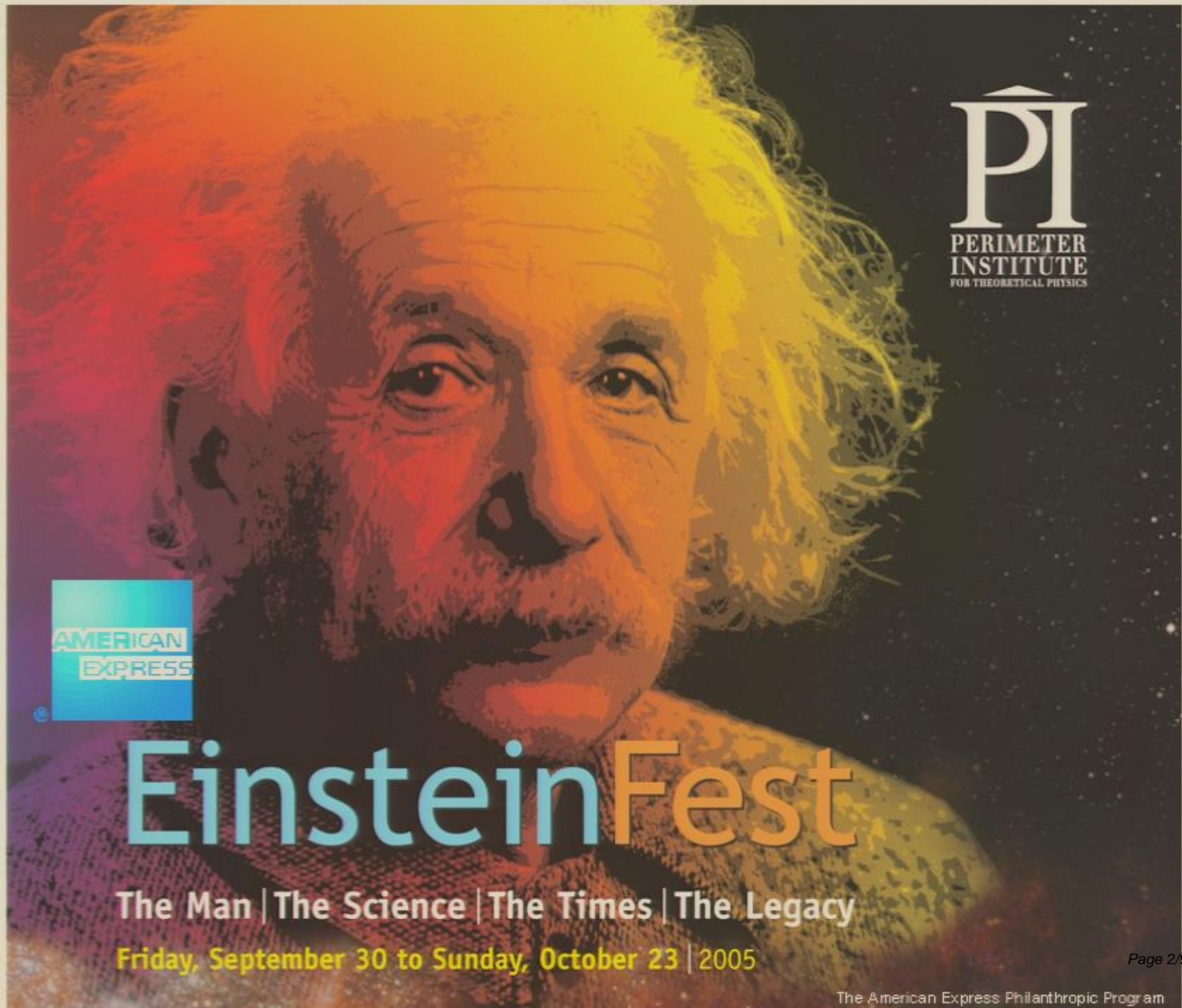


Title: Einstein, Picasso: Space, Time and the Beauty that Causes Havoc

Date: Oct 17, 2005 07:00 PM

URL: <http://pirsa.org/05100031>

Abstract: The most important scientist of the twentieth century, and its most important artist, went through their periods of greatest creativity almost simultaneously and in remarkably similar circumstances: Einstein's special theory of relativity and Picasso's Les Demoiselles d'Avignon. It turns out they were both working on the same problem: the nature of space and time and, more particularly, simultaneity. When they produced these astonishing works, Einstein and Picasso were not the distinguished elderly figures that later became so familiar: they were in their twenties, unknown, feisty, dirt-poor, and prone to getting into trouble - their personal and creative beauty caused havoc. <kw>Arthur Miller, Einstein, Picasso, Les Demoisselle D'Avignon, Arts, science, biography, special relativity, space, time, simultaneity, </kw>



PI  
PERIMETER  
INSTITUTE  
FOR THEORETICAL PHYSICS



# EinsteinFest

The Man | The Science | The Times | The Legacy

Friday, September 30 to Sunday, October 23 | 2005

EINSTEIN



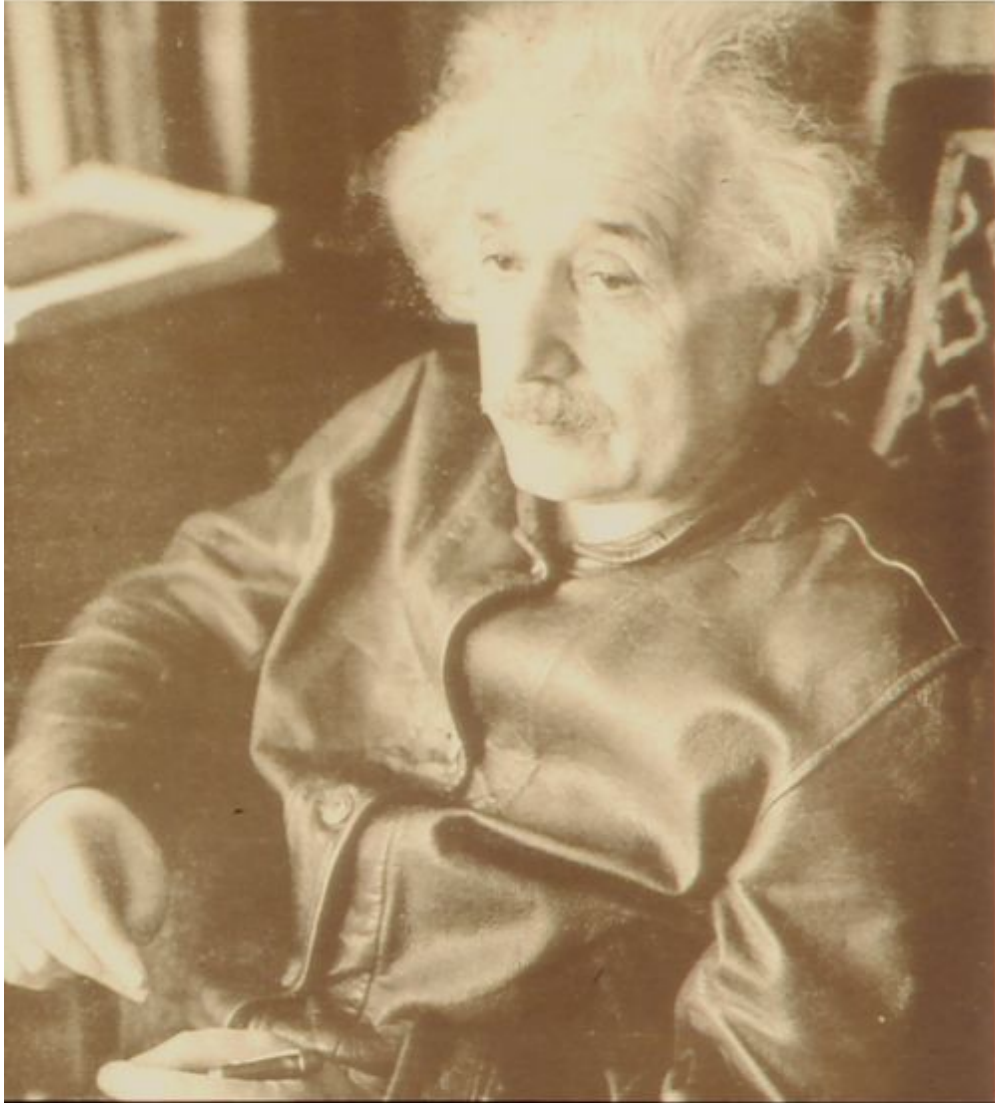
*SPACE, TIME,  
AND THE  
BEAUTY  
THAT CAUSES  
HAVOC*



ARTHUR I. MILLER

PICASSO





Pirsa: 05100031







# ***YOUNG EINSTEIN***

***'The kind of male beauty  
that caused such havoc'***

ALBERT EINSTEIN



*The  
Love  
Letters*

MILEVA MARIĆ







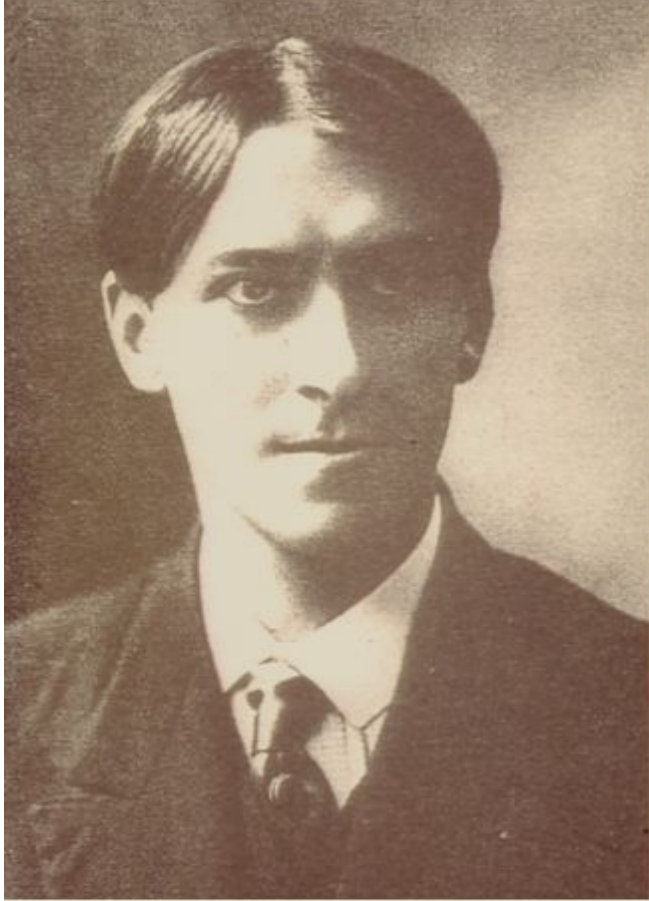






# ***YOUNG PICASSO***

***'A Good-Looking Bootblack'***

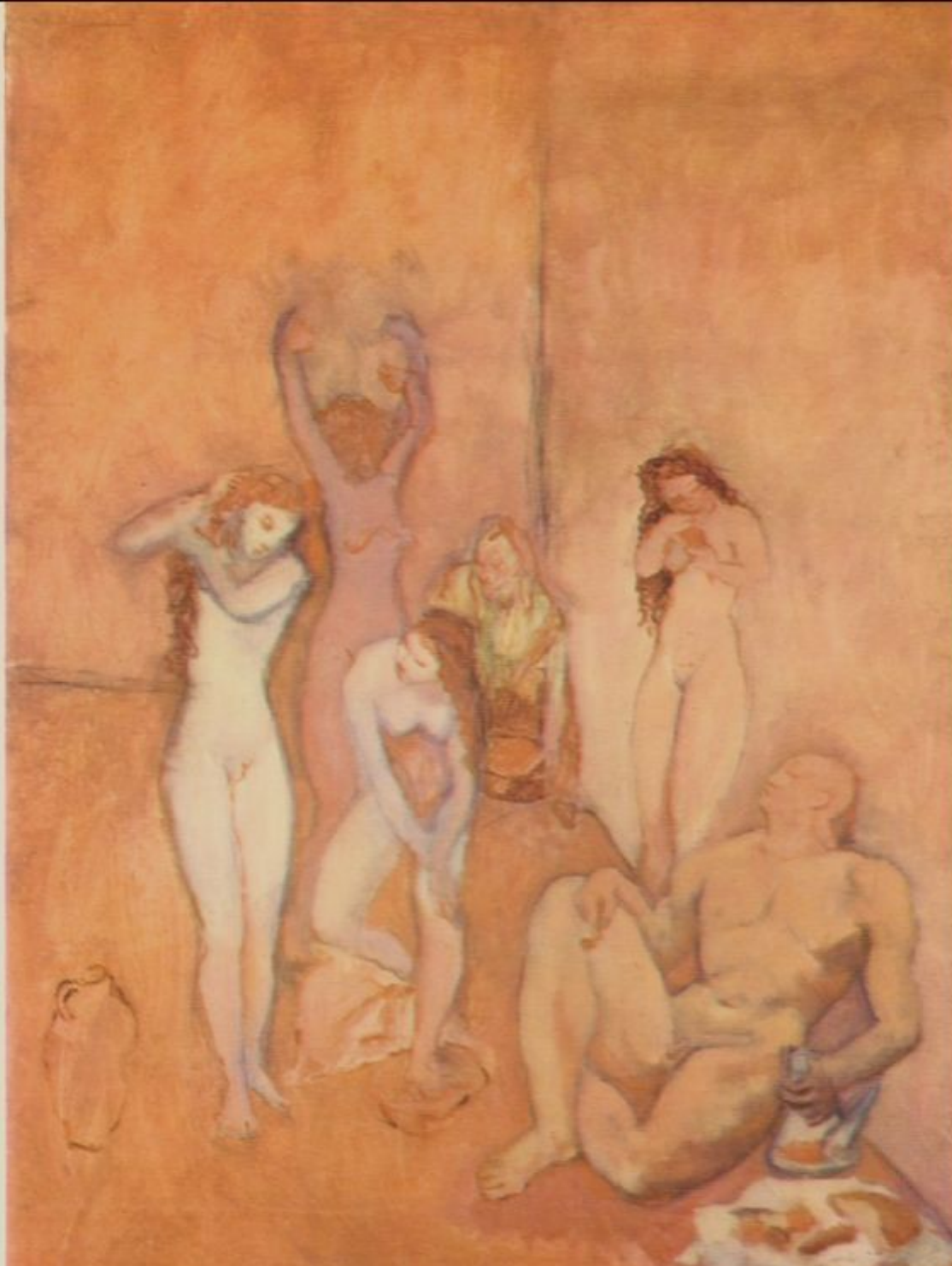


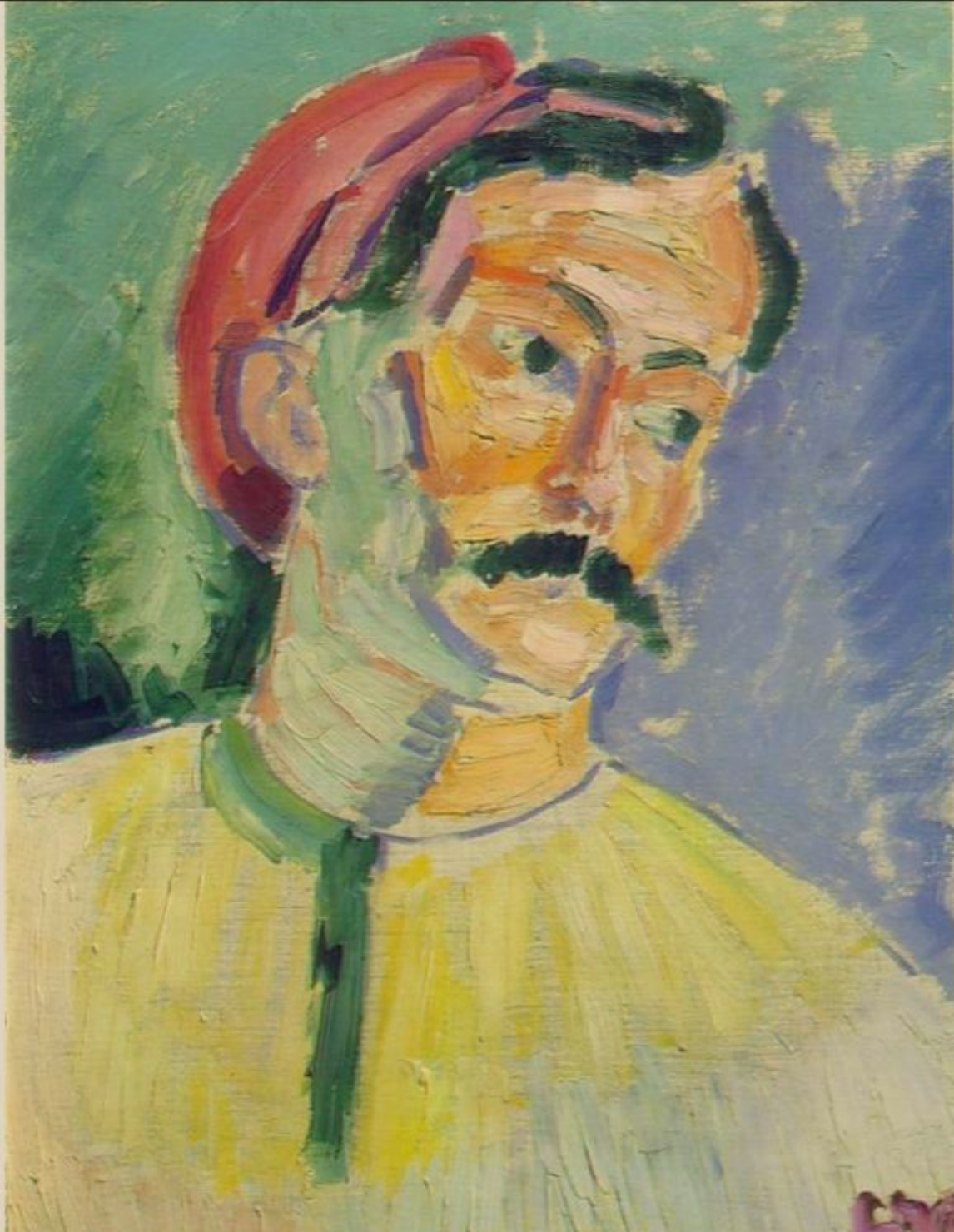








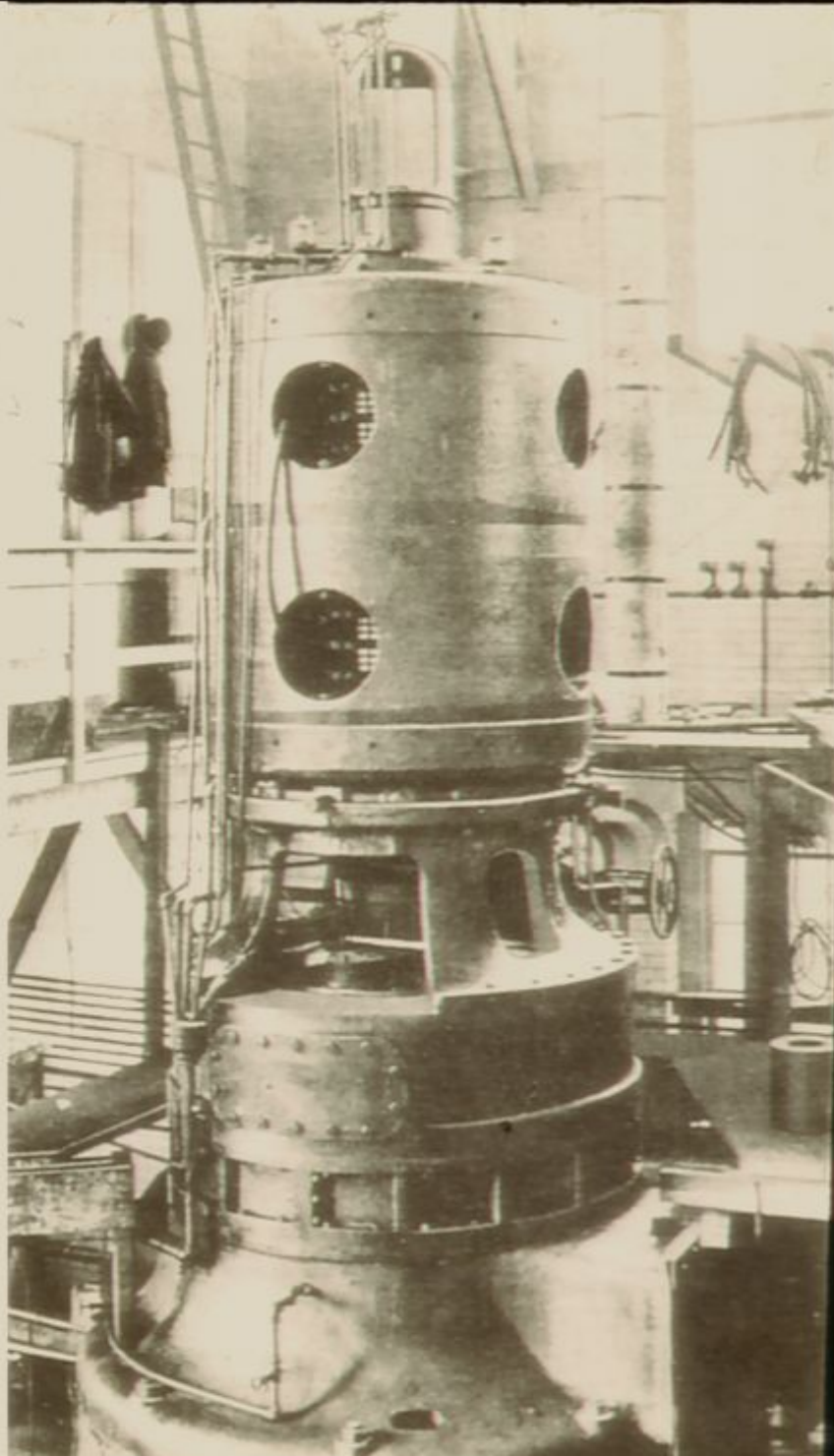


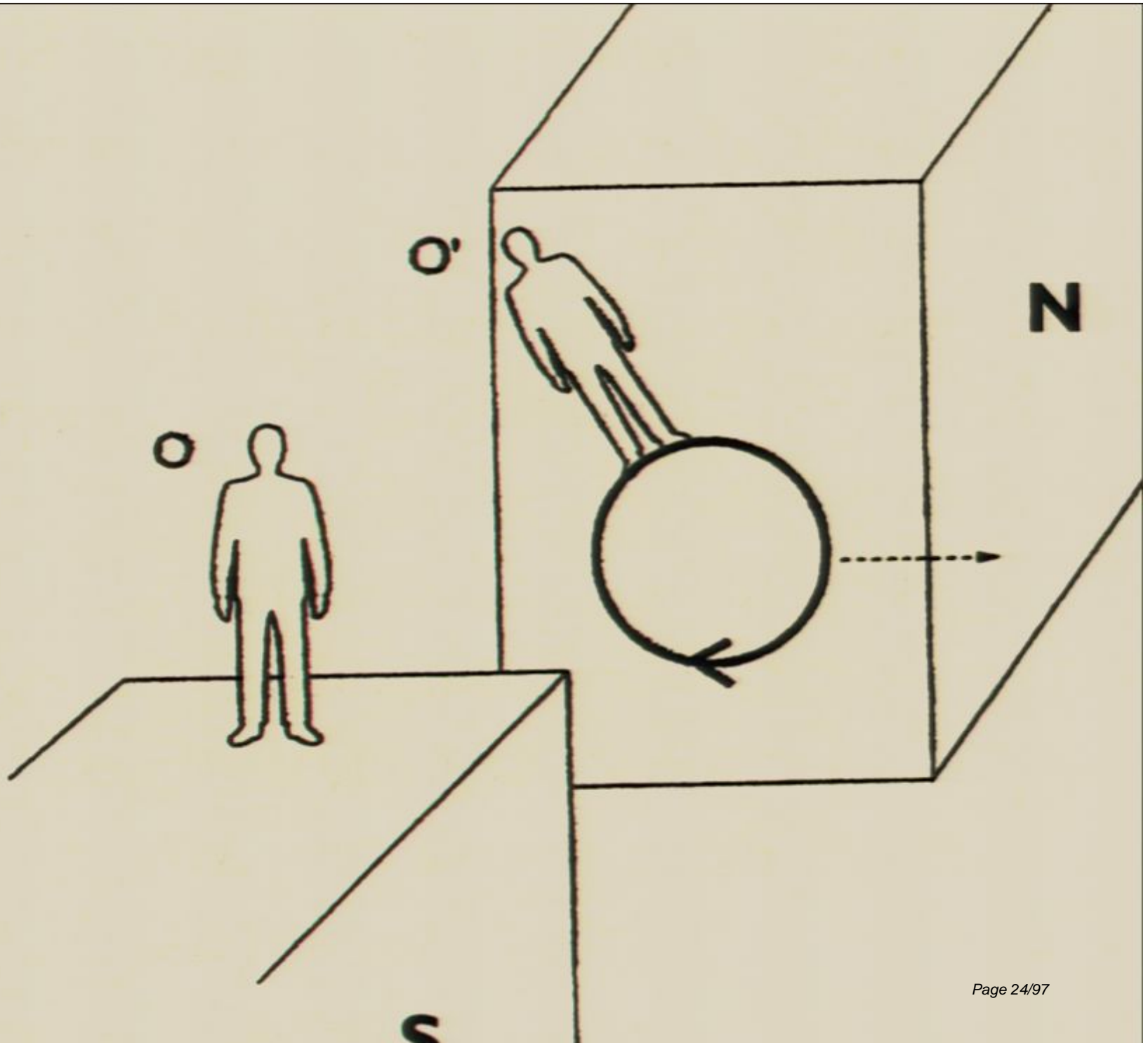




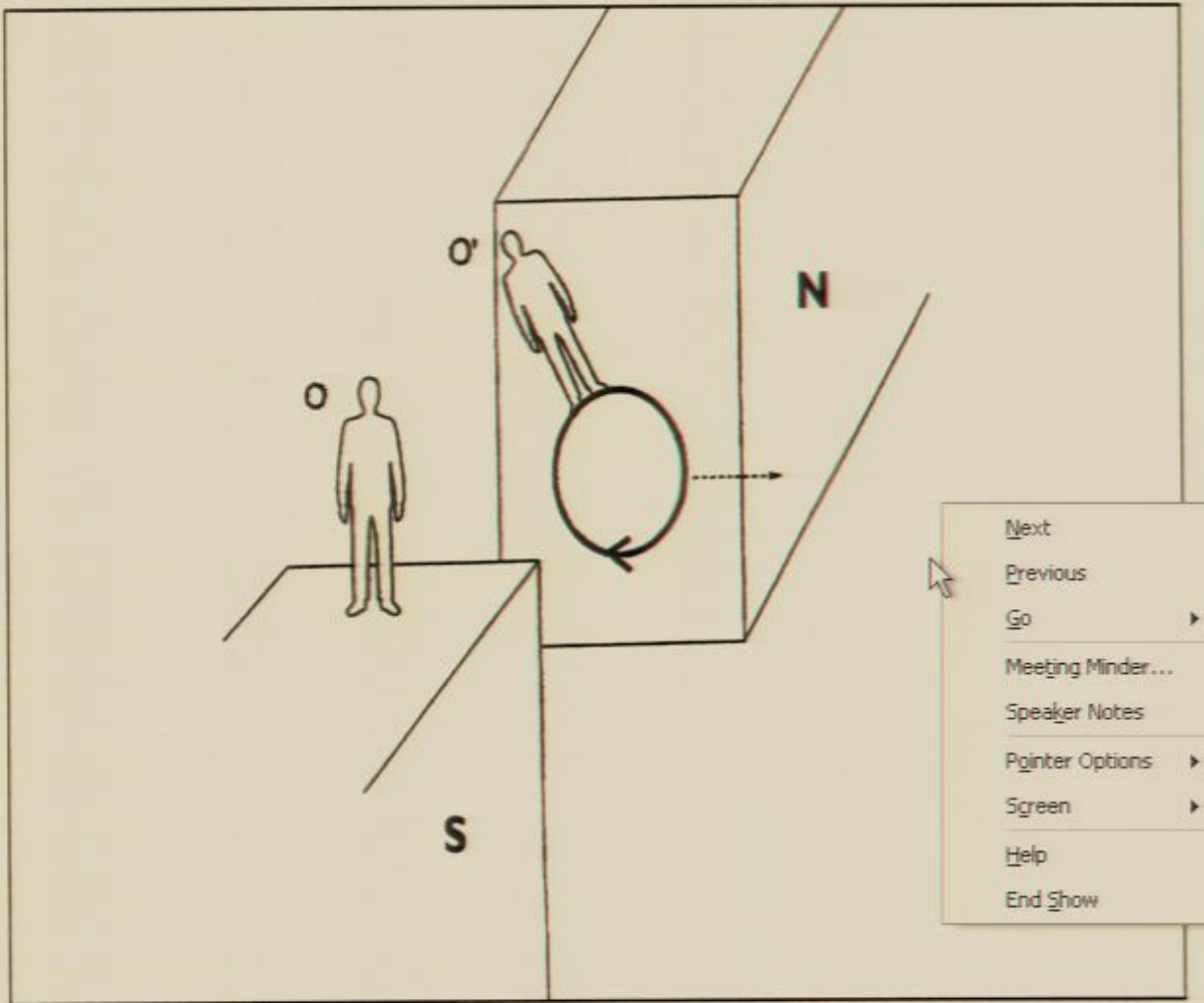
***EINSTEIN'S***

***AESTHETIC DISCONTENTS***

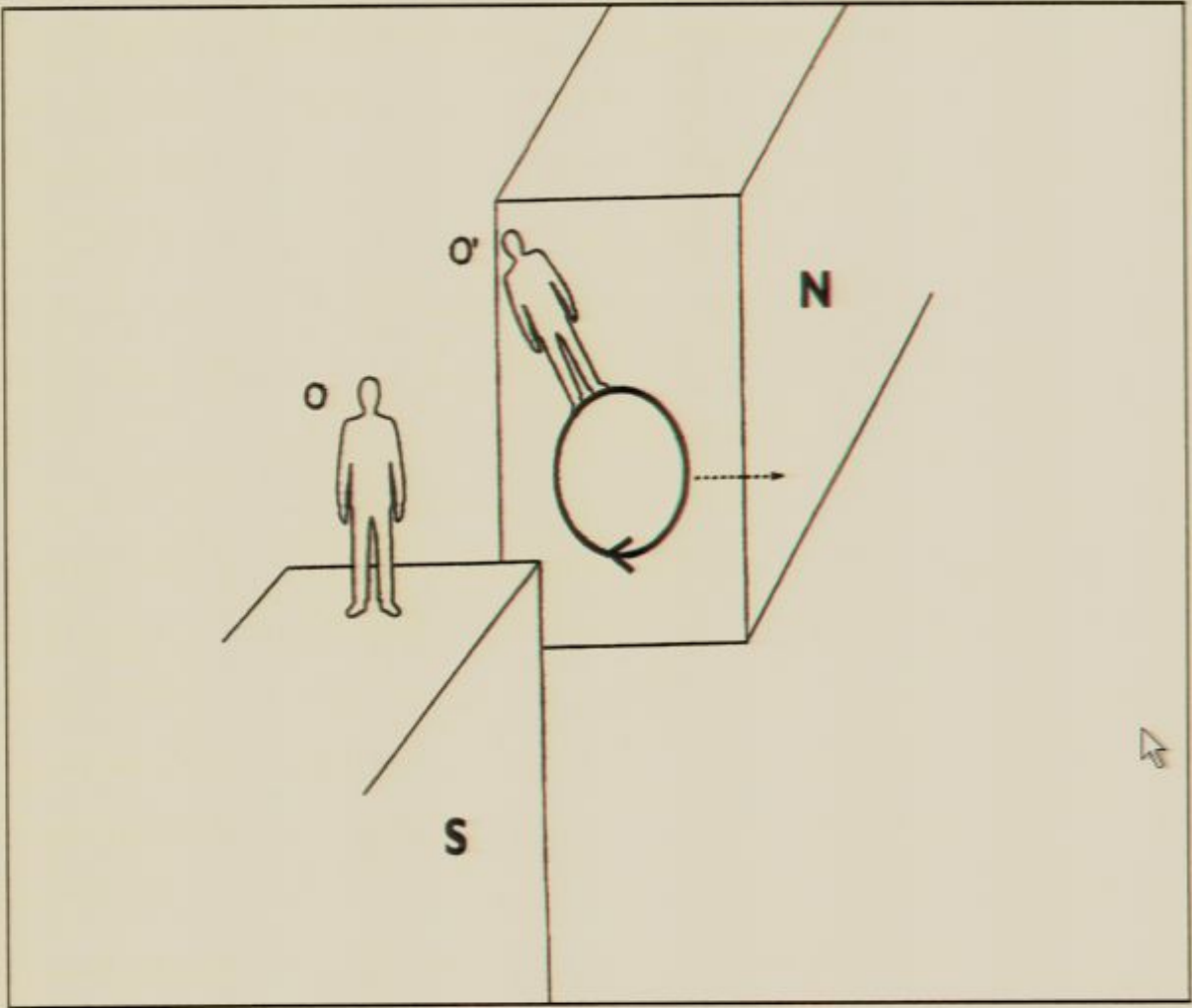


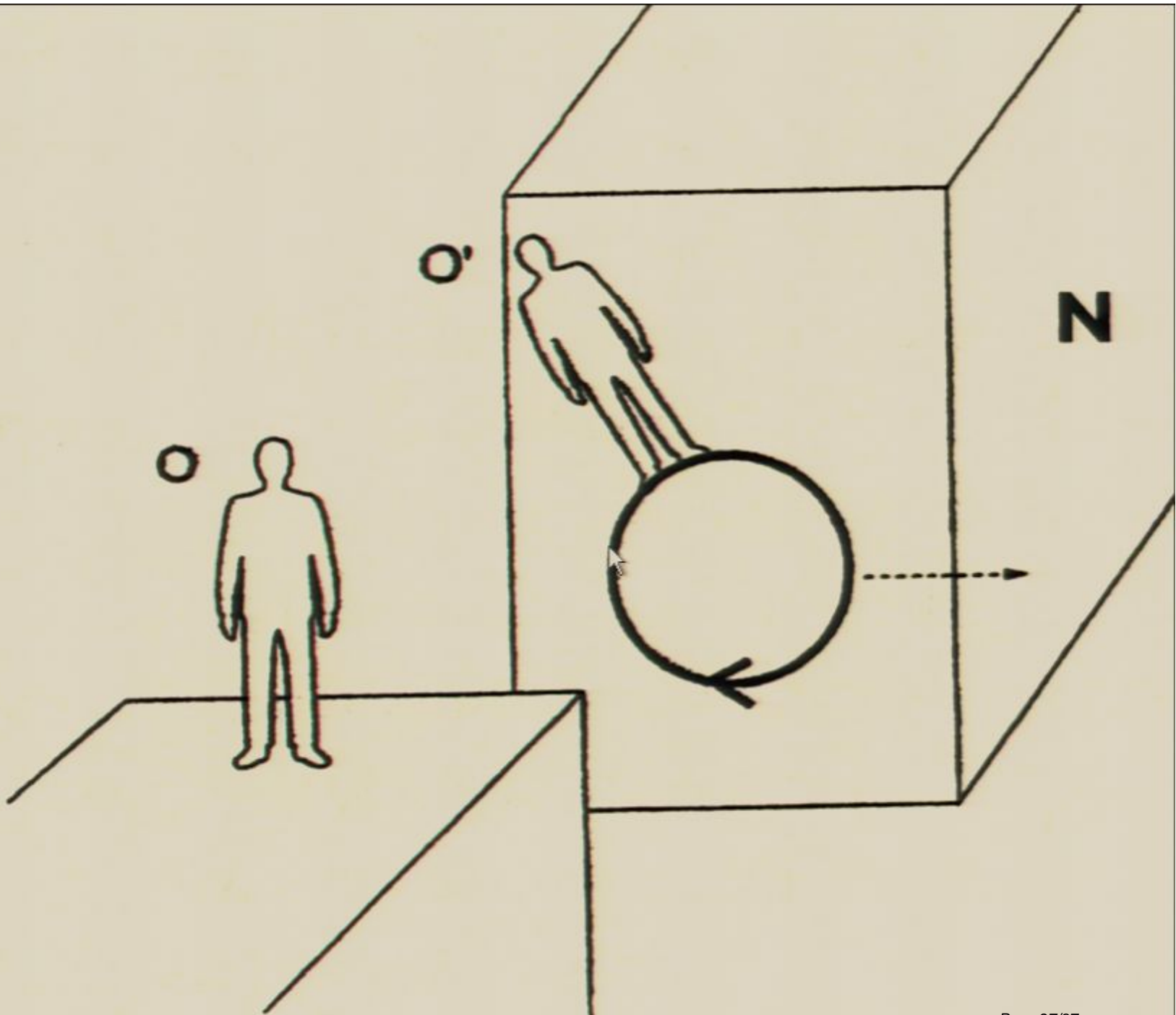


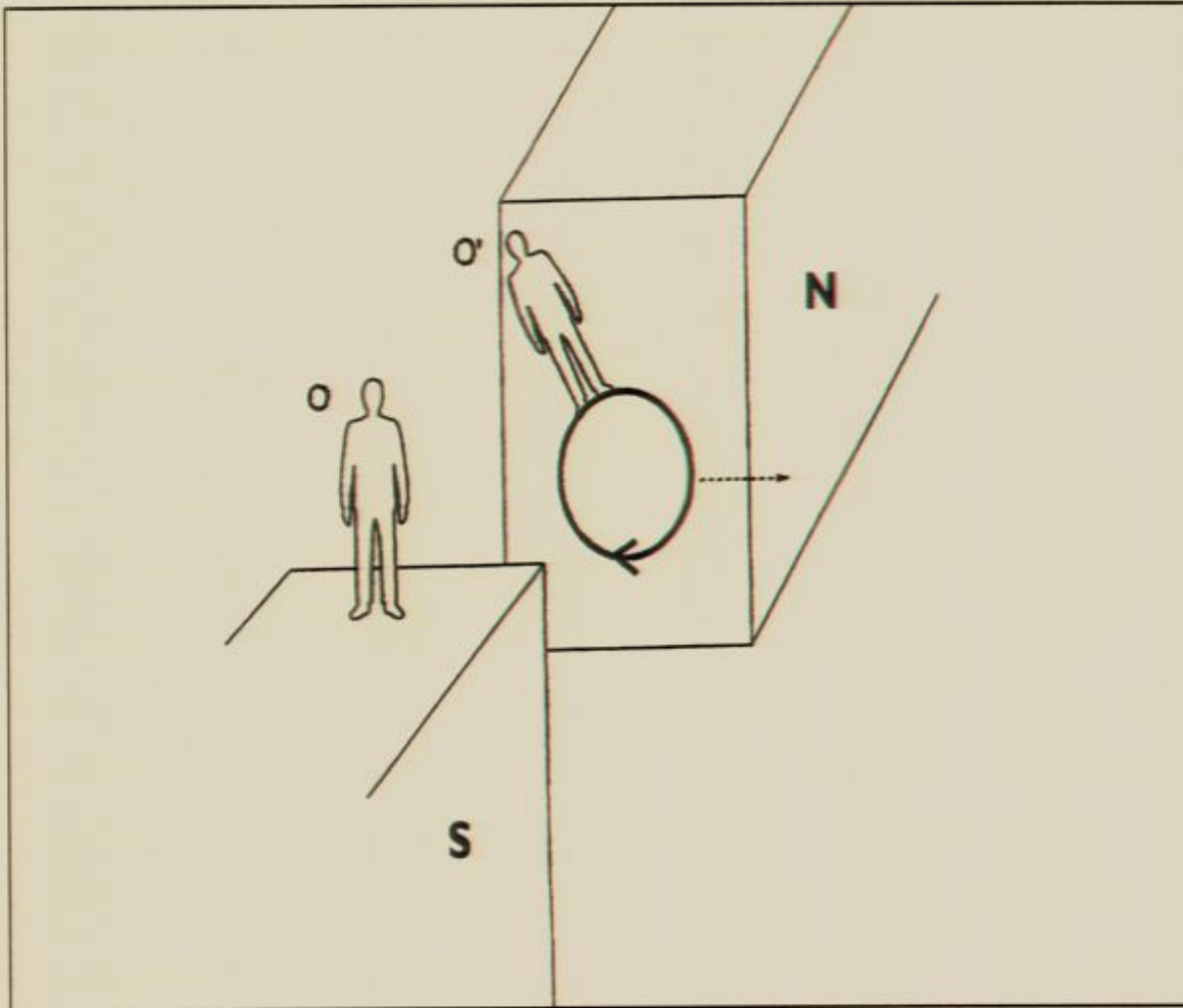




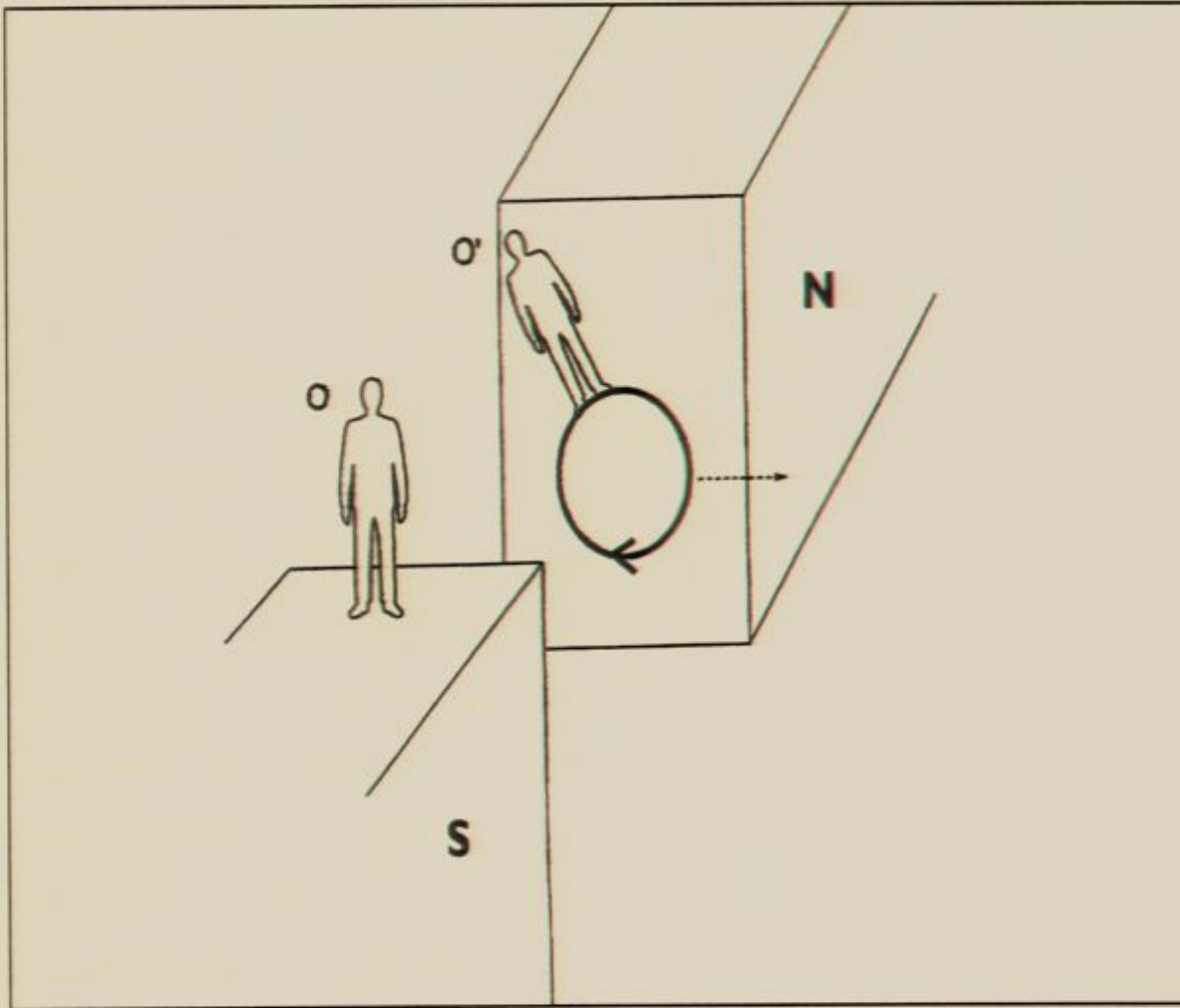
**Redundancy in explanation is unaesthetic – an *asymmetry***





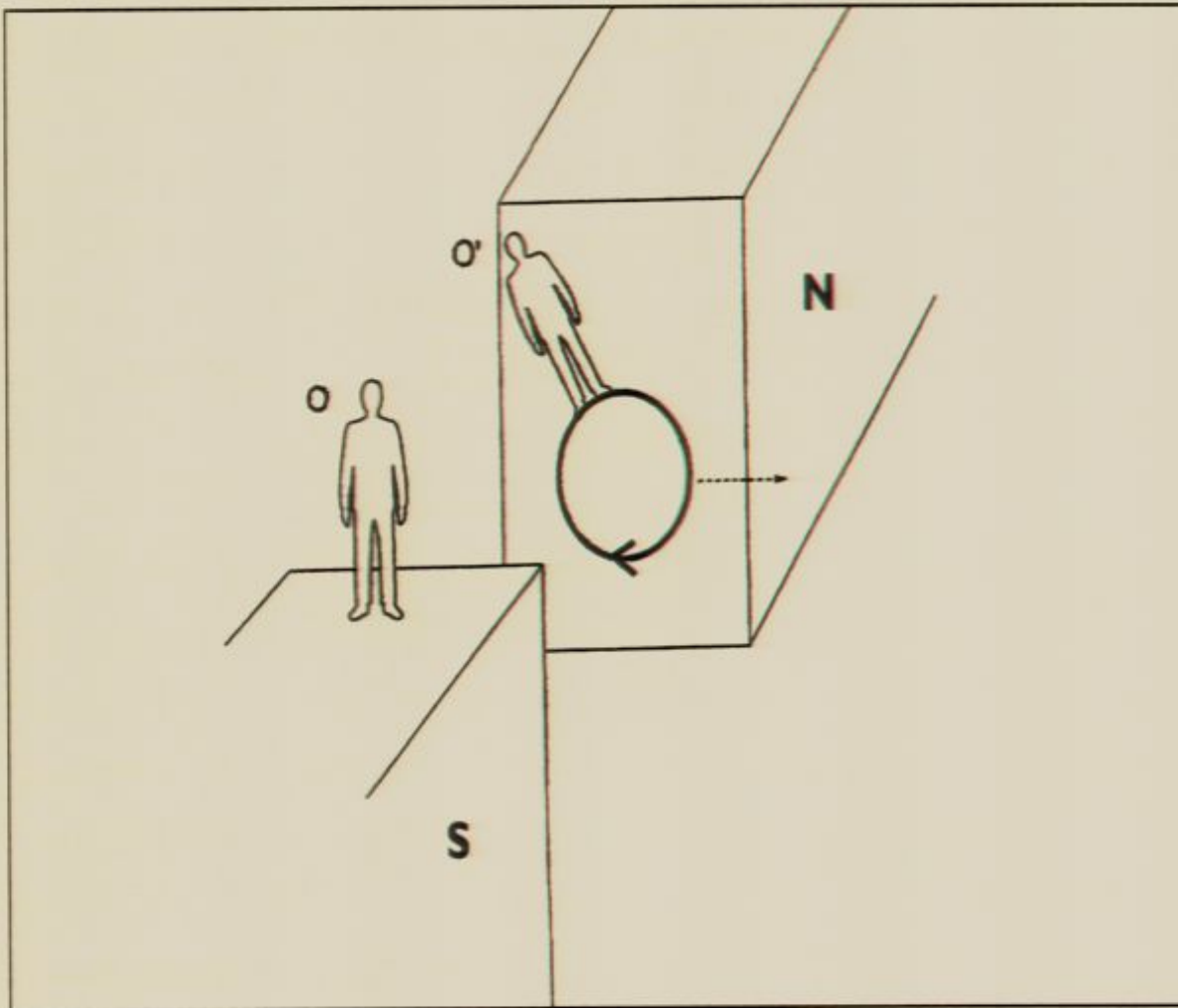


**Redundancy in explanation is unaesthetic – an *asymmetry***



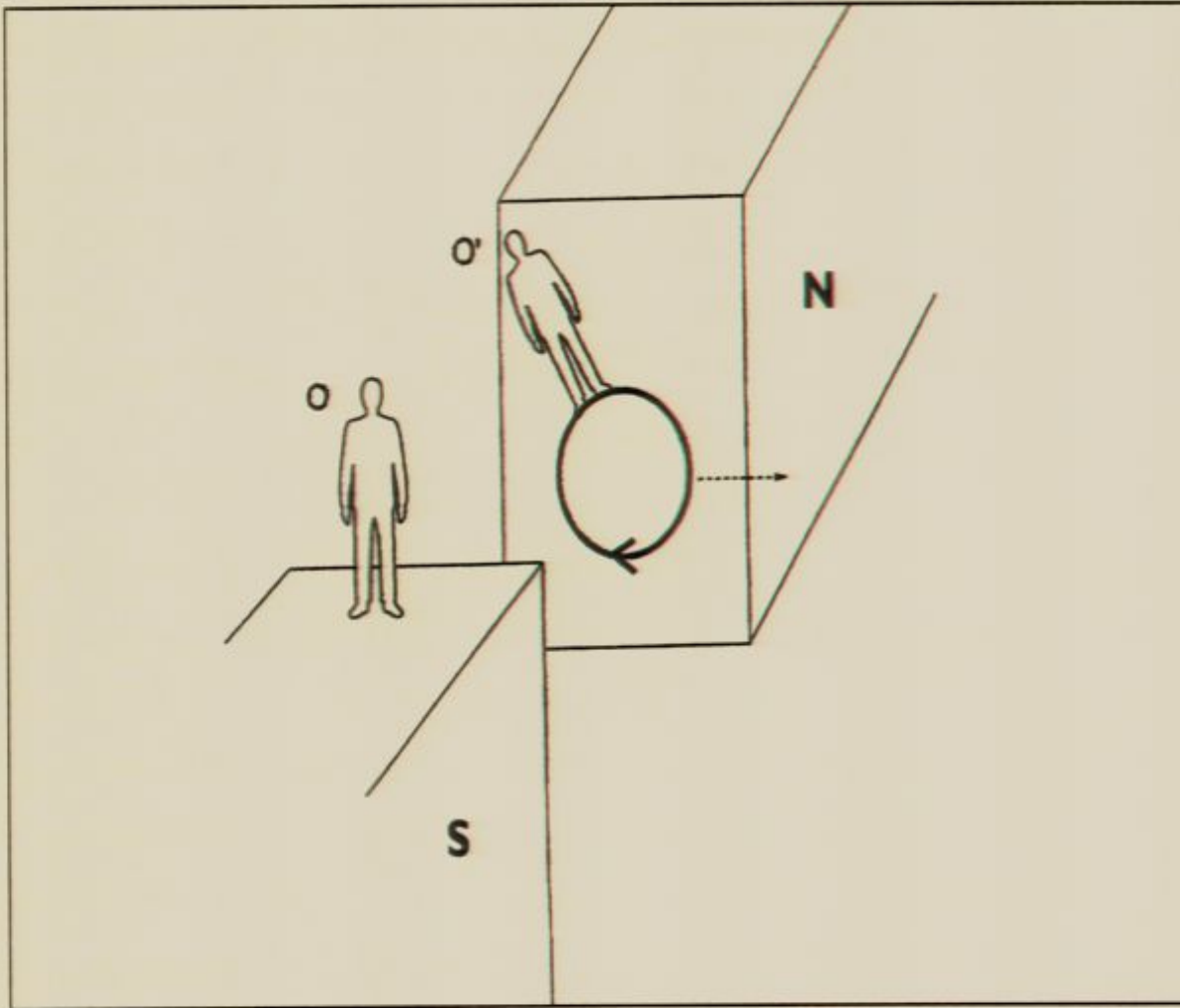
Redundancy in explanation is unaesthetic – an *asymmetry*

No real difference – only one of viewpoint



Redundancy in explanation is unaesthetic – an *asymmetry*

No real difference – only one of viewpoint → *Principle of Relativity*



Redundancy in explanation is unaesthetic – an *asymmetry*

No real difference – only one of viewpoint → *Principle of Relativity*

# *Conception over Perception*



# PICASSO'S ANGST















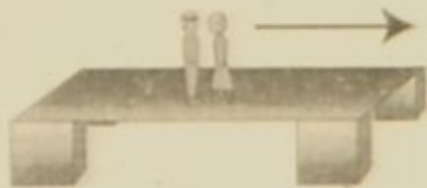


# *EINSTEIN DISCOVERS SPECIAL RELATIVITY*





Observers on Platform B do *not* measure the two events on Platform A to be simultaneous – Event 1 occurs *before* Event 2.

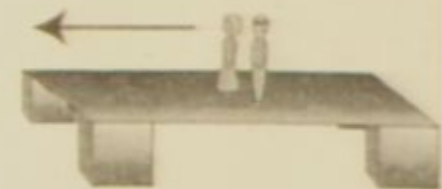


Platform B



Platform A

Events 1 and 2 are simultaneous events on Platform A.



Platform C

Observers on Platform C measure that Event 2 occurs *before* Event 1.

# ***PICASSO DISCOVERS THE FOURTH DIMENSION***



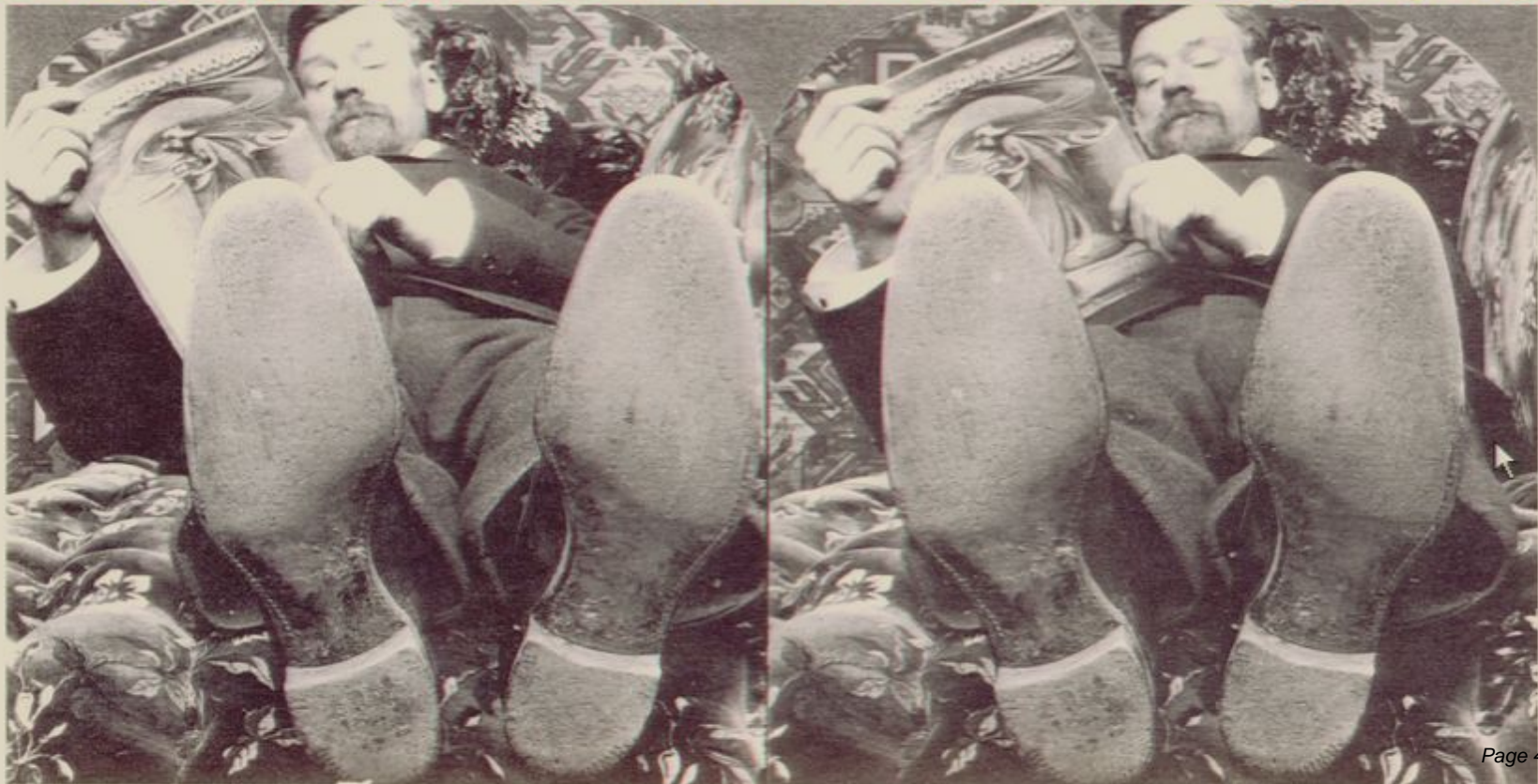
# ***AVANT-GARDE DEVELOPMENTS***

- ***Technology: Aeroplanes, wireless telegraphy, Automobiles, Photography***



# AVANT-GARDE DEVELOPMENTS

- *Technology: Aeroplanes, wireless telegraphy, Automobiles, Photography*



# ***AVANT-GARDE DEVELOPMENTS***

- ***Technology: Aeroplanes, wireless telegraphy, Automobiles, Photography***
- ***Science: X-Rays***

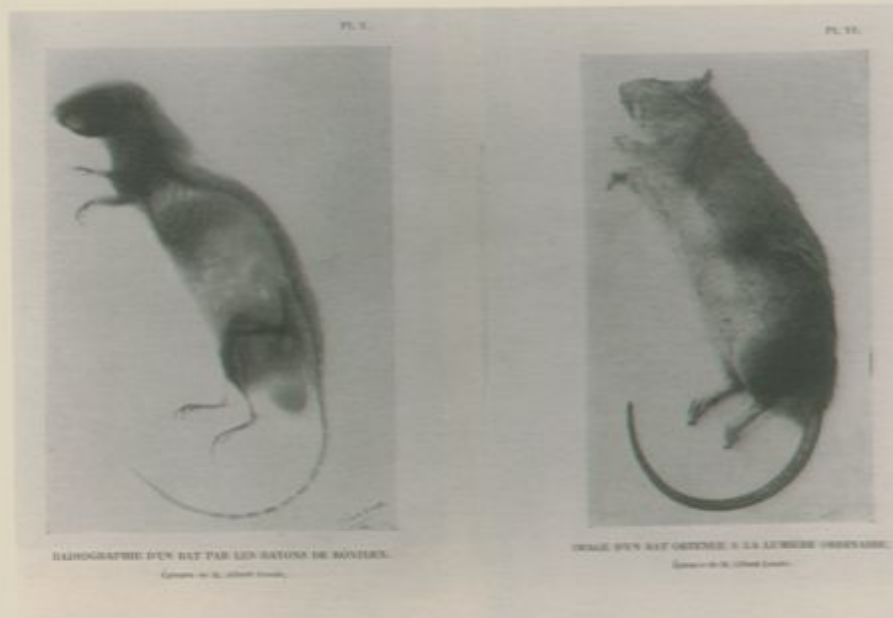




4 Albert Robida, "Variations sur les rayons X," *La Nature*, May 9, 1896, p. 91.



5 Early French advertisements for X-ray equipment, from Otto Glasser, *Wilhelm Conrad Röntgen und die Geschichte der Röntgenstrahlen*, Berlin, 1931, p. 281.

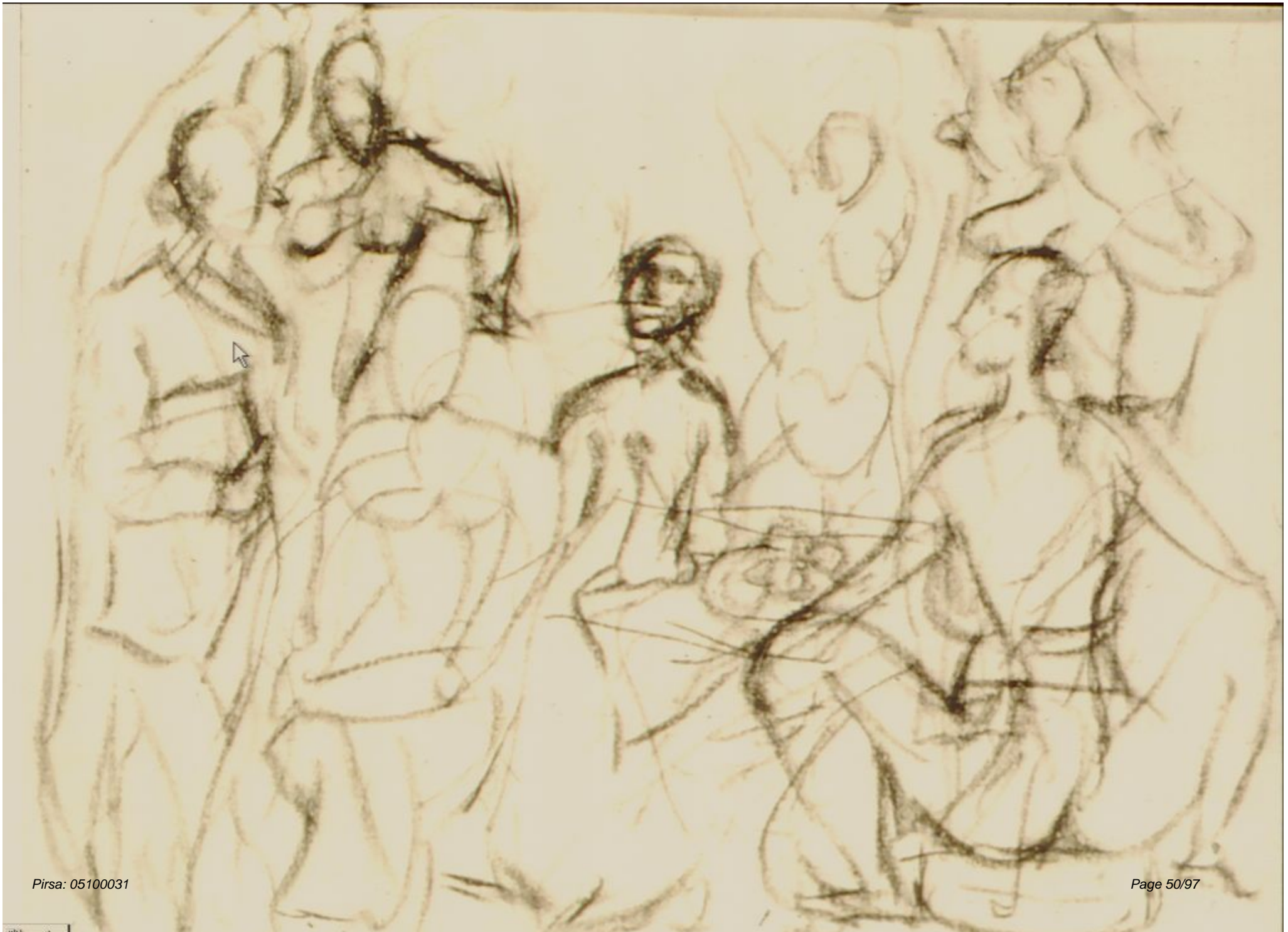


6 Albert Londe, photographs taken with X-rays and with ordinary light, from Charles-Edouard Guillaume,



# ***AVANT-GARDE DEVELOPMENTS***

- ***Technology: Aeroplanes, wireless telegraphy, Automobiles, Photography***
- ***Science: X-Rays***
- ***Mathematics: Exotic multidimensional geometries***







TRAITÉ ÉLÉMENTAIRE  
DE  
GÉOMÉTRIE A QUATRE DIMENSIONS

ET INTRODUCTION  
A LA GÉOMÉTRIE A  $n$  DIMENSIONS,

PAR

E. JOUFFRET,

Lieutenant-Colonel d'Artillerie en retraite,  
Ancien Élève de l'École Polytechnique,  
Officier de la Légion d'honneur,  
Officier de l'Instruction publique.  
Membre de la Société mathématique de France.

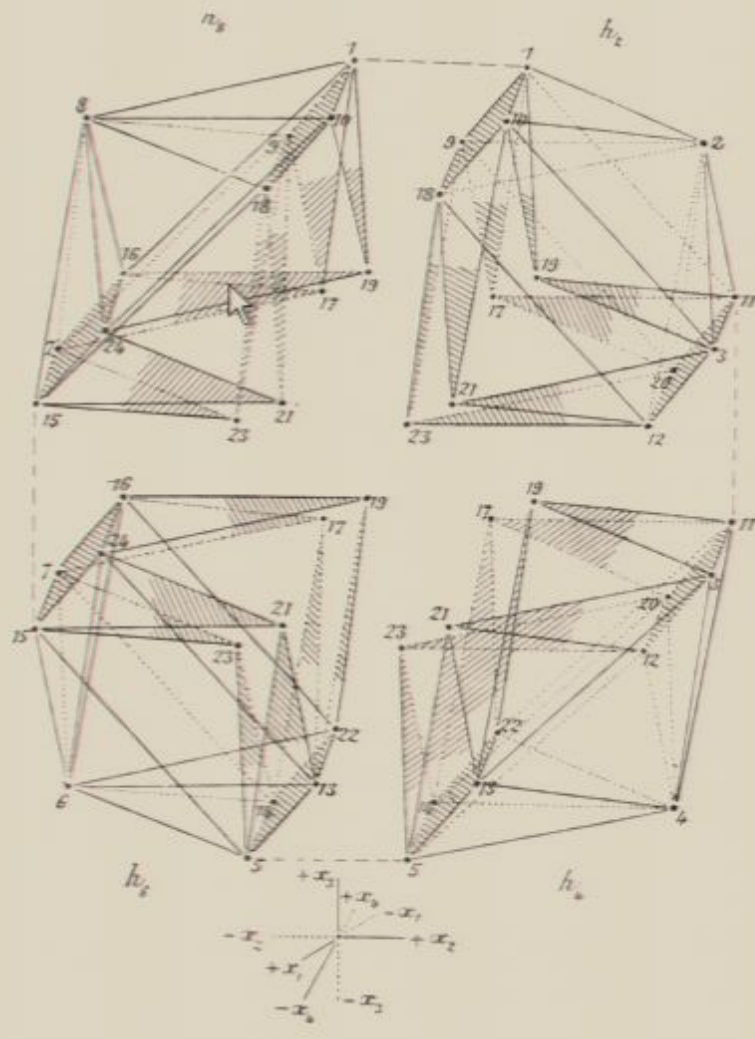
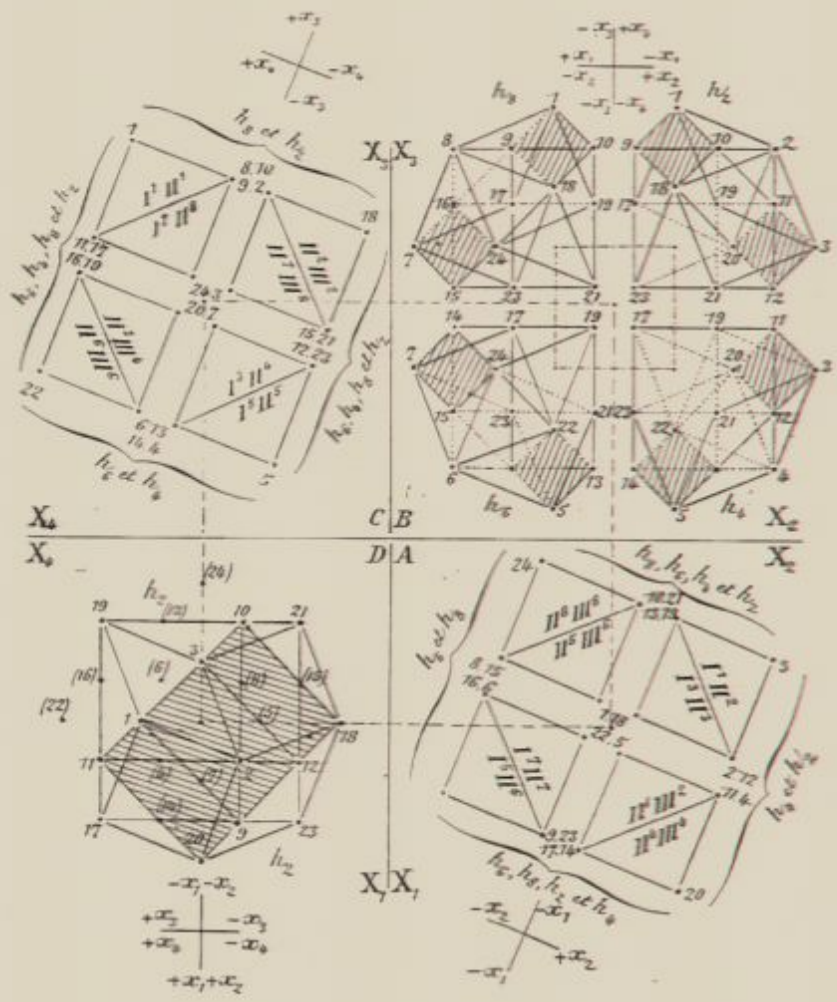


PARIS,

GAUTHIER-VILLARS, IMPRIMEUR-LIBRAIRE

DU BUREAU DES LONGITUDES, DE L'ÉCOLE POLYTECHNIQUE,  
Quai des Grands-Augustins, 55.

1903





Pour le 33 anniversaire  
amicalement  
Picasso

7 juillet 1908

HENRI POINCARÉ XXX

LA SCIENCE XXXXXX  
ET L'HYPOTHÈSE (XX

XXXXXXXX FLAMMARION

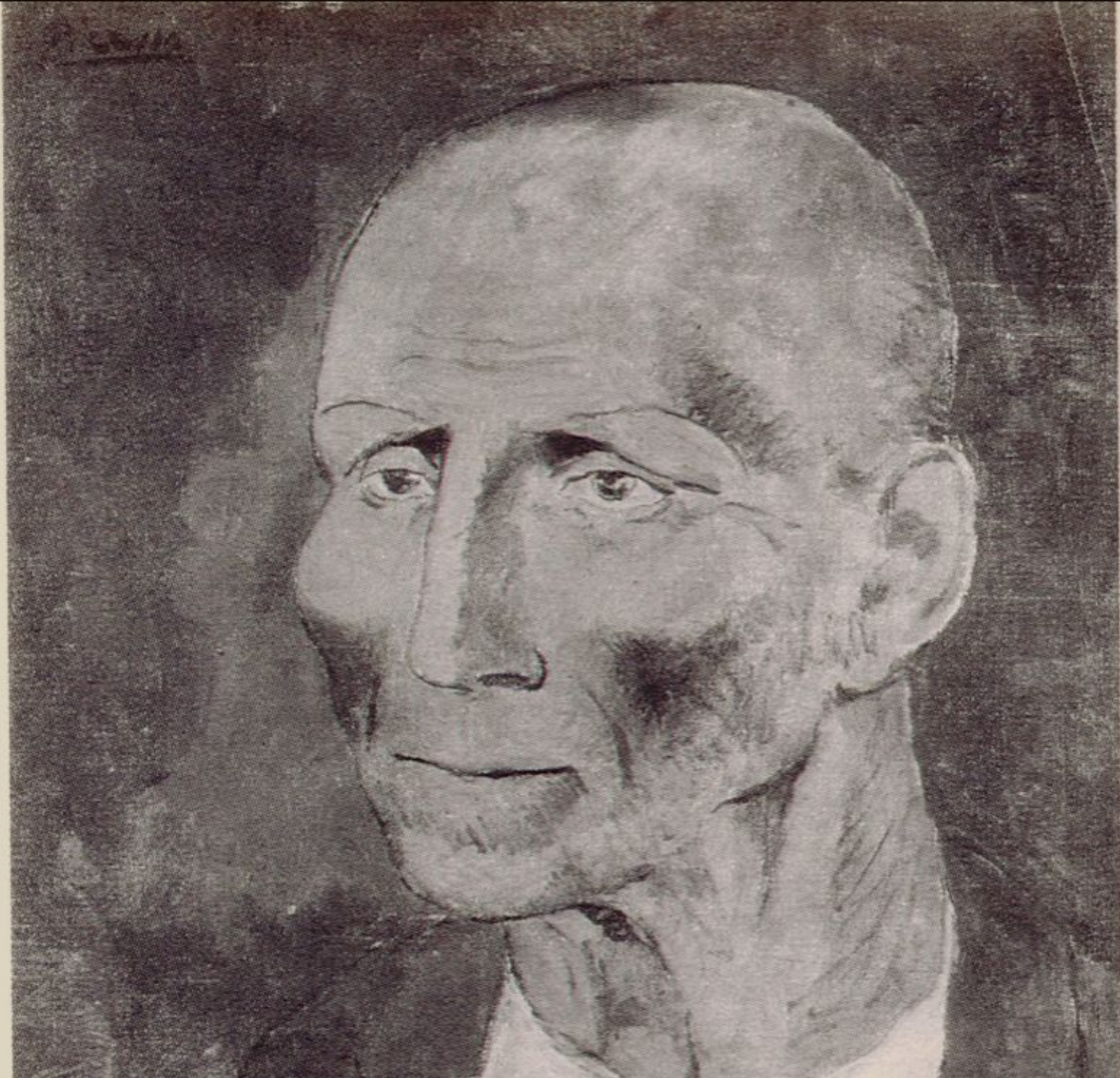


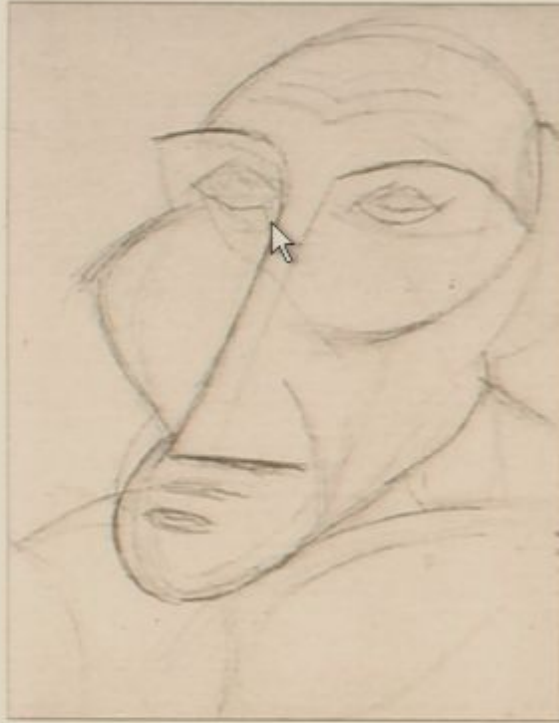
SCIENCE  
DE LA NATURE

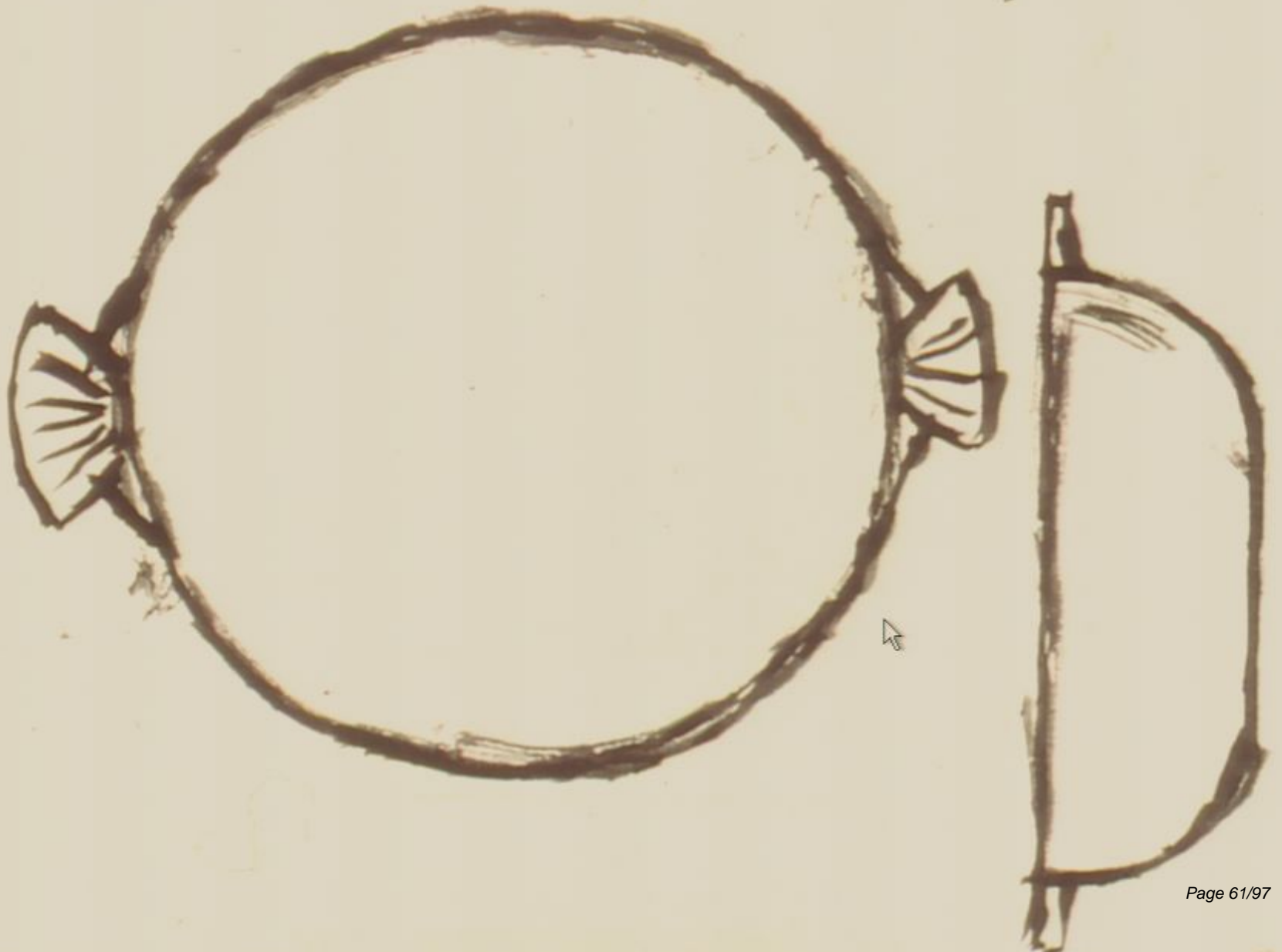


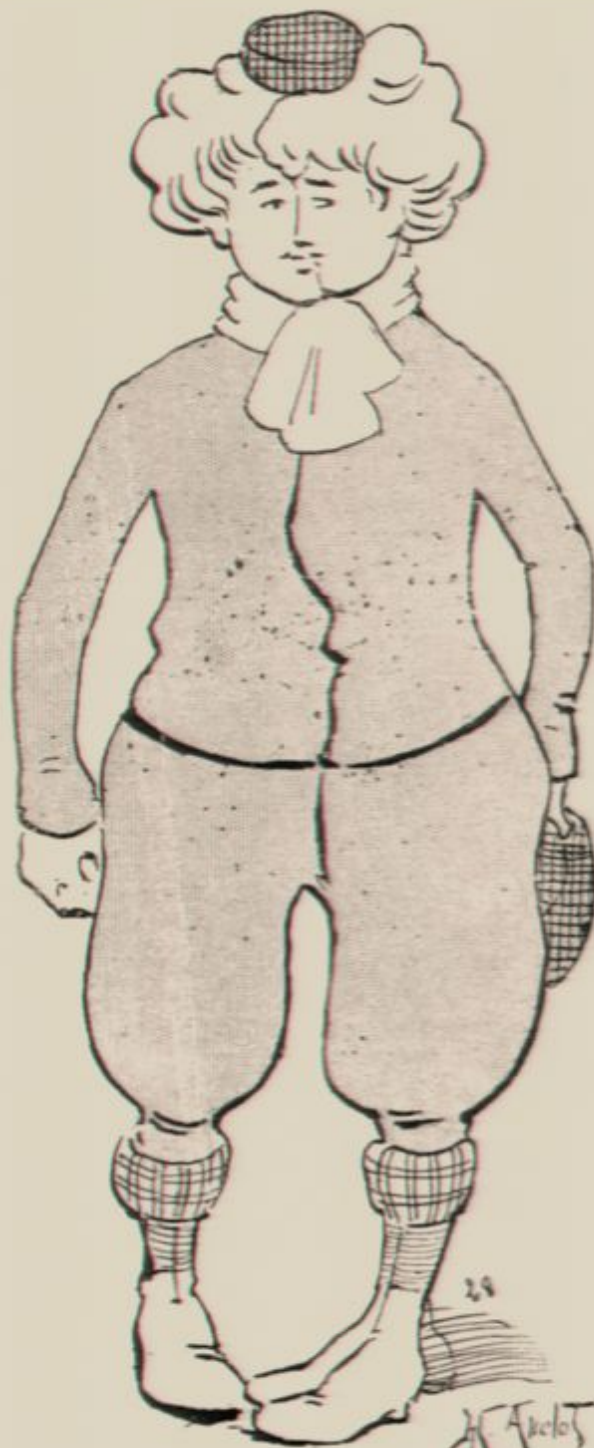














Afrique occidentale Française  
1072. SOUDAN - Types de Femmes



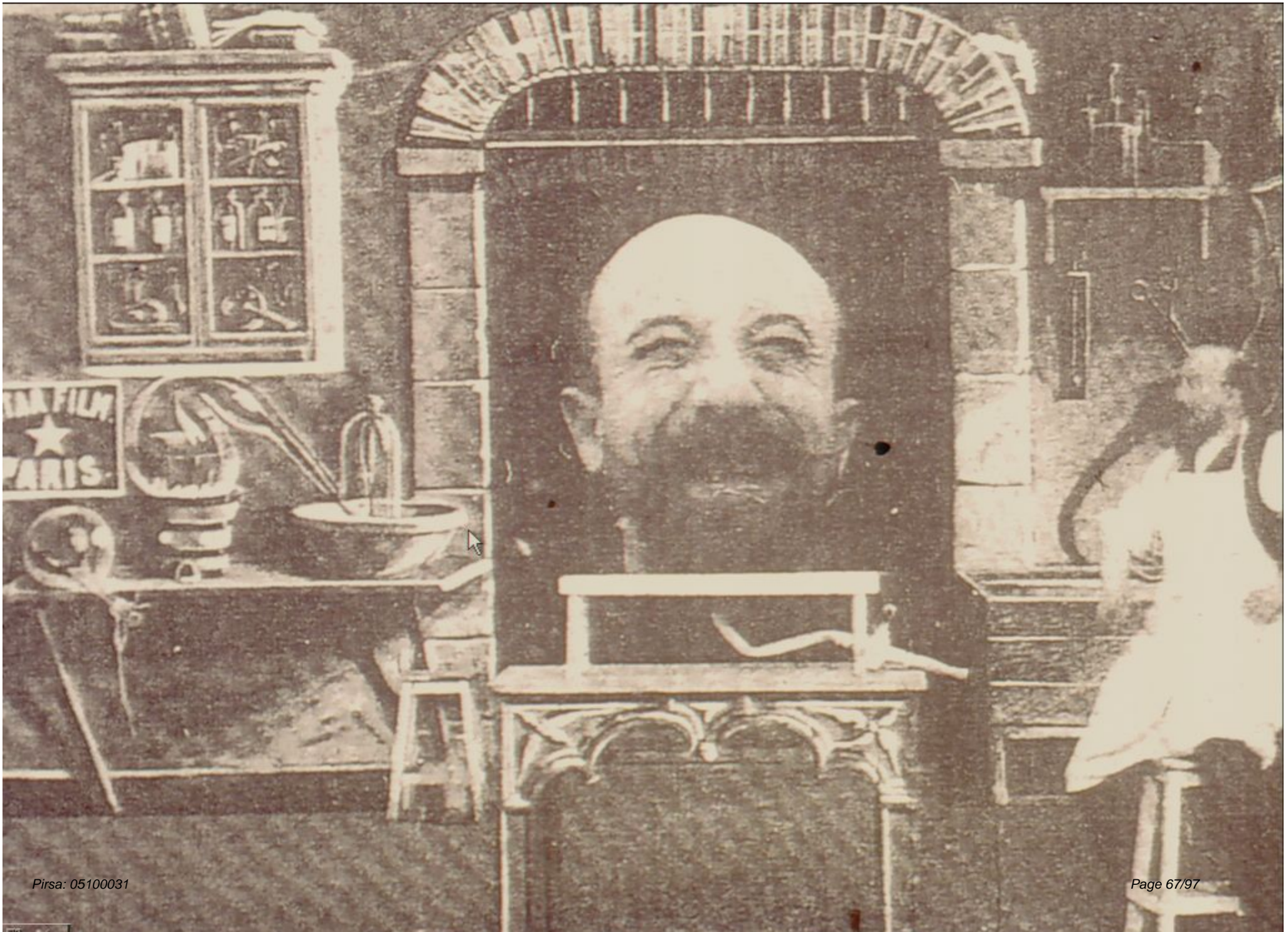
Collection Fottier, Dakar

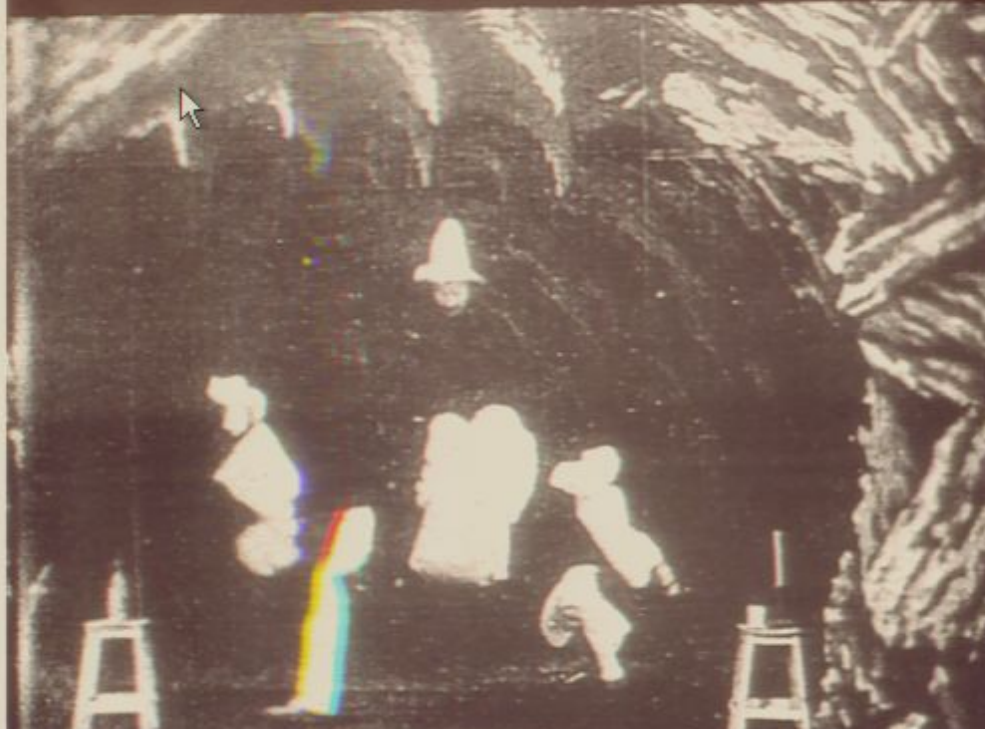
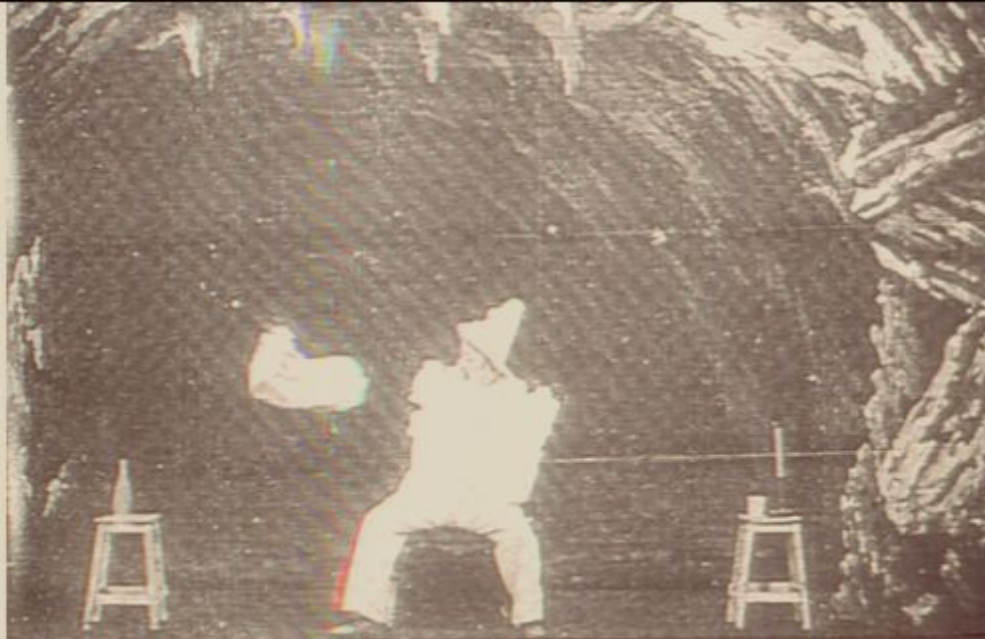




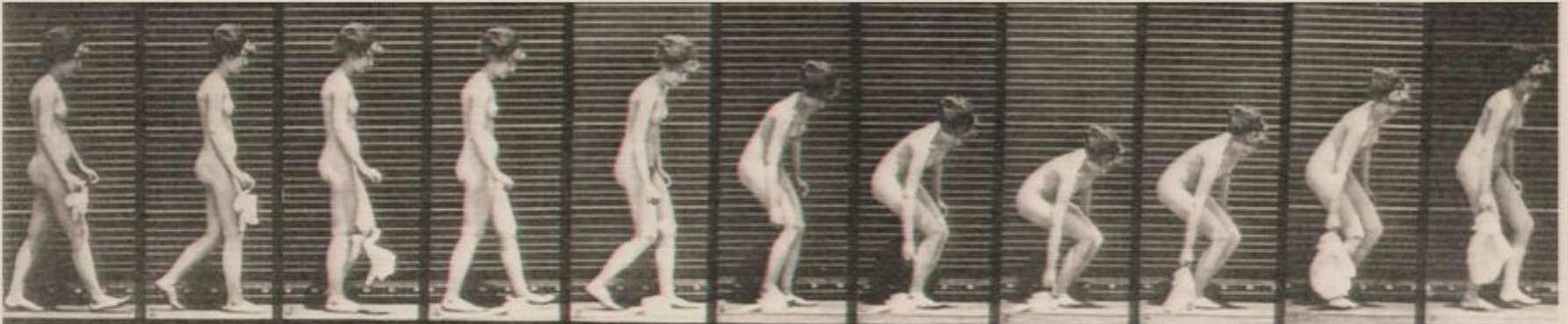
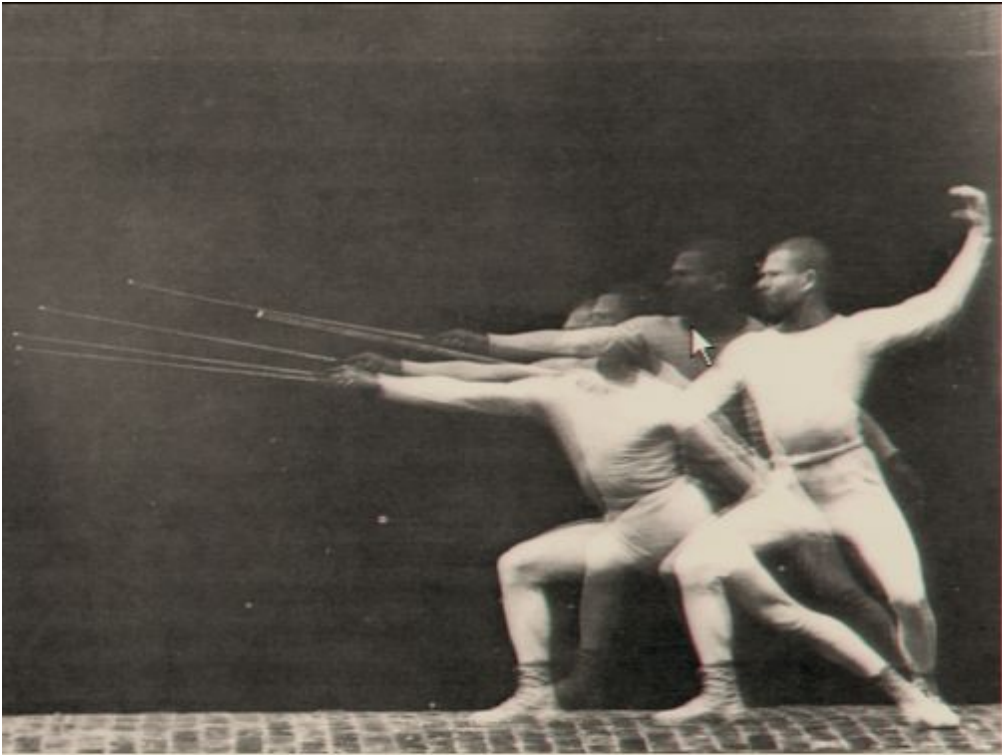














7

# ***EINSTEIN, PICASSO***





# EINSTEIN, PICASSO

## 3. Zur Elektrodynamik bewegter Körper; von A. Einstein.

Daß die Elektrodynamik Maxwells — wie dieselbe gegenwärtig aufgefaßt zu werden pflegt — in ihrer Anwendung auf bewegte Körper zu Asymmetrien führt, welche den Phänomenen nicht anzuhaften scheinen, ist bekannt. Man denke z. B. an die elektrodynamische Wechselwirkung zwischen einem Magneten und einem Leiter. Das beobachtbare Phänomen hängt hier nur ab von der Relativbewegung von Leiter und Magnet, während nach der üblichen Auffassung die beiden Fälle, daß der eine oder der andere dieser Körper der bewegte sei, streng voneinander zu trennen sind. Bewegt sich nämlich der Magnet und ruht der Leiter, so entsteht in der Umgebung des Magneten ein elektrisches Feld von gewissem Energiewerte, welches an den Orten, wo sich Teile des Leiters befinden, einen Strom erzeugt. Ruht aber der Magnet und bewegt sich der Leiter, so entsteht in der Umgebung des Magneten kein elektrisches Feld, dagegen im Leiter eine elektromotorische Kraft, welcher an sich keine Energie entspricht, die aber — Gleichheit der Relativbewegung bei den beiden ins Auge gefaßten Fällen vorausgesetzt — zu elektrischen Strömen von derselben Größe und demselben Verlaufe Veranlassung gibt, wie im ersten Falle die elektrischen Kräfte.

Beispiele ähnlicher Art, sowie die mißlungenen Versuche, eine Bewegung der Erde relativ zum „Lichtmedium“ zu konstatieren, führen zu der Vermutung, daß dem Begriffe der absoluten Ruhe nicht nur in der Mechanik, sondern auch in der Elektrodynamik keine Eigenschaften der Erscheinungen ent-



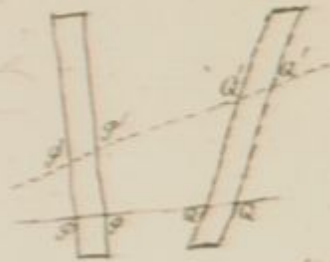
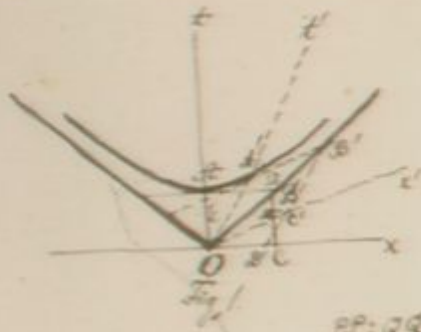
# *Tiles of Creativity*



# *Tiles of Creativity*

## ➤ *Geometry*





$$PP' = QQ' = OC \cdot OS'$$

$$= OC \cdot OS = Q'Q \cdot OS'$$

*Two strips parallel*



Fig. 1.



Fig. 2.



# *Tiles of Creativity*

- *Geometry*
- *Technology*



# *Tiles of Creativity*

- *Geometry*
- *Technology*
- *Science*



# *Tiles of Creativity*

- ***Geometry***
- ***Technology***
- ***Science***
- ***Aesthetics***

# *Tiles of Creativity*

- ***Geometry***
- ***Technology***
- ***Science***
- ***Aesthetics***
- ***Competitiveness***



# *Tiles of Creativity*

- ***Geometry***
- ***Technology***
- ***Science***
- ***Aesthetics***
- ***Competitiveness***
- ***Sex***

# *Tiles of Creativity*

- *Geometry*
- *Technology*
- *Science*
- *Aesthetics*
- *Competitiveness*
- *Sex*
- *Philosophy and Literature*

# Einstein and Picasso - *Nature of Simultaneity*



# Einstein and Picasso - *Nature of Simultaneity*

Breakthroughs –

➤ Conception over perception

# Einstein and Picasso - *Nature of Simultaneity*

## Breakthroughs –

- Conception over perception
- The discovery of a new aesthetic -

Einstein – minimalism

Picasso – reduction of forms to geometry

# *Einstein and Picasso Responded to the Avant-Garde*



# *Einstein and Picasso Responded to the Avant-Garde*



*Principal Problem –*

**NATURE OF SPACE AND TIME**

**REPRESENTATION OF SIMULTANEITY**

# *Einstein and Picasso Responded to the Avant-Garde*



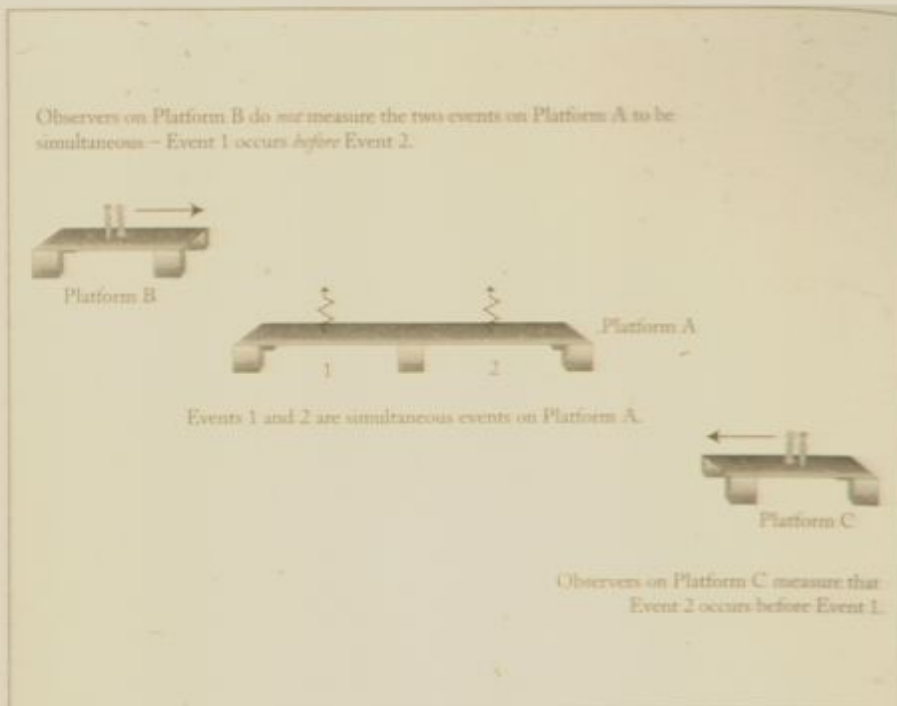
*Principal Problem –*

*NATURE OF SPACE AND TIME*

*REPRESENTATION OF SIMULTANEITY*

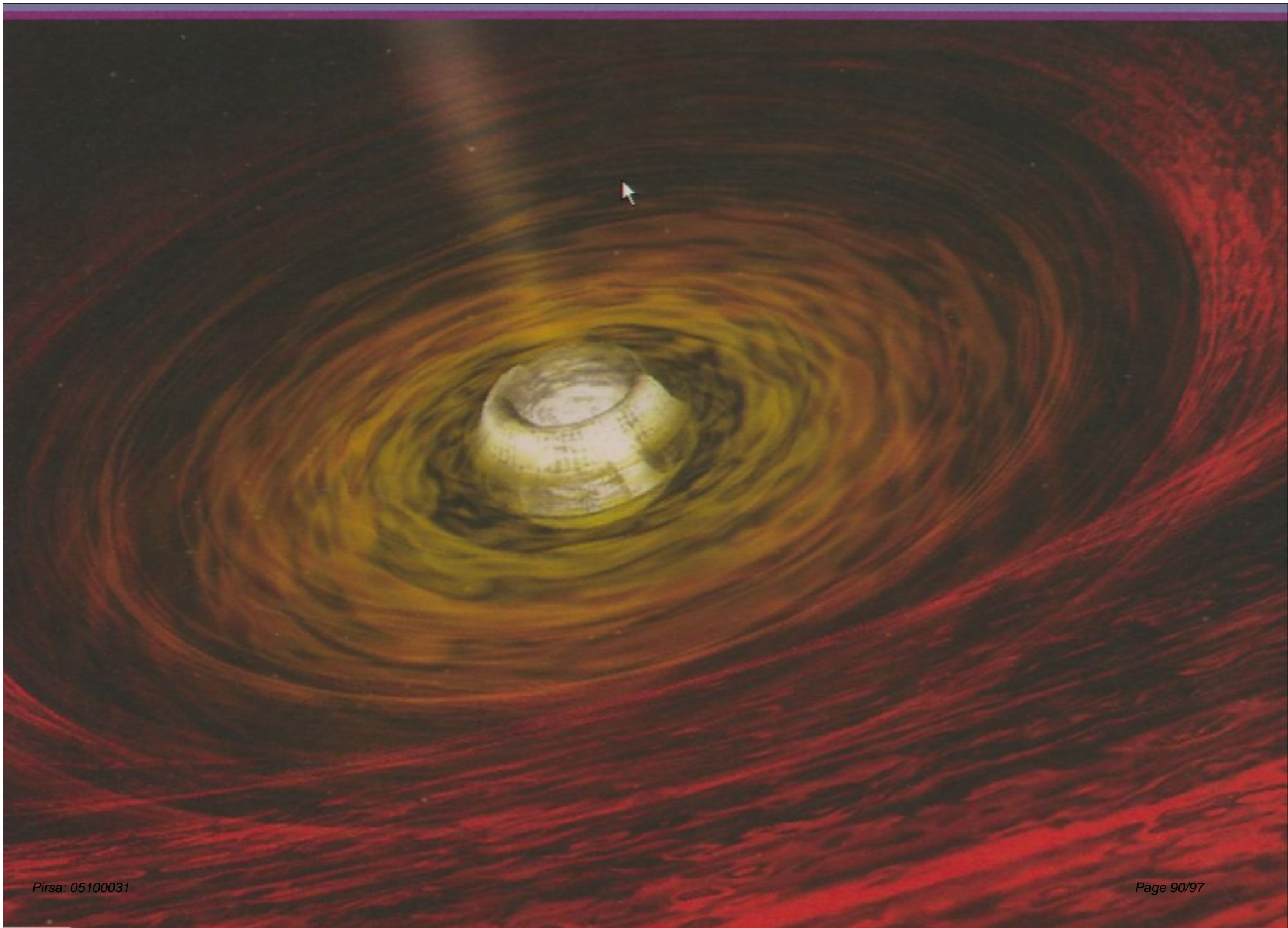


# Nature of Simultaneity



**Temporal Simultaneity**

**Spatial Simultaneity**



*Obsession, Friendship and Betrayal  
in the Quest for Black Holes*

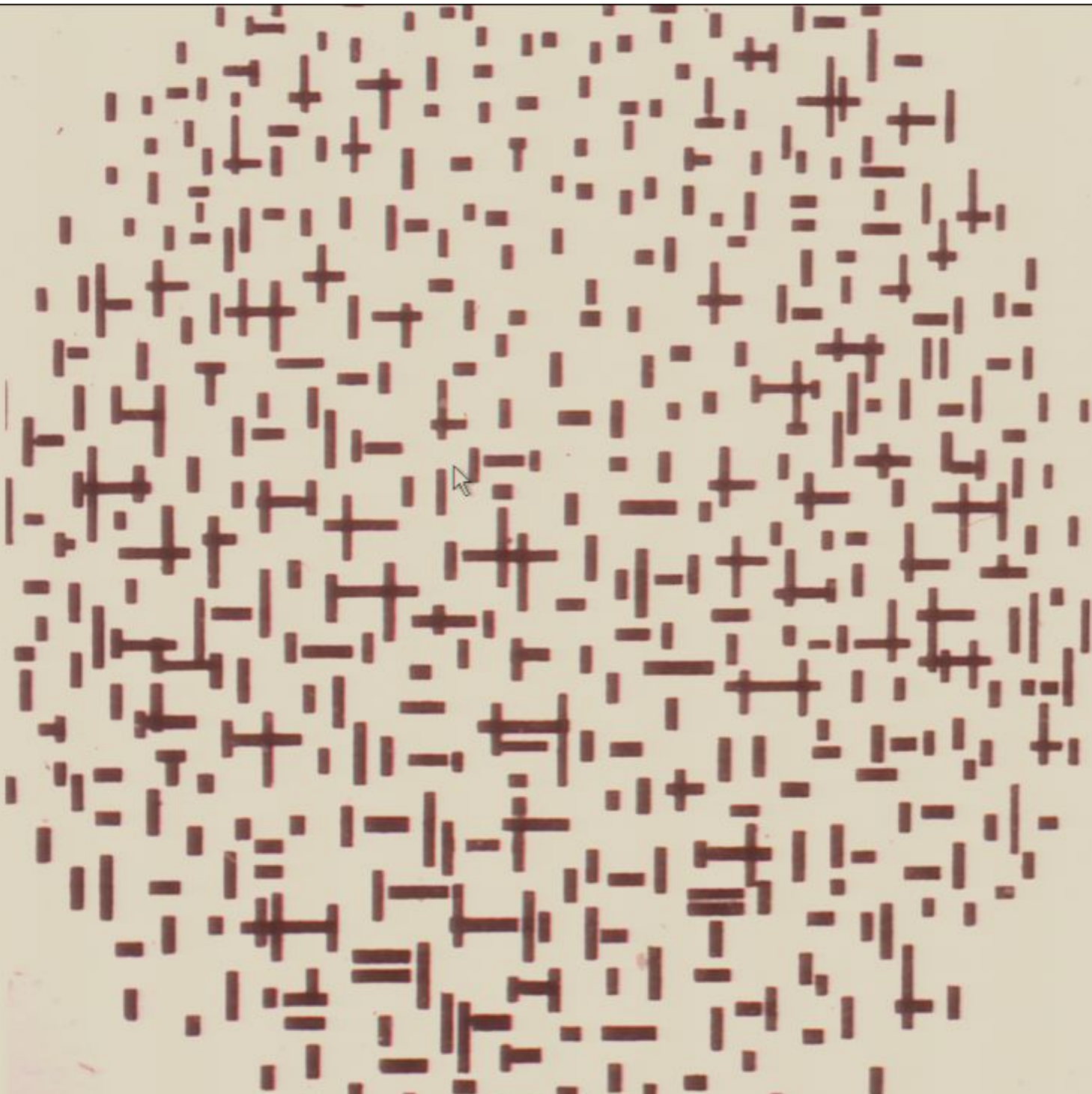


EMPIRE  
*of the*  
STARS

ARTHUR I. MILLER













EINSTEIN



*SPACE, TIME,  
AND THE  
BEAUTY  
THAT CAUSES  
HAVOC*



ARTHUR I. MILLER

PICASSO

