



**THE AGE  
OF  
ENTANGLED  
MENT**

WHEN QUANTUM

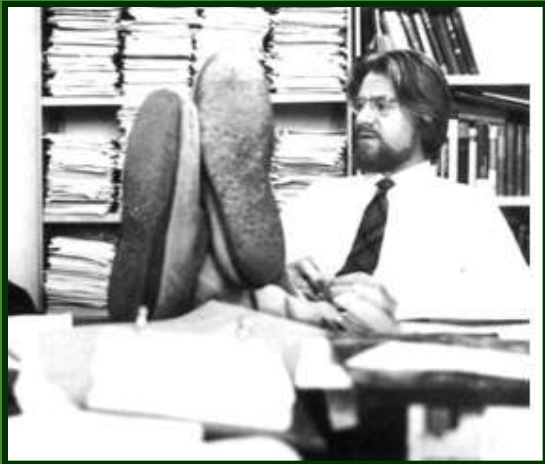
PHYSICS

WAS

REBORN

**LOUISA**

**GILDER**



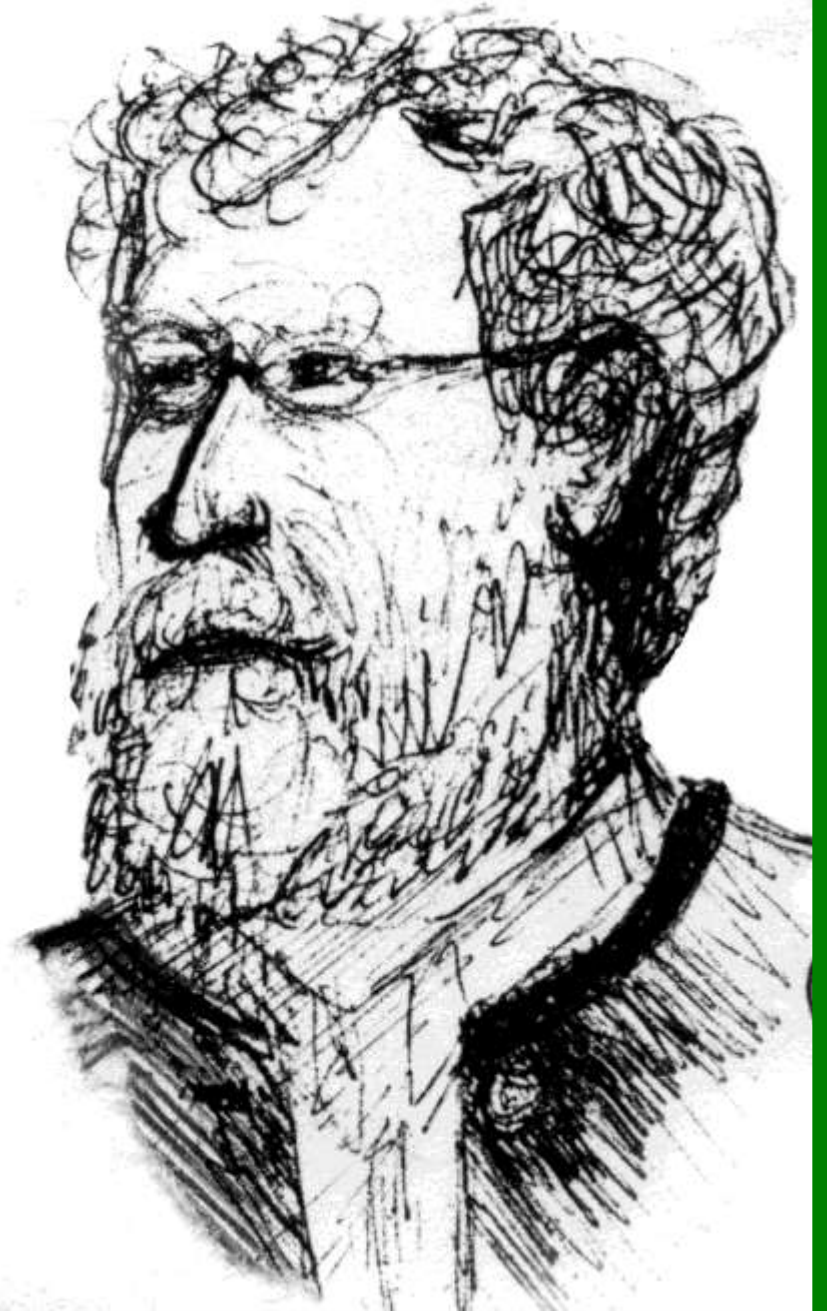
John Stewart **Bell**

# Bertlmann's socks and the nature of reality





# Anton Zeilinger





Gisin's lab:



Bellevue



Bernex

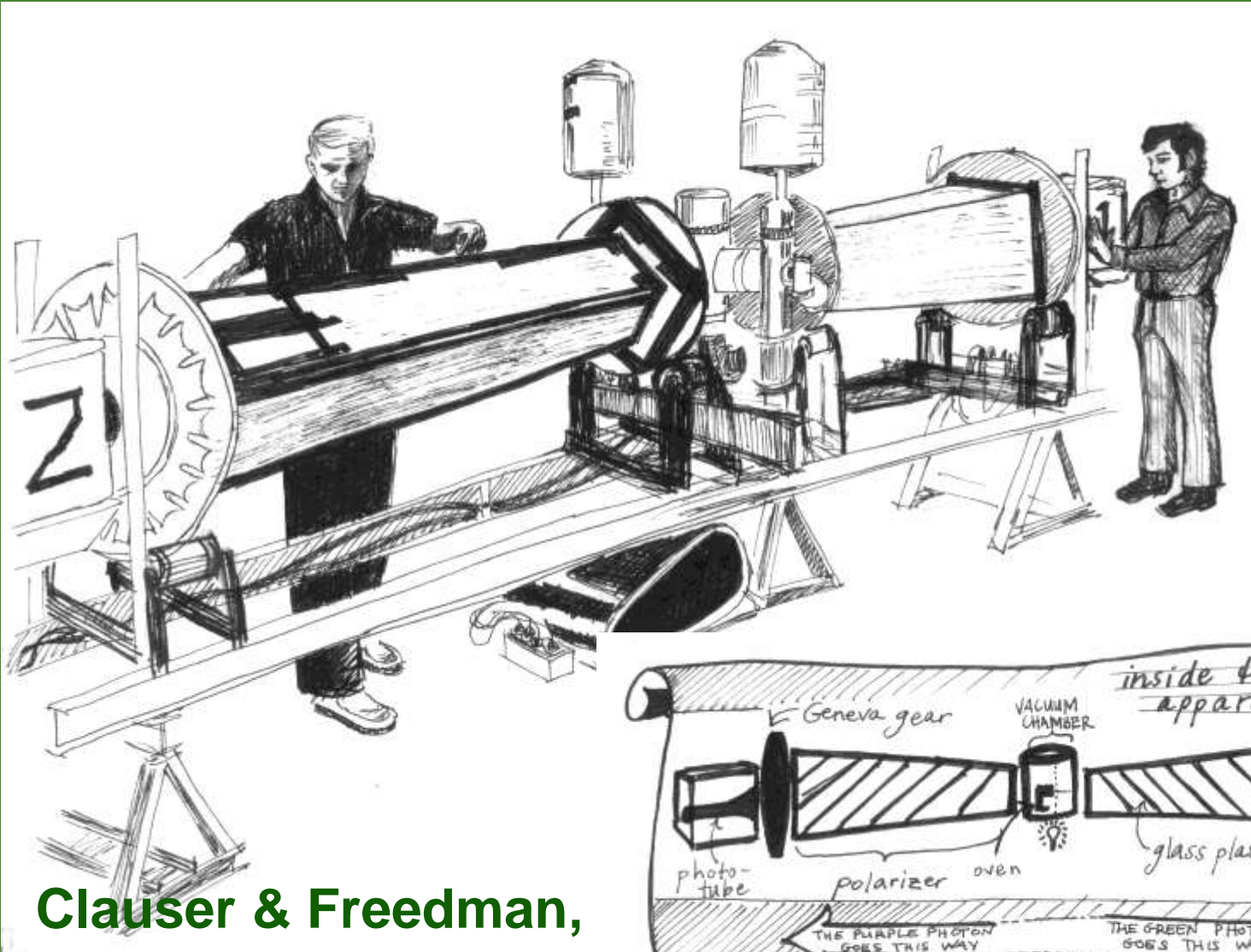


the fiber-optic  
phone lines  
of

Geneva



# Quantum philosophy enters the lab



**Clauser & Freedman,**

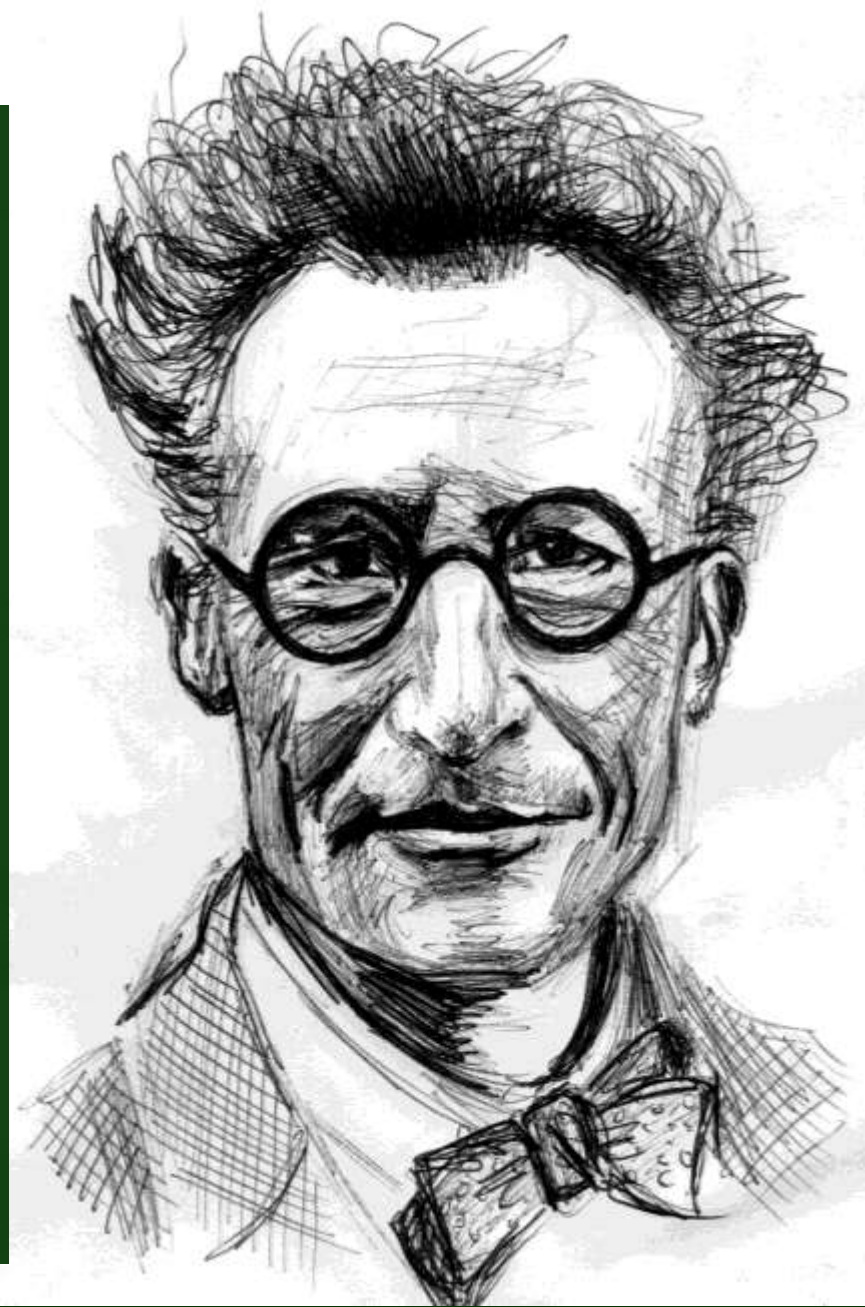
1972

*The peculiar  
situation is:*

the best possible knowledge of a  
whole does not necessarily include  
the best possible knowledge of all its  
parts,

even though they may be entirely  
separated....

*-Schrödinger, 1935.*



# Einstein vs. Bohr

(with Ehrenfest caught in the middle)



Spooky action-at-a-distance:

*"No reasonable definition of reality could be expected to permit this." -Einstein*

*"This resignation as regards to visualization...is an essential advance." -Bohr*





# *die Knaben der Quantenmechanik*

(In 1925, Heisenberg was 24, Pauli was 26, & Dirac was 23.)



Schrödinger

Pauli

Heisenberg



Dirac

Lorentz

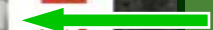
Bohr

Rutherford

Compton

Born

Einstein



**Complementarity** was Bohr's generalization  
of the Heisenberg uncertainty principle:  
two pictures are both necessary,

but they are also mutually exclusive--

the more you have of one,  
the less you have of the other.

*“Truth & clarity are  
complementary.”*

*-Niels Bohr*

*“Well, I'd rather be clear &  
wrong than vague & right.”*

*- John Bell*