare U.S. government technical guide.

Though America's first thermonuclear weapon had been detonated the year before, the information in this pamphlet - intended for architects and engineers - was largely based on the damage observed at Hiroshima and Nagasaki, and includes photos taken in the ruins of those cities.

First edition; 36-page booklet, wire-stitched (23 x 15 cm); illustrations and diagrams throughout, contents clean; original buff wrappers printed in black, spine and edges faded, lightly rubbed with a few faint marks, excellent condition.

[ref: 120149]



32. Mid Pacific News.
Bomb Gone. H-Bomb Puts Britain on Level Terms.
Special Souvenir Edition.
Christmas Island, Royal Army Educational Corps, May
15, 1957.

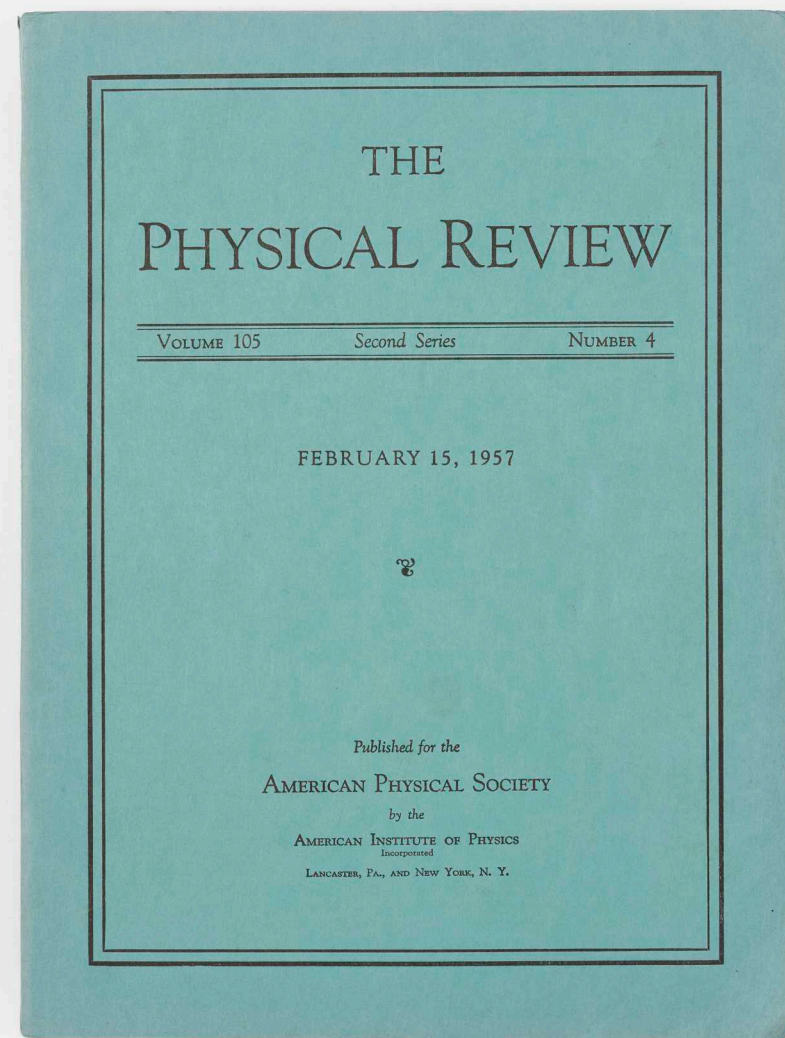
£500

A rare newsletter celebrating the supposed
detonation of Britain's first hydrogen bomb as part of
Operation Grapple in the Christmas Islands during
1957. The text describes the preparation, the event
itself, and the Valiant XD 818 used to drop the bomb.
Task Force Commander Air Vice Marshall W.E. Oulton
and Scientific Director W.R.J. Cook are profiled.

'In May-June 1957, the first three Grapple tests were
held at Malden Island, codenamed Grapple 1 (Short
Granite), Grapple 2 (Orange Herald), and Grapple 3
(Purple Granite). The nuclear devices were detonated
high over the ocean after being dropped from a
Valiant bomber. After the three tests, the British
Government (falsely) stated that it had achieved a
thermonuclear explosion in the megaton range. The
MidPacific News - a newsletter produced for staff and
troops on Christmas Island - reported: 'Bomb Gone!
H-Bomb puts Britain on level terms' (Maclellan,
*Grappling with the Bomb: Britain's Pacific H-Bomb
Tests*, p. 2, 2017). It was quickly determined that none
of the detonations had actually reached 1 megaton,
but Grapple X in November of the following year
achieved this.

2-leaf mimeographed broadside, wire-stitched (33.5 x
20.5 cm), text printed in red and black, slight rusting
from the staple, excellent condition.

[ref: 121987]



The great experimentalist of her generation

33. WU, C.S. [Chien-Shiung].

Experimental Test of Parity Conservation in Beta Decay [in] The Physical Review Second Series, volume 105, number 4, pp. 1413-1414.

Lancaster, PA & New York, for the American Physical Society by the American Institute of Physics, February 15, 1957.

£2750

First edition, journal issue, of one of the most important experiments in the history of science, which upended the laws of physics by proving that objects and their mirror images do not always behave the same way.

Chien-Shiung Wu (1912-1997), one of the foremost experimental physicists of the 20th century, grew up in China and attended a school founded by her father, a supporter of women's education. She completed her PhD at Berkeley in 1940, and in 1944 joined the Manhattan Project at Columbia University.

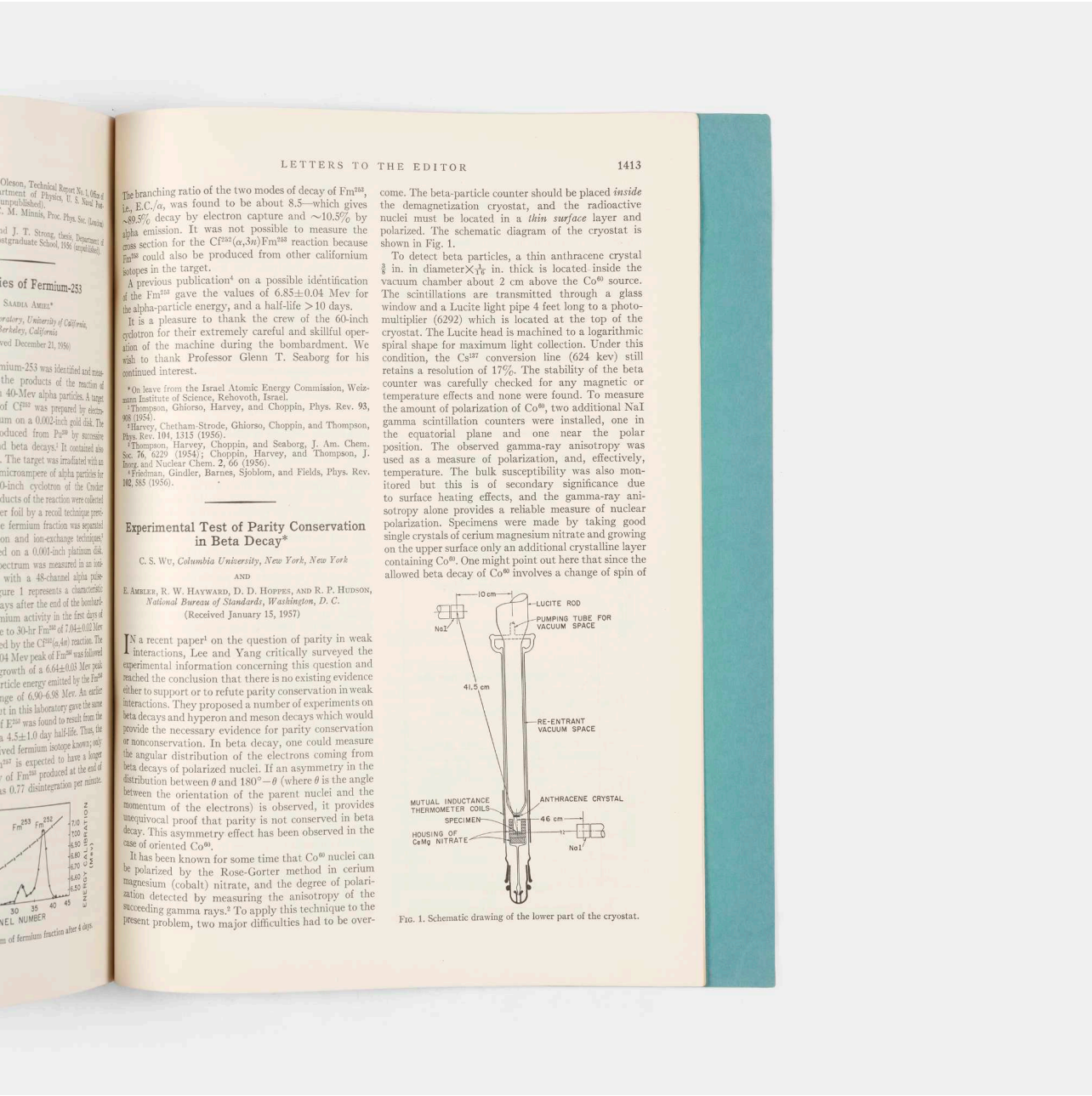
After the war, Wu was appointed to the Columbia faculty and began doing important work on beta decay, the process by which the nucleus of one radioactive element changes into another. 'In 1956, she was approached by theoretical physicists Tsung Dao Lee and Chen Ning Yang who knew about her expertise in beta decay. They asked her to devise an experiment to prove their theory that the law of conservation of parity did not hold true during beta decay. The law of parity states that all objects and their mirror images behave the same way, but with the left hand and right hand reversed. Wu's experiments, which utilized radioactive cobalt at near absolute zero temperatures, proved that identical nuclear particles do not always act alike'. (Atomic Heritage Foundation biography).

'After this major success, Wu began a new series of experiments on beta decay. She was searching for confirmation or violation of conservation laws. After devising tedious, delicate experiments, Wu's results

helped destroy what had previously been considered a law of nature. Lee and Yang won the 1957 Nobel Prize for Physics for originating the idea, although Wu and many others thought she should have shared the honour' (Ogilvie, Biographical Dictionary of Women in Science, p. 1410).

First edition, journal issue; large 8vo; diagrams within the text; original green wrappers printed in black, wrappers a little creased and rubbed, head of spine bumped with just a little loss, very good condition.

[ref: 124166]





34. WU, C.S. [Chien-Shiung].

Beta Decay.

New York, Interscience Publishers, a division of John Wiley & Sons, 1966.

£1750

First edition, first printing of 'the standard reference on low-energy emission of electrons by decaying atoms' by one of the foremost experimental physicists of her generation, Chien-Shiung Wu (*Columbia University Record* obituary, February 21st, 1997). An attractive copy, and uncommon in the dust jacket.

First edition, first printing; 8vo; diagrams within the text; original buff cloth, titles to spine and upper board in blue, an excellent copy in the lightly rubbed jacket with a short split at the head of the spine panel; 394pp.

[ref: 124130]

Small group of ephemera published by the British nuclear disarmament movement.
London, circa 1958-1981.

A fantastic collection of twenty-four ephemeral flyers and pamphlets, and one poster, tracing the history of the Campaign for Nuclear Disarmament and its splinter group, the Committee of 100. Including a rare publication by Spies for Peace on RSG 6; an unused Committee of 100 poster; an early flyer on the origin and meaning of the CND logo and the first ceramic badges; a booklet of talks by prominent women activists including Iris Murdoch; and a booklet illustrated by photomontage artist Peter Kennard.

The most significant CND items in this collection are:

1. 'Britain and the Bomb: The Fallacy of Nuclear Defense', a twenty-page pamphlet by playwright and Labour MP Benn W. Levy (1900-1973), published in 1959.
2. Pottery badge flyer. The 'peace sign' was designed by artist and CND member Gerald Holtham (1914-1985) and was initially distributed in the form of white and black ceramic badges made by designer Eric Austen (1922-1999). This flyer explains the origin and meaning of the symbol.

3. Advice to Marchers flyers for the 1961 and 1963 Aldermaston marches, both a single sheet folded once. These provide details of the route and activities, do's and don'ts, and recommended clothing and supplies.

4. Women Ask Why: An Intelligent Woman's Guide to Nuclear Disarmament' containing the text of three talks by novelist Iris Murdoch ('Morality and the Bomb'), developmental biologist and IVF pioneer Anne McLaren ('Genetic Effects of Radiation'), and archaeologist and peace activist Jacquetta Hawkes ('The Way Out'). The talks were presented at the Methodist Central Hall in Westminster on January 15th, 1962.

5. An attractively designed flyer with geometric decoration advertising the Easter March of 1966, and which could be used to request more information by post.

6. 'No Nuclear Weapons' by Peter Kennard and Ric Sissons, published by Pluto Press in 1981. This forty-four page booklet is extensively illustrated by photomontage artist Peter Kennard (1949 -), including his famous 'Haywain with Cruise Missiles' based on Turner's The Hay Wain.

The Committee of 100 was a splinter group of the CND, founded by Bertrand Russell and other organisation leaders to engage in non-violent civil disobedience as a compliment to the CND's non-confrontational approach. It quickly became successful, and the first event was a sit-down demonstration at the Ministry of Defence on February 18th, 1961 in which several thousand people took part. But debts, internal conflict, heavy-handed police action, and the shifting of focus to other causes took a toll. In 1962 the national organisation disbanded in favour of regional groups, of which the London branch was the most active. Russell resigned in 1963, and the committee as a whole was wound down in 1968.

The most significant Committee of 100 items in this collection are:

7. Mimeographed hand-out dated February 11, 1961, providing details and advice for the Committee's first action on February 18th, 1961. It explains that 'the number of people pledged to participate in the sit-down... totalled 2,040 by this morning. Pledges are still being received at a rate of 40-50 per day and a large and effective protest is now assured.' Participants are advised to contact their local news outlets and to put up posters, accommodation is available at the Stoke Newington Society of Friends Meeting House, and advice is given on how to deal with police and press on the day.

8. 'Anti-Polaris demonstration 18th Feb', flyer advertising the first action, which is take place 'about the time that the U.S. depot ship carrying Polaris Missiles is expected to arrive in the Clyde'. The demonstrators 'intended to serve notice on the Government that they can no longer stand aside whilst preparations are being made for the destruction of mankind'. Speakers are to be Bertrand Russell, art historian Herbert Read, and poet Hugh MacDiarmid. Strikingly designed and incorporating the CND logo.

9. 'Legal Briefing for all Demonstrators' for the action on February 18th, 1961, single sheet folded once. A detailed explanation of the procedure for arrests and potential charges and penalties for participation.

10. 'The Policy of the Committee of 100', single sheet flyer. An early, undated flyer explaining the Committee's aims and principles.

11. 'Committee of 100 Announces a Public Assembly in Parliament Square', single sheet folded once. This flyer advertises the Committee's second major action, a sit-down assembly in Parliament Square. With advice for the day and illustrated with photographs of the February 18th event, including a large crowd with Parliament in the background, and Bertrand Russell and Reverend Michael Scott seated on the ground.

12. Large flyer, single sheet folded once, describing the Committee's purpose, its first three actions, and the response of the authorities, and stating that the

next demonstration is planned for December 9th, 1961. The cover of this striking publication is a black and white photograph of a protester being dragged from Trafalgar Square.

13. 'Mass Resistance, Saturday, 9th December 1961', single sheet folded once. This flyer advertises the Committee's fourth action, the simultaneous blocking of the NATO base at Wethersfield, USAF headquarters at Ruislip, and the strategic bomber base at Brize Norton, with demonstrations in Cardiff, Bristol, Yorkshire, and Manchester. It was at this point that the authorities began taking the organisation very seriously. Its office was raided and six members arrested and jailed for conspiracy, though the police refused to arrest Bertrand Russell when he put himself forward.

14. 'Air Ministry: Mass Sit-Down, 7,000 Strong', single sheet of yellow paper printed in black. After the arrest of the 'Wethersfield Six', many activists felt that mass civil disobedience had failed to accomplish the group's aims or change public opinion, and support began to dwindle. This flyer was distributed to advertise a 1962 demonstration that was to take place on September 9th, but had to be called off due to lack of participants.

15. Poster for a 'Public Assembly, Richmond Terrace, Air Ministry, September 23 3pm'. This poster, printed in red and green on white, advertises the assembly planned to replace the cancelled sit-down protest.

16. 'Danger! Official Secret: RSG-6' by Spies for Peace, published on Good Friday 1963. Just off the normal Aldermaston march route was a secret government complex, RSG 6. Regional Seats of Government were part of civil defense planning, designed to support government continuity in the event of nuclear attack, and their existence was revealed by a group of Committee activists calling themselves Spies for Peace, led by Peter Cadogan (1921-2007). During the 1963 march, Spies for Peace proposed a breakaway from the main route to demonstrate at RSG 6. This six-leaf mimeographed hand-out describes in great detail the role of the facility, with a room-by-room plan

of its layout and a map showing how to reach it from the march. The introduction states that 4,000 copies were printed and a number sent to prominent politicians, government officials such as the head of MI5, and other activists.

Also part of this group are three publications from outside the CND and Committee. A Socialist Labour League booklet titled 'CND and Politics' by G. Gale; 'Nuclear Testing and Disarmament' by the United States Information Service, and 'Freedom from War' by The United States Department of State. 27 loose flyers, pamphlets, and booklets, and 1 poster (50 x 38 cm). Some creasing, toning, and spotting, occasional short closed tears, poster unused, overall very good condition.

[ref: 125605]

**COMMITTEE
OF 100**  **ANNOUNCES**

29 **A PUBLIC ASSEMBLY**
APRIL in PARLIAMENT SQUARE

SATURDAY NON-VIOLENT CIVIL DISOBEDIENCE

MINISTRY OF DEFENCE
18 FEB 1961



ON SATURDAY, 18th FEBRUARY, 1961

about the time that the U.S. depot ship carrying Polaris Missiles is expected to arrive in the Clyde, the 'Committee of 100' will organise a non-violent demonstration outside the Ministry of Defence in London. Here the demonstrators, led by Earl Russell and The Rev. Michael Scott, will sit down on the pavement whilst a declaration demanding the scrapping of the Polaris agreement is posted on the Ministry's door. In this way the demonstrators intend to serve notice on the Government that they can no longer stand aside whilst preparations are being made for the destruction of mankind.

In support of the aims of the demonstrators, a March and Rally is being held immediately before the demonstration.

MARCH
Leaves Marble Arch 1 p.m.

RALLY
2 p.m. TRAFALGAR SQUARE

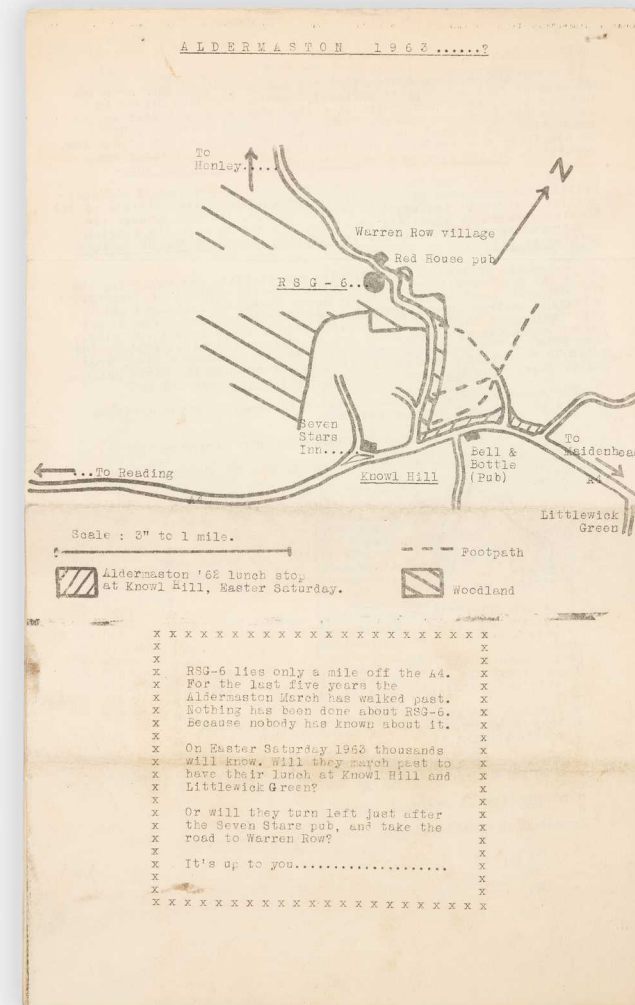
Speakers:
EARL RUSSELL
SIR HERBERT READ
HUGH McDIARMID

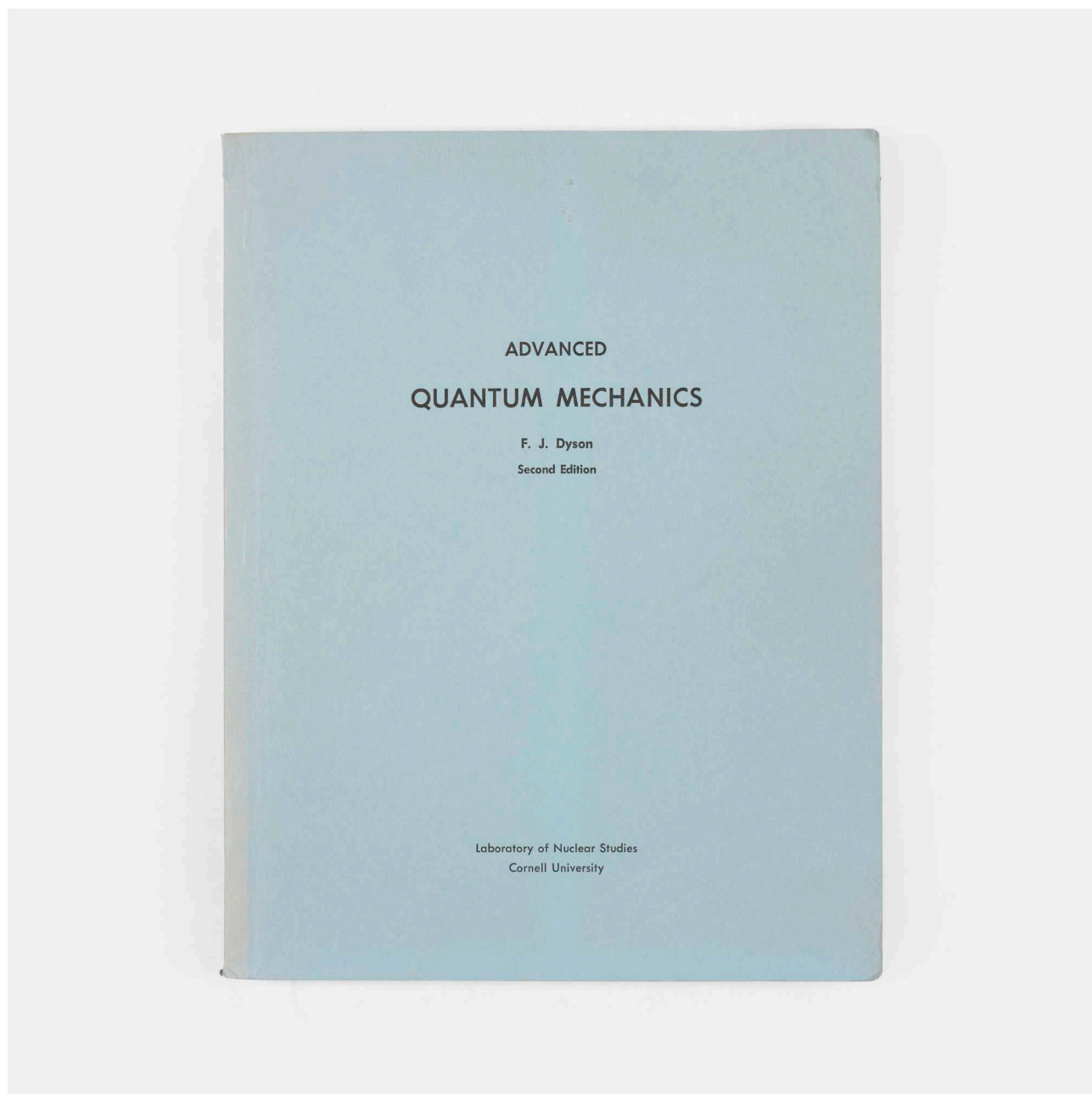
**NO POLARIS BASES
NO NUCLEAR WEAPONS**



ANTI-POLARIS DEMONSTRATION 18th FEB.

Published by the Committee of 100, 13 Goodwin St., London, N.4. ARChway 1239
Printed by Precision Press (T.U. 38-hour week), 44 Broad Street, Teddington, Mx.





Signed

36. DYSON, Freeman.

Advanced Quantum Mechanics. Second edition.
Ithaca, NY, Laboratory of Nuclear Studies, Cornell
University, [c. 1961].

£2500

Second edition of this classic set of lectures, signed by Dyson on the title. Loosely inserted into this copy is the Cornell bookstore invoice recording that it was ordered in March 1961 by the previous owner, J.G. Ireland of Emmanuel College Cambridge, whose name is written on the title.

Freeman Dyson (1923-2020) was one of the most original and eclectic thinkers of the 20th century. As a young research fellow he demonstrated the equivalence of the Feynman and Tomonaga-Schwinger theories of quantum electrodynamics, paving the way for the three men to be awarded the Nobel Prize. Though Dyson himself never won a Nobel, he had a huge influence on science and popular culture, contributing 'to five fields of mathematics and 11 fields of physics, as well as to theoretical biology, engineering, operations research, literature and public affairs' (Royal Society biographical memoir, 2022).

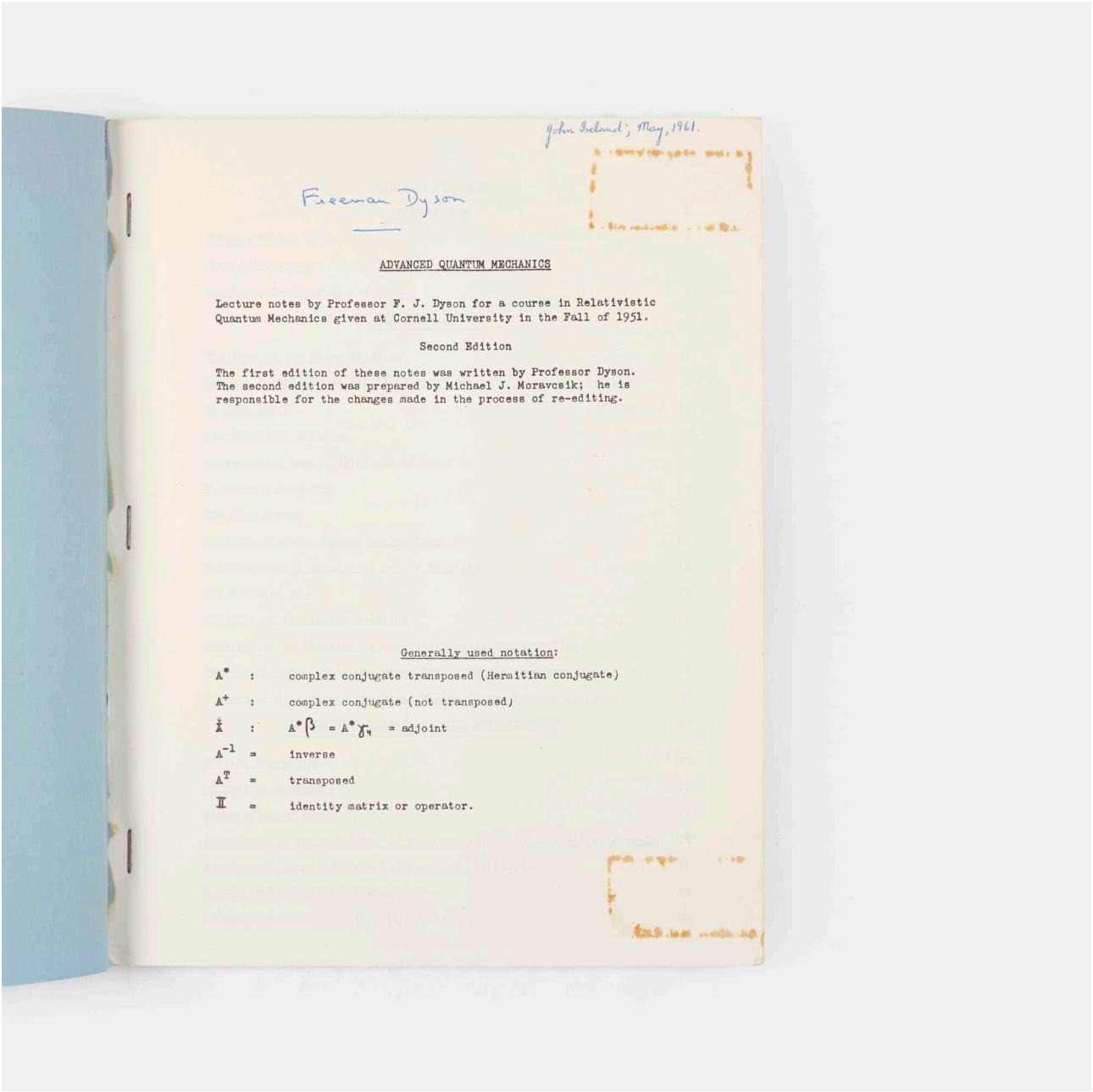
These highly regarded lectures were presented in autumn 1951 during the single year in which Dyson was a professor at Cornell before joining the Institute For Advanced Study at Princeton. Most notably they include a section on Feynman diagrams, which Dyson was the first to understand and appreciate, and which he presented in a way that made them more accessible to other physicists, paving the way for their acceptance by figures such as Oppenheimer.

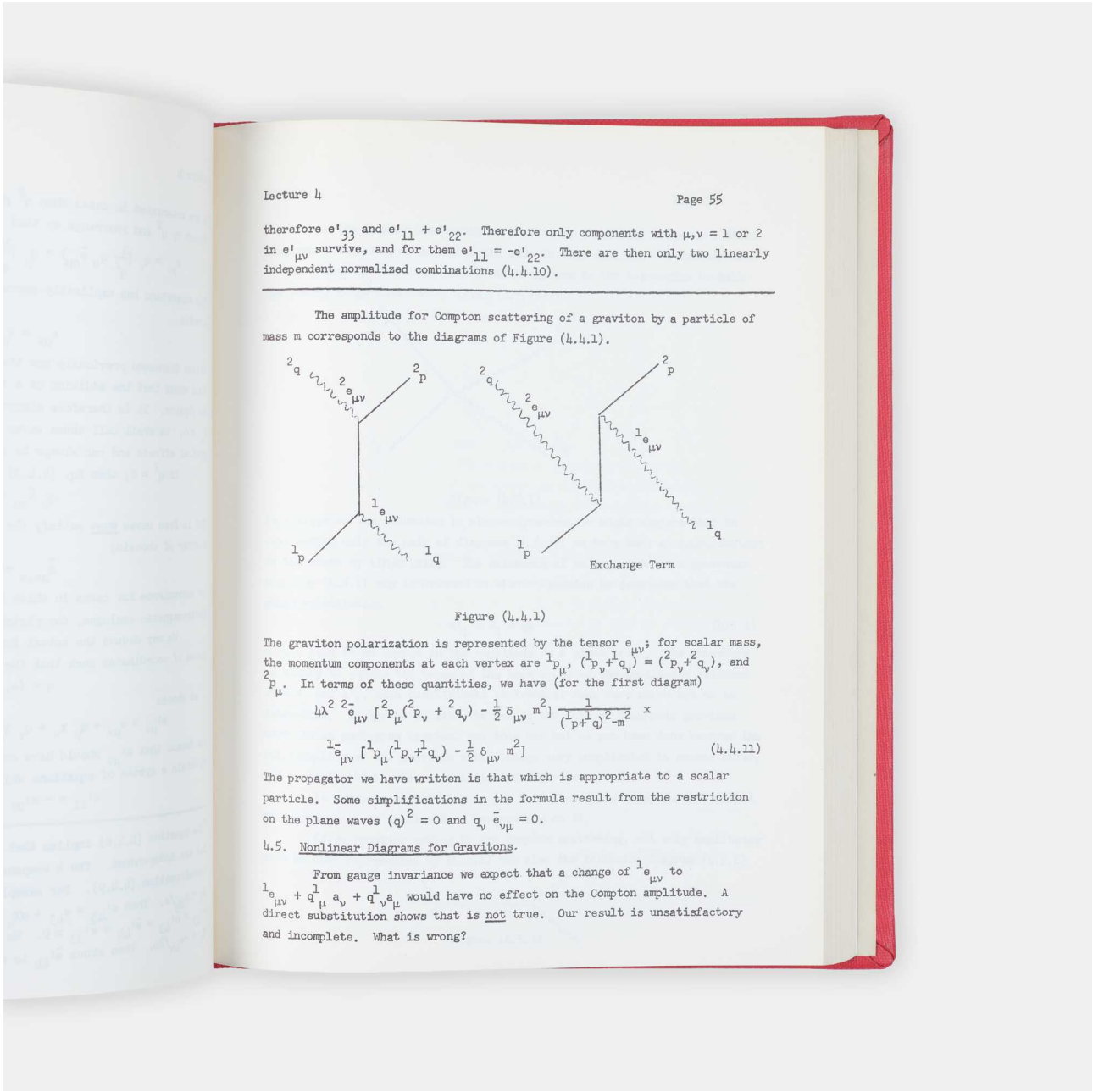
Provenance: J.G. Ireland (signature).

Second edition, signed by the author on the title; mimeographed text, perfect bound and wire-stitched; equations and diagrams within the text, ownership inscription of J.G. Ireland in blue ink on the title, with

loosely inserted Cornell bookstore invoice, two rectangular spots to the title and final leaf from removed book tickets or tape, slightly affecting the following leaves as well, otherwise contents clean; original blue wrappers printed in black, spine faded and with a short closed tear at the head, wrappers a little rubbed and creased, very good condition, 213pp.

[ref: 120416]





37. FEYNMAN, Richard.
Lectures on Gravitation.
Pasadena, CA, Caltech, [c. 1963-71].

£975

Early Xerox'd copy of this important lecture series, originally published as a mimeograph by the Caltech bookstore in 1963. From the library of physicist Charles Needham (1936-2013), who earned his PhD at the University of New Mexico at Albuquerque in 1971 with a thesis on Cepheid variable stars. Needham likely made this copy from an original mimeograph that he borrowed from the library or from a colleague. He may have forgotten to copy the title, as he has inserted his own typed title page before the Xerox'd text.

Feynman's course on gravitation was presented to graduate students and postdocs during the afternoons at the same time that he was giving the morning undergraduate lectures that would become the Feynman *Lectures on Physics*. Two postdocs, Fernando B. Morinigo and William G. Wagner, made typed notes based on the taped lectures, and these were mimeographed and sold in the bookstore 'for many years' (Preskill & Thorne', foreword to *The Feynman Lectures on Gravitation*, 1995).

Feynman gave twenty-seven lectures in all, but he only found time to check the first eleven, 'making various corrections and additions'. They are 'pervaded by Feynman's spirit and sprinkled with his jokes, but inevitably his idiosyncratic use of language has been only partially preserved' (Preskill & Thorne). The earliest copies sold at Caltech therefore only included eleven lectures, as here, though in 1971 a further five were added.

'Because of their unique insights into the foundations of physics', these lectures 'had a significant influence on many of the people who read them' and, in their introduction to the 1995 edition, Preskill and Thorne cite three reasons for their importance: 'First, nowhere else is there a comparable pedagogical account of an unusual approach to the foundations of general relativity that was pioneered by Feynman

(among others)... Second, the notes contain a number of fascinating digressions and asides on the foundation of physics and other issues that make them enlightening and interesting to read. Third, the notes have historical value. At the time he taught the course, Feynman had been thinking hard for several years about fundamental problems in gravitation, and it is useful to have a record of his insights and viewpoint at that particular time... In some cases, his views were rapidly evolving as he taught the course'.

154-leaf Xeroxed mimeograph, rectos only, typescript title page, contents fresh; contemporary red library cloth, title to spine gilt, binder's ticket of New Mexico Bookbinders, Albuquerque, spine very slightly faded but overall cloth fresh, excellent condition.

[ref: 119514]



Signed by Teller

38. TELLER, Edward; TALLEY, Wilson K.; HIGGINS, Gary H.JOHNSON, Gerald W.

The Constructive Uses of Nuclear Explosives.
New York, McGraw-Hill Book Company, 1968.

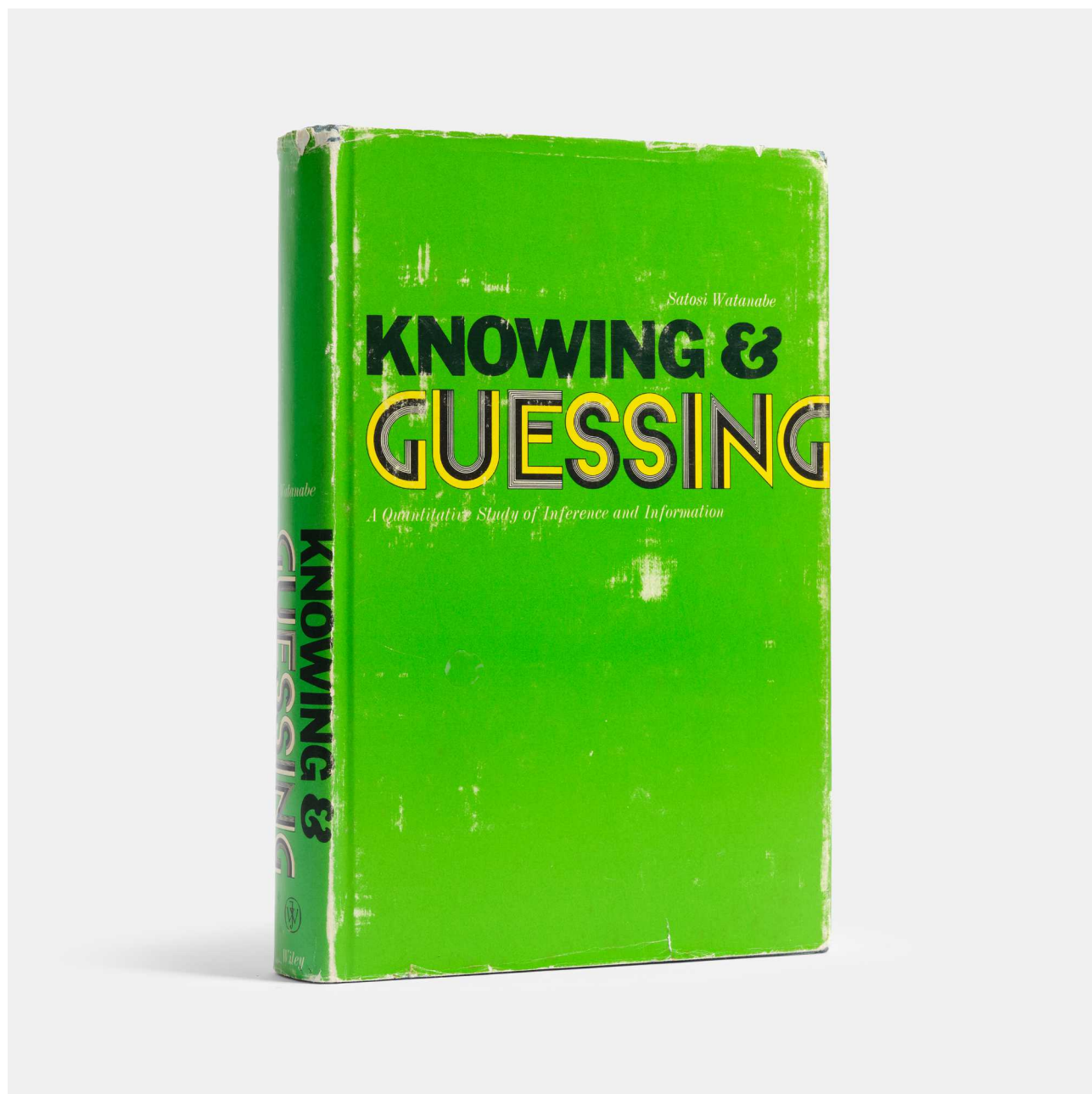
£2250

First edition, first printing, presentation copy signed by Edward Teller on the title, and humorously inscribed by his coauthor, UC Davis physicist Wilson Talley to an unnamed recipient: 'To err* is human - To forgive** divine, Wilson Talley. *you ** ahem - me'. Uncommon signed.

Though many Manhattan Project scientists felt deeply concerned or ambivalent about the weapons they invented, physicist Edward Teller (1908-2003) was a life-long booster of the technology. In addition to promoting arms build-up and spearheading the development of the hydrogen bomb, he sought out 'civilian' uses for nuclear explosions that would make the technology seem less threatening to the public. As part of Operation Plowshare, under the Atoms for Peace initiative, Teller recommended using nuclear weapons to open harbours and canals, for mining, geological and meteorological research, and even highway construction. This volume covers all these applications and others, with significant background on the physics and mathematics of nuclear explosions.

First edition, first printing; 8vo; illustrations within the text, light spot affecting the margin of pages 14-20; original grey cloth, titles to spine and upper board in green and black, cloth lightly rubbed at the extremities, a very good copy in the rubbed jacket with several chips, some affecting the title, and some marks and creasing; 320 pp.

[ref: 123408]



From the library of a Bletchley cryptographer

39. WATANABE, [Satoshi] Satoshi.

Knowing and Guessing. A Quantitative Study of Inference and Information.

New York, John Wiley & Sons, Inc., 1969.

£500

First edition, first printing of this unusual cross-disciplinary work by physicist Satoshi Watanabe (1910-1993). This copy from the library of British mathematician Peter Hilton (1923-2010), who worked with Alan Turing on the Naval Enigma at Bletchley Park and was a leader in the field of algebraic topology.

Author Satoshi Watanabe studied theoretical physics at Tokyo Imperial University, and then in Europe under de Broglie and Heisenberg. His most significant contributions were to debates about time symmetry in quantum dynamics; the development of two-state vector formalism; and his proposal of the ugly duckling theorem, which states mathematically that classification is not possible without bias.

The present work was an attempt 'to offer a unified theoretical view of a field now split into different disciplines: philosophy, information science, cybernetics, psychology, electrical engineering, physics. It investigates the cognitive process of knowing and guessing and in the course of this investigation a number of novel ideas and theories are explored' (blurb).

Provenance: Peter Hilton (ink stamps).

First edition, first printing; 8vo; diagrams and equations within the text, ink library stamps of Peter Hilton to the front endpapers, a few spots to the edges of the text block, original blue-grey cloth, titles to spine and upper board in white and black, an excellent copy in the rubbed jacket with some small nicks and short splits and spots on the lower panel; 592pp.

[ref: 122489]



Futile preparedness?

40. Central Office of Information [and] National Lampoon.

Protect and Survive [with] Domestic Nuclear Shelters [and] Meet Mr. Bomb.

London, Her Majesty's Stationery Office for the Home Office [and] High Meadow Publishing Inc., Suron International Publications, 1980, 1981, 1983.

£500

Uncommon first editions of the UK's famous *Protect and Survive* civil defense pamphlet, its companion volume, *Domestic Nuclear Shelters*, and the parody *Meet Mr. Bomb*.

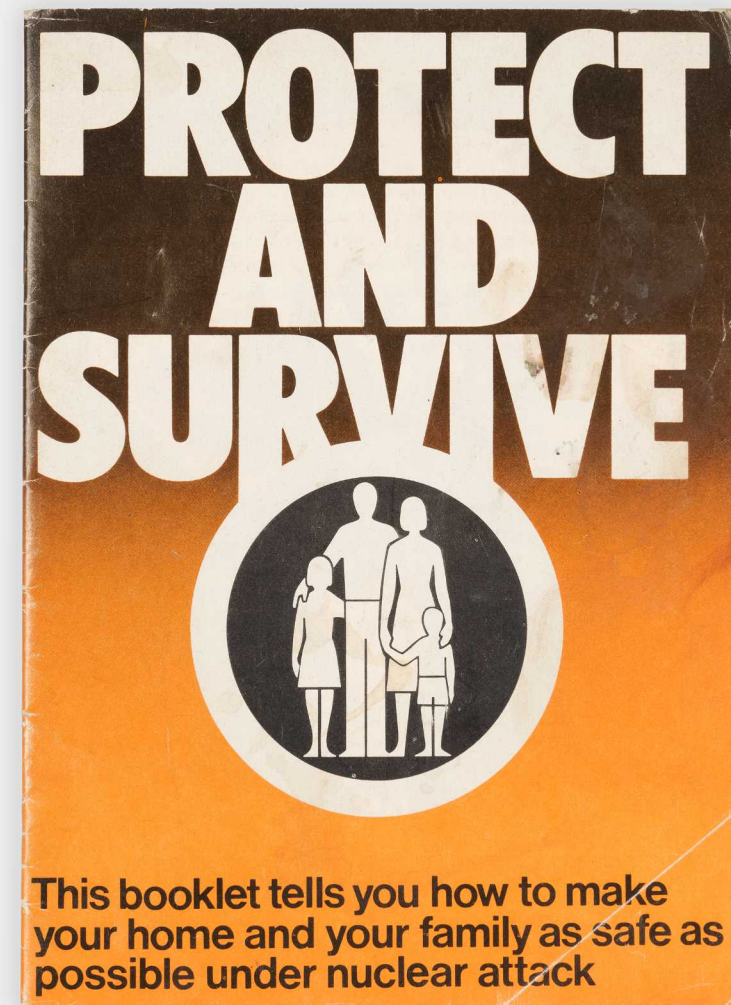
Described by Imperial War Museum curator Matt Brosnan as, 'deeply unnerving', *Protect and Survive* was based on civil defense guidelines developed during the 1970s. These were originally meant to be issued only if war broke out, but rising Cold War tensions led Margaret Thatcher's government to publish them in May of 1980. The booklet provides advice on sheltering in place for up to two weeks by constructing an 'inner refuge' in the home, with details of what to keep in a survival kit. Its companion volume, *Domestic Nuclear Shelters*, goes into greater detail about the physical and radiological impacts of a nuclear detonation and how to build a more permanent shelter in a garden or basement (Brown, 'Armageddon Advice Guide to be Republished, the *Guardian*, March 2017).

The parody booklet, *Meet Mr. Bomb: A Practical Guide to Nuclear Extinction* by 'the Ministry of Futile Preparedness', was produced by staff of the US comedy magazine *National Lampoon*, and was part of a wave of responses that included E. P. Thompson's *Protest and Survive* and Raymond Briggs' *When the Wind Blows*.

First editions. Pamphlet 1, *Protect and Survive*: 30 pages, wire-stitched (21 x 15 cm); illustrations throughout printed in black and orange, ink lines drawn through the lettering on the lower cover,

dampstain to the upper cover affecting the extreme edge of the margins of a few leaves, rubbed and creased, very good condition. Pamphlet 2, Domestic Nuclear Shelters: 23 pages, wire-stitched (20 x 14.5 cm), illustrations throughout printed in black and blue, rubbed and creased with some marks on the covers, very good condition. Pamphlet 3: Meet Mr. Bomb: 28 pages, wire-stitched (27 x 20.5 cm), illustrations throughout printed in black and orange, rubbed and creased, very good condition.

[ref: 124446]



Now the Inner Refuge

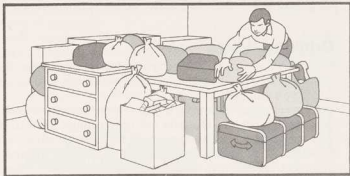
Still greater protection is necessary in the fall-out room, particularly for the first two days and nights after an attack, when the radiation dangers could be critical. To provide this you should build an inner refuge. This too should be thick-lined with dense materials to resist the radiation, and should be built away from the outside walls.

Here are some ideas:

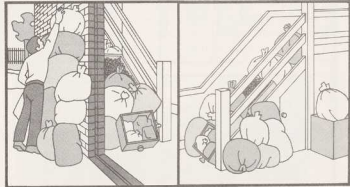
1. Make a 'lean-to' with sloping doors taken from rooms above or strong boards rested against an inner wall. Prevent them from slipping by fixing a length of wood along the floor. Build further protection of bags or boxes of earth or sand – or books, or even clothing – on the slope of your refuge, and anchor these also against slipping. Partly close the two open ends with boxes of earth or sand, or heavy furniture.



2. Use tables if they are large enough to provide you all with shelter. Surround them and cover them with heavy furniture filled with sand, earth, books or clothing.



3. Use the cupboard under the stairs if it is in your fall-out room. Put bags of earth or sand on the stairs and along the wall of the cupboard. If the stairs are on an outside wall, strengthen the wall outside in the same way to a height of six feet.



3 Protect and survive

What you have read so far tells you how to prepare to face a nuclear explosion. What follows tells you how to use the protection you have provided.

First – Know the Warning Sounds:

THE ATTACK WARNING

When an air attack is expected the sirens will sound a rising and falling note. The warning will also be broadcast on the radio.

THE FALL-OUT WARNING



When there is danger from fall-out you will hear three loud bangs or three whistles in quick succession.

THE ALL-CLEAR

When the immediate danger from both air attack and fall-out has passed, the sirens will sound a steady note.

What to do on hearing an Attack Warning:

At home

If you are at home you should:
Send the children to the fall-out room.
Turn off the gas and electricity at the mains; turn off all pilot lights. Turn off oil supplies. Close stoves, damp down fires. Shut windows, draw curtains. Go to the fall-out room.

At work or elsewhere

If you can reach home in a couple of minutes try to do so. If you are at work, or elsewhere, and cannot reach home within a couple of minutes, take cover where you are or in any nearby building.

In the open

If you are in the open and cannot get home within a couple of minutes, go immediately to the nearest building. If there is no building nearby and you cannot reach one within a couple of minutes, use any kind of cover, or lie flat (in a ditch) and cover the exposed skin of the head and hands.



Light and heat from an explosion will last for up to twenty seconds, but blast waves may take up to a minute to reach you. If after ten minutes there has been no blast wave, take cover in the nearest building.

APPEAL FROM TSUKUBA, JAPAN



Industrial Promotion Hall of Hiroshima city was gutted and all the wooden houses near the hall were burnt by the A-bomb. It was exploded just above the hall. About 140,000 people were killed in Hiroshima.

— From "Record of the Atomic Bomb" —

41. [ATOMIC BOMBINGS].

Appeal from Tsukuba, Japan.

Tsukuba, Japan, Council of Labor Unions in Tsukuba Science City, May 1, 1982.

£100

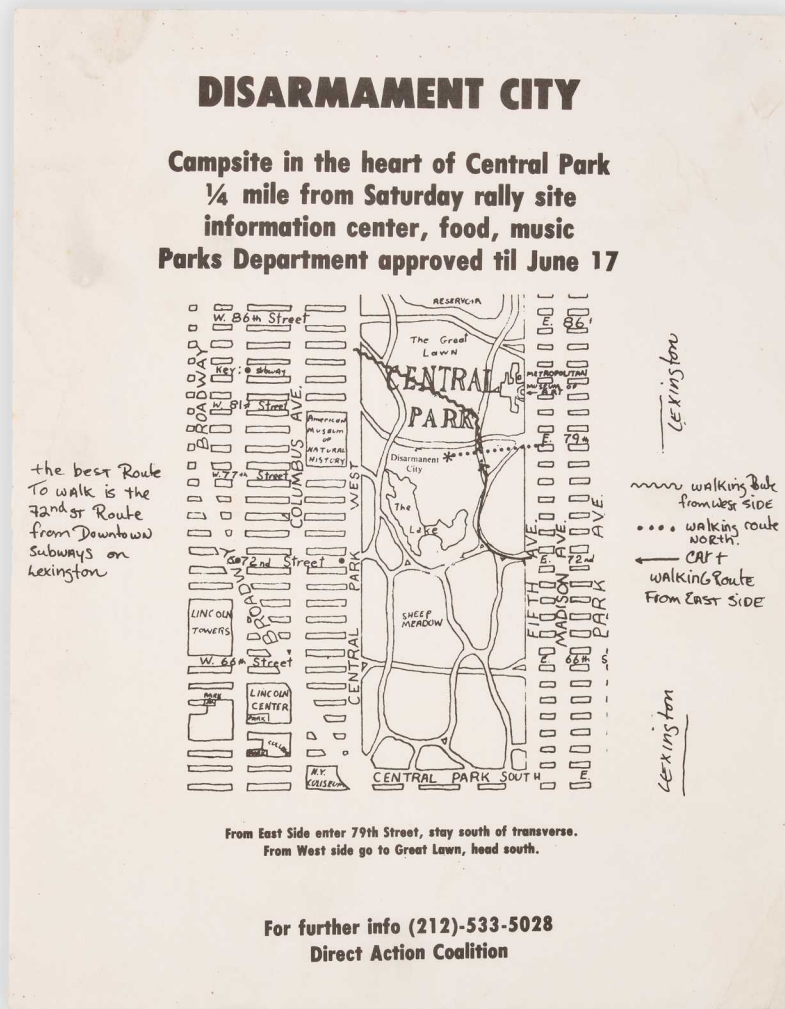
A rare anti-weapons flyer published by the Council of Labor Unions of Tsukuba Science City.

Developed between the 1960s and 1980s near Tokyo, Tsukuba is Japan's primary scientific research hub, home to two universities, sixty national institutes, and hundreds of private research facilities.

This flyer was published on May 1st, 1982 in reaction to perceived government efforts to increase military research. The first page is 'A Personal Message from a Research Scientist at Tsukuba', Fumikazu Ikazaki, who recounts his family's experience as 1st and 2nd generation survivors of the bombing of Hiroshima. The following page prints the resolutions of the Council of Labor Unions 'to oppose all military related research'. They state that, 'self-defence force soldiers are beginning to visit the institutes in Tsukuba Science City. The Japanese Government is trying to start military research with the United States... We must never allow the results of our research to be used for war. We must not turn our faces away from the tragedy in Hiroshima and Nagasaki, the slaughter in Auschwitz, and what the Japanese army did in China...'.

Flyer, single sheet folded once (30 x 21 cm folded), printed in black on yellow paper, illustration from photograph of the 'Atomic Bomb Dome' on the cover, map on the back, fine condition.

[ref: 120156]



42. Direct Action Coalition.
Disarmament City.
New York, Direct Action Coalition, June 1982.

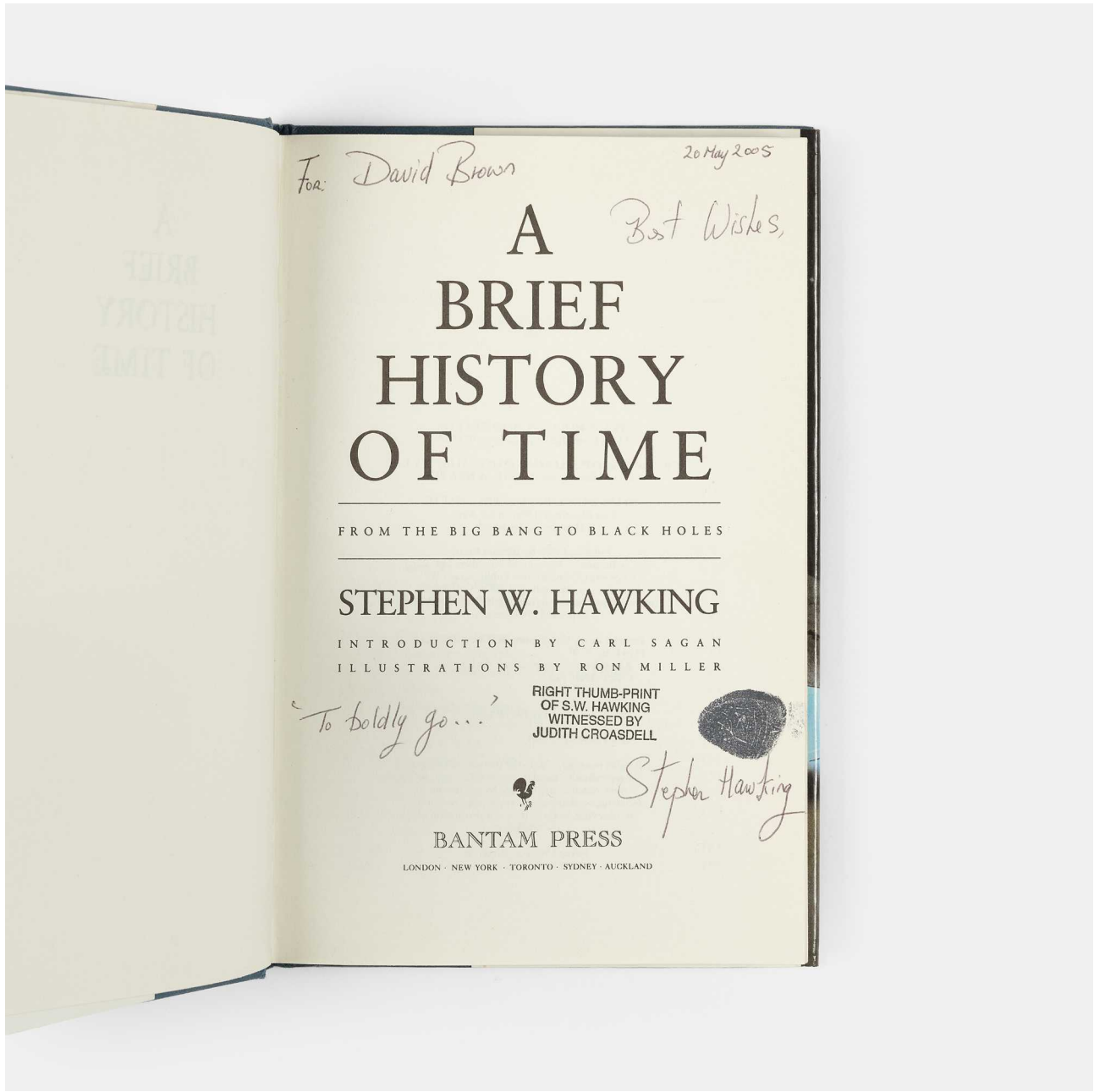
£100

The largest nuclear disarmament rally in U.S. history took place in New York City on June 12th, 1982, when over a million people marched from Central Park to the United Nations. A Parks Department-approved camping site called Disarmament City was erected near the north end of the Lake, with an information center, food, and entertainment, as described here.

‘The 1982 protest coincided with the second United Nations Special Session on Disarmament. The June 12 Rally Committee engaged in extensive planning with hundreds of organizations, an effort led in part by Leslie Cagan, also active in feminist and LGBT campaigns, African-American radical Jack O’Dell, and peace organizer Cora Weiss. Tensions surfaced over whether to emphasize freezing or reducing the number of nuclear weapons, and concerns over whether the march was truly inclusive. Yet the sheer number of people made June 12 a landmark day in the movement for nuclear disarmament’ (‘Nuclear Disarmament’, Museum of the City of New York).

Single leaf flyer (27.5 x 22 cm), text and map on one side only, a few smudges and small marks, some creasing, excellent condition.

[ref: 120155]



Signed with thumbprint

43. HAWKING, Stephen.
A Brief History of Time. From the Big Bang to black holes. Introduction by Carl Sagan, illustrations by Ron Miller.
London, Bantam Press, 1988.

£12,500

Thumbprint-signed copy of the eighth printing (published in the same year as the first), inscribed, 'To David Brown, Best Wishes, "To boldly go...", Stephen Hawking, 20 May 2005' and with the ink stamp 'right thumb-print of S.W. Hawking witnessed by Judith Croasdell'. The recipient was the former Deputy Head Porter at Gonville & Caius College, Cambridge, where Hawking was a Fellow.

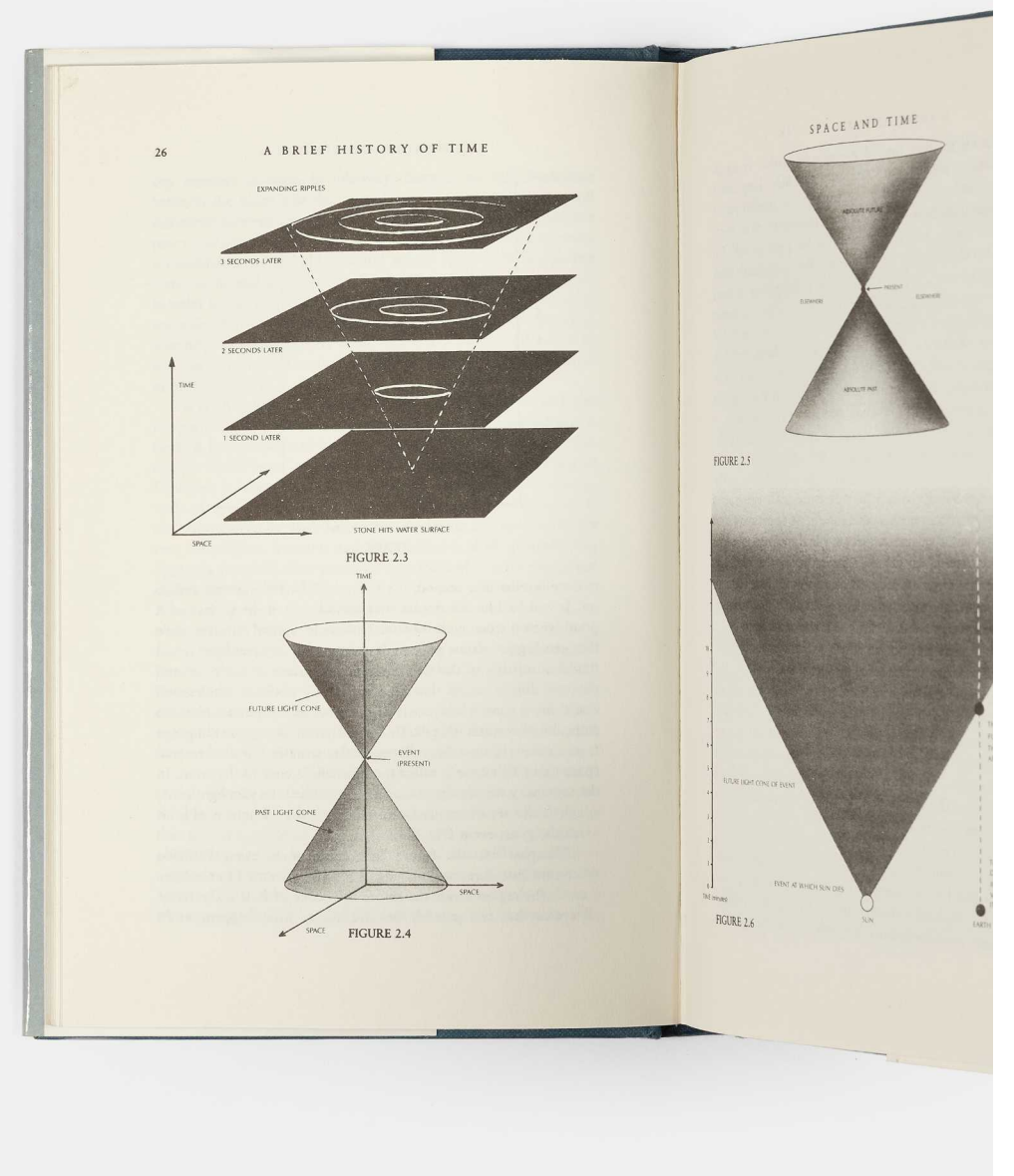
In 1974 physicist Stephen Hawking (1942-2018) made the revolutionary discovery that black holes, rather than being totally inescapable, actually release a type of energy now known as Hawking radiation. That same year he was elected one of the youngest-ever members of the Royal Society, and in 1979 he followed in the footsteps of Isaac Newton when he was appointed Lucasian Professor of Mathematics at Cambridge.

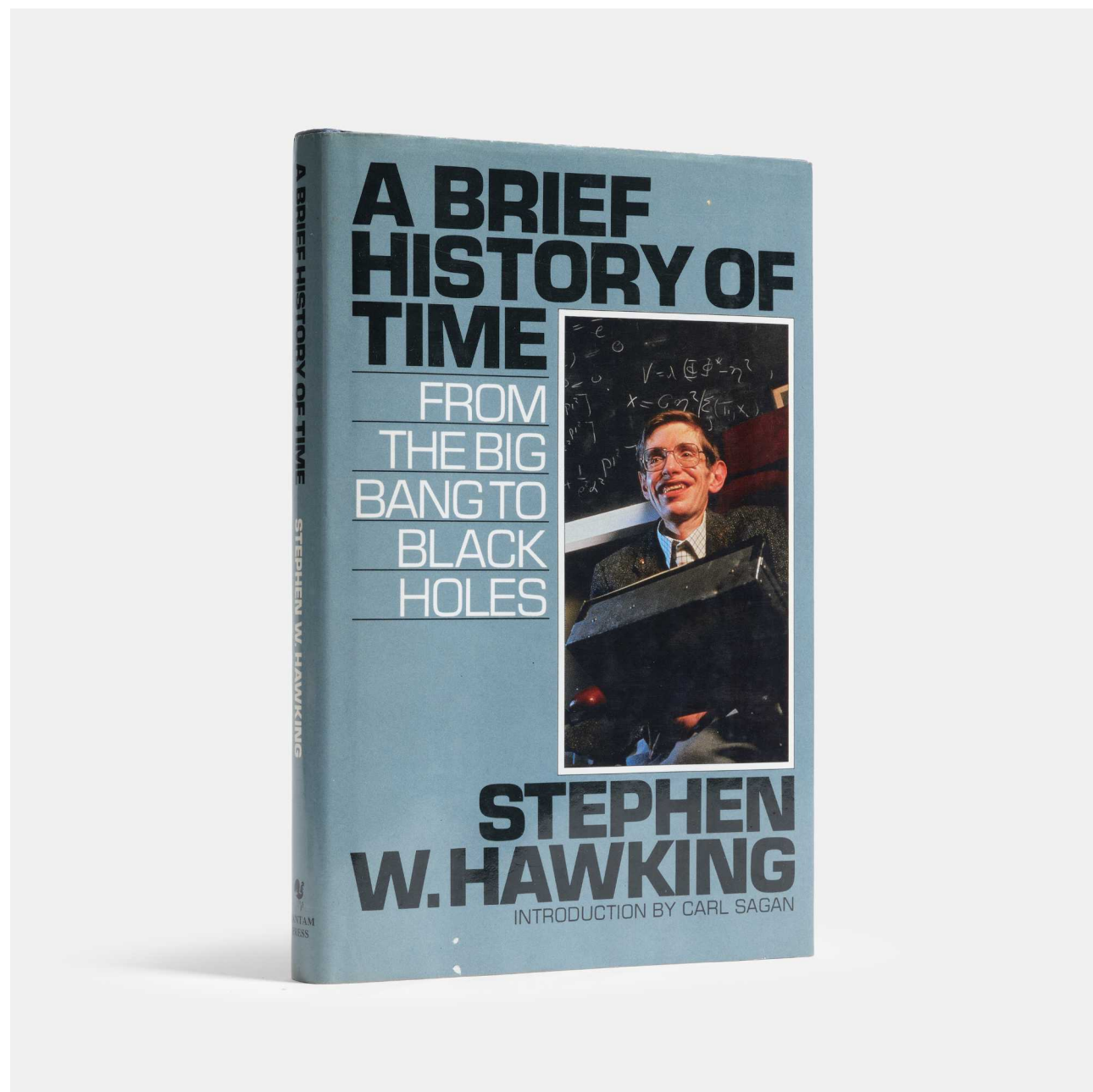
Hawking began to consider writing for a general audience in the early 1980s and approached an editor at the Cambridge University Press, who suggested that he avoid equations. Famously, *A Brief History of Time* contains only one: $e = mc^2$, instead relying on narrative and illustrations to explain concepts such as the Big Bang, the expansion and fate of the universe, black holes, the directionality of time, and the search for a unifying theory of physics. Despite its complex subject matter, the book was an immediate success, and the *Guardian* has described it as 'a succinct, entertaining and brilliantly lucid account of our relationship with the universe' (McCrum, 'The 100 Best Non-Fiction Books No. 6', March 2016).

Eighth printing; 8vo; illustrations throughout the text, contents clean; original blue boards, titles to spine gilt,

edges of boards very lightly rubbed, an excellent copy in the lightly rubbed jacket with some minor creasing at the edges; 198pp. Thumbprint-signed copy of the eighth printing, published the same year as the first.

[ref: 120413]





Cosmology for the masses

44. [PHYSICS] HAWKING, Stephen W.

A Brief History of Time. From the Big Bang to Black Holes. Introduction by Carl Sagan. Illustrations by Ron Miller.

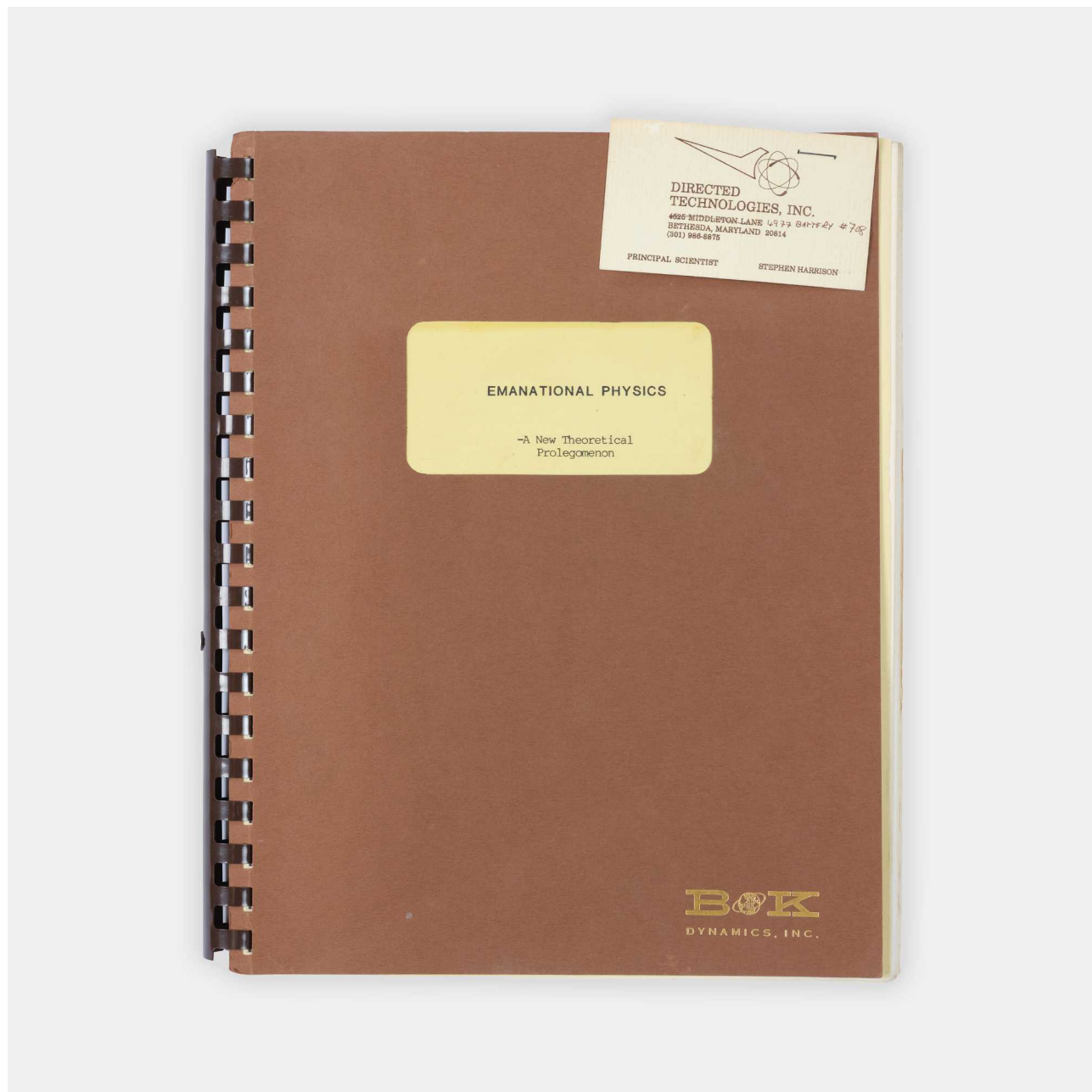
London, Bantam Press, 1988.

£950

First edition, the corrected second printing, of one of the most successful popular science books ever written. The first printing included a number of textual errors and was recalled, making copies uncommon.

First edition, corrected second printing; 8vo; illustrations throughout the text, a few small spots to the title and contents leaf and to the edges of the text block; publisher's blue boards, titles to spine gilt, a very good copy in the lightly rubbed jacket with a couple of small spots to the upper panel; 198pp.

[ref: 118558]



Clearing up the mess of modern physics

45. [SANDAGE, Allan] HARRISON, Stephen.
Emanational Physics. A new theoretical prolegomenon. Second edition. Bethesda, MD, by the author, 1988.

£1250

The second edition of this rare, self-published text proposing to correct modern physics by reframing it metaphysically. Described as a not-for-sale edition limited to 100 copies, this one was sent to Allan R. Sandage, who determined the first reasonably accurate value for the age of the universe and was considered 'the greatest and most influential observational astronomer of the last half-century' (*New York Times* obituary, November 17, 2010). An introductory letter from the author is loosely inserted.

Stephen Harrison is somewhat mysterious, but he seems to have been a technology consultant in Washington D.C. and the author of three self-published books: *The Mind/Brain Problem*, *Artificial Intelligence: A House Built Upon the Sand*, and *The New Monadology*. We can locate no institutional copies of *Emanational Physics*, and only one institutional copy of any of the other books: *The New Monadology*, at Purdue. Harrison's obituary, which described him as a philosopher aged 96, appeared in the *Washington Post* on March 16th, 2016.

The contents of this volume comprise an elaborate, conservative-leaning, and pseudo-scientific critique of relativity, quantum mechanics, and materialist conceptions of human consciousness. As Harrison writes in the preface, 'It is no secret that the state of theoretical physics & cosmology is replete with contradictions and paradoxes... What is chiefly wrong with physicists is that they are metaphysically light-weight'. He goes on to explain that, 'undaunted by my limited grasp of modern physics, I decided to blunder in, and try my hand at clearing up the mess'. The appearance of a second edition only six months after the first was occasioned by 'my very recent discovery of literature sources critical of relativity... it seems it is

not easy to publish material contrary to the Establishment Doctrine...’.

Among the 90 recipients of this text (who must have been thrilled) were some of the most prominent scientists of the period, including Roger Penrose, Murray Gell-Mann, Steven Weinberg, Stephen Hawking, Freeman Dyson, and John Archibald Wheeler. A number of humanities scholars were sent copies, among them political philosopher Paul Gottfried, theologian Thomas F. Torrance, historian of science Stanley Jaki, and religious philosopher Richard Swinbourne.

Most remarkably, at least a few of them engaged seriously with Harrison’s text. In the preface he thanks ‘a number of readers who sent in their comments in response to the original’. Mathematician Joseph Gerver is specially praised for ‘his very detailed commentary on a number of points’. And not only did neuroscientist and philosopher Raymond Tallis read *Emanational Physics*, he cited it in his 1991 book on consciousness, *The Explicit Animal*.

Provenance: Allan Sandage (purchased from the library, presentation letter from the author loosely inserted).

Second edition, typed letter signed from the author loosely inserted; comb-bound photocopy (28 x 21.5 cms); title on yellow paper, illustrations, charts and graphs throughout, one coloured by hand, the author’s name and address in pencil partially erased from the title, occasional additions and corrections made by taping or pasting in new slips of paper; Original brown paper covers, the upper cover with a plastic window for the title and “BK Dynamics” embossed in gold. The author’s Directed Technologies business card, with the address corrected by hand, is stapled to the upper cover, very good condition.

[ref: 113071]

46. SKINNER, Lawrence W. (ed.)
Radiation Matters 1-3.
Las Vegas, NV, Network Opposing Nuclear Ecocide,
1991.

£100

A rare and unusual set of newsletters by the ‘Network Opposing Nuclear Ecocide’, published in downtown Las Vegas during 1991 (the latter two numbers being dated to July and October of that year).

The first two issues focus on the dangers of hydrogen bombs contaminating large areas by destroying nuclear power plants, with the first issue comprising an excerpt from *The Fate of the Earth* by Jonathan Schell (1982), an important work in the history of the disarmament movement. The third number contains an editorial titled ‘Anthropocide, Anyone?’

Radiation Matters seems to have been the short-lived project of its editor, Lawrence W. Skinner, and appears only glancingly in the historical record, named in a list of documents by the U.S. Nuclear Regulatory Commission and in a handful of places in the radical press. It is mentioned in a letter to the editors of the *Nation* in 1991, presumably a missive written by Skinner himself. The first two issues include sign-up forms on the backs, with Skinner requesting the equivalent of four postage stamps. The third number is described as ‘free’ and does not include a form.

3 loose leaves of white paper, text printed in black on both sides, fine condition.

[ref: 120153]



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