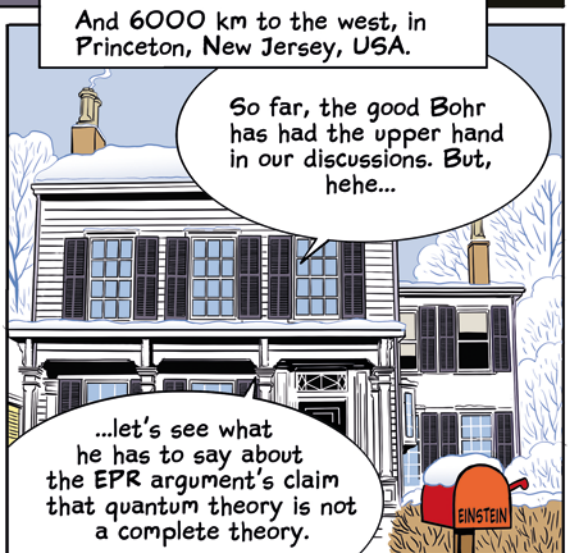
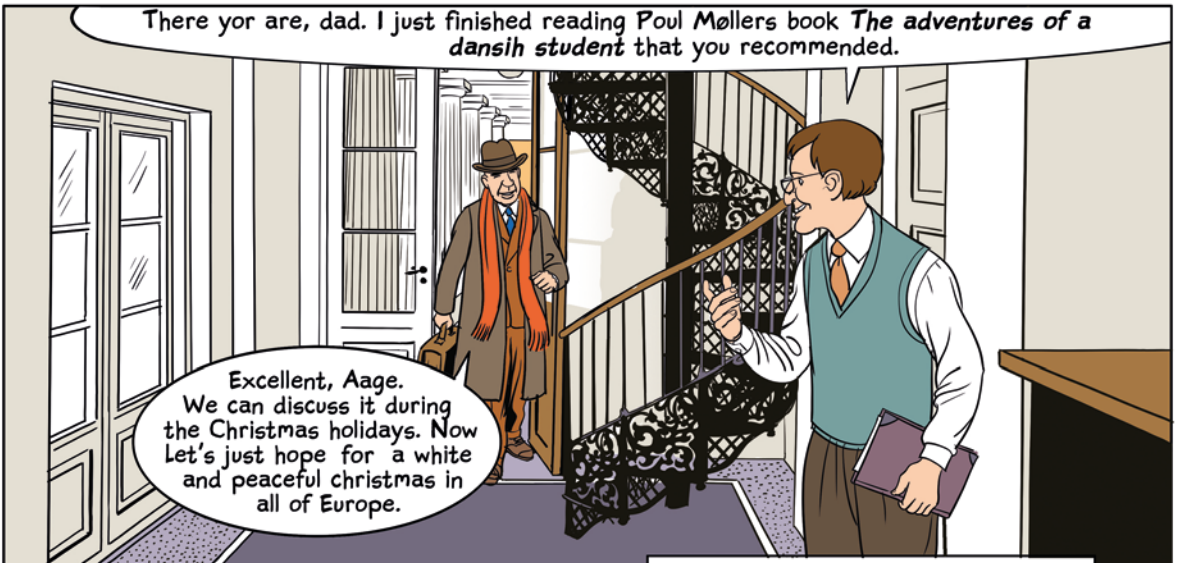
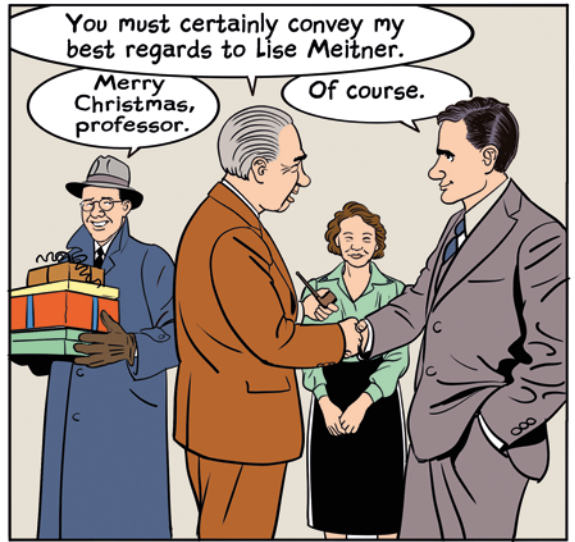
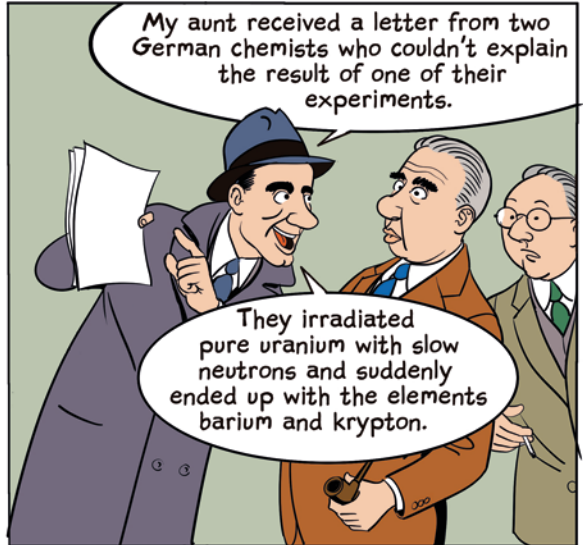
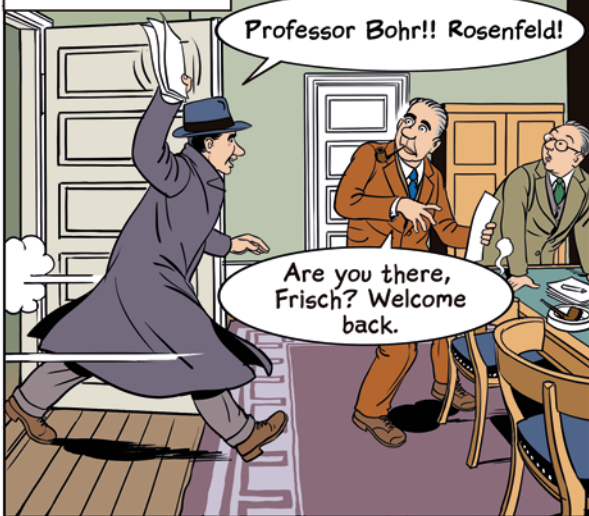


Christmas 1938



After New Year's eve...

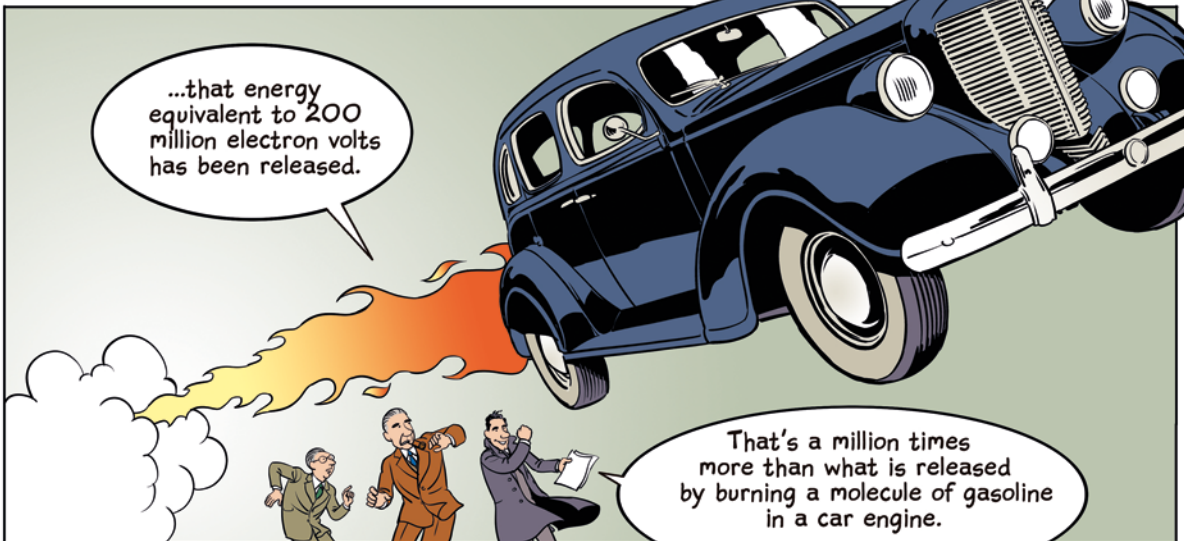
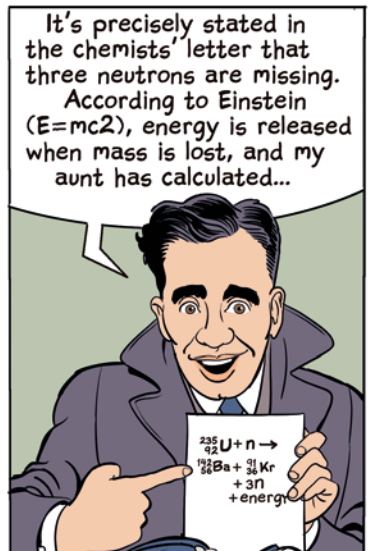
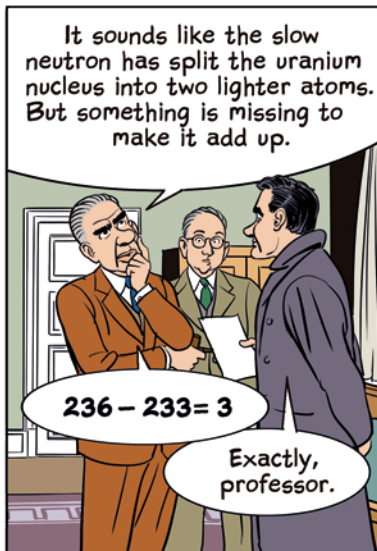


Uranium 235
92 protons + 143 neutrons
+ 1 = 236

Barium
56 protons + 86 neutrons
= atomic mass 142

Krypton
36 protons + 55 neutrons
= atomic mass 91

142 + 91 = 233




What big idiots we have been. But that's how it must fit together. It's wonderful.

We call it **fi-fi-fission.**



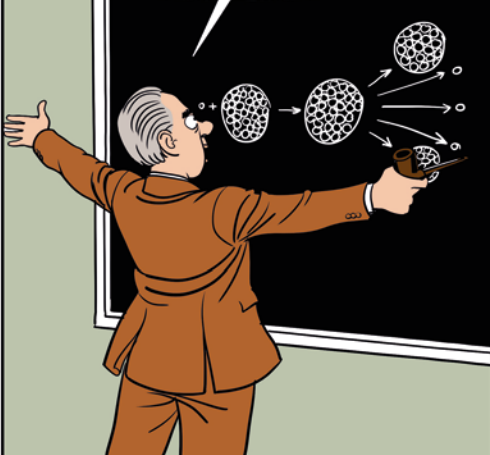
But... will the splitting of the atomic nucleus also be able to trigger a chain reaction that can be harnessed as an energy source if controlled?



No! No! That's absolutely impossible.




Yes. Yes. It is possible!



The diagram on the chalkboard shows a large nucleus being struck by a neutron, splitting into two smaller nuclei and releasing more neutrons, which then strike other nuclei, creating a chain reaction.

Soon...

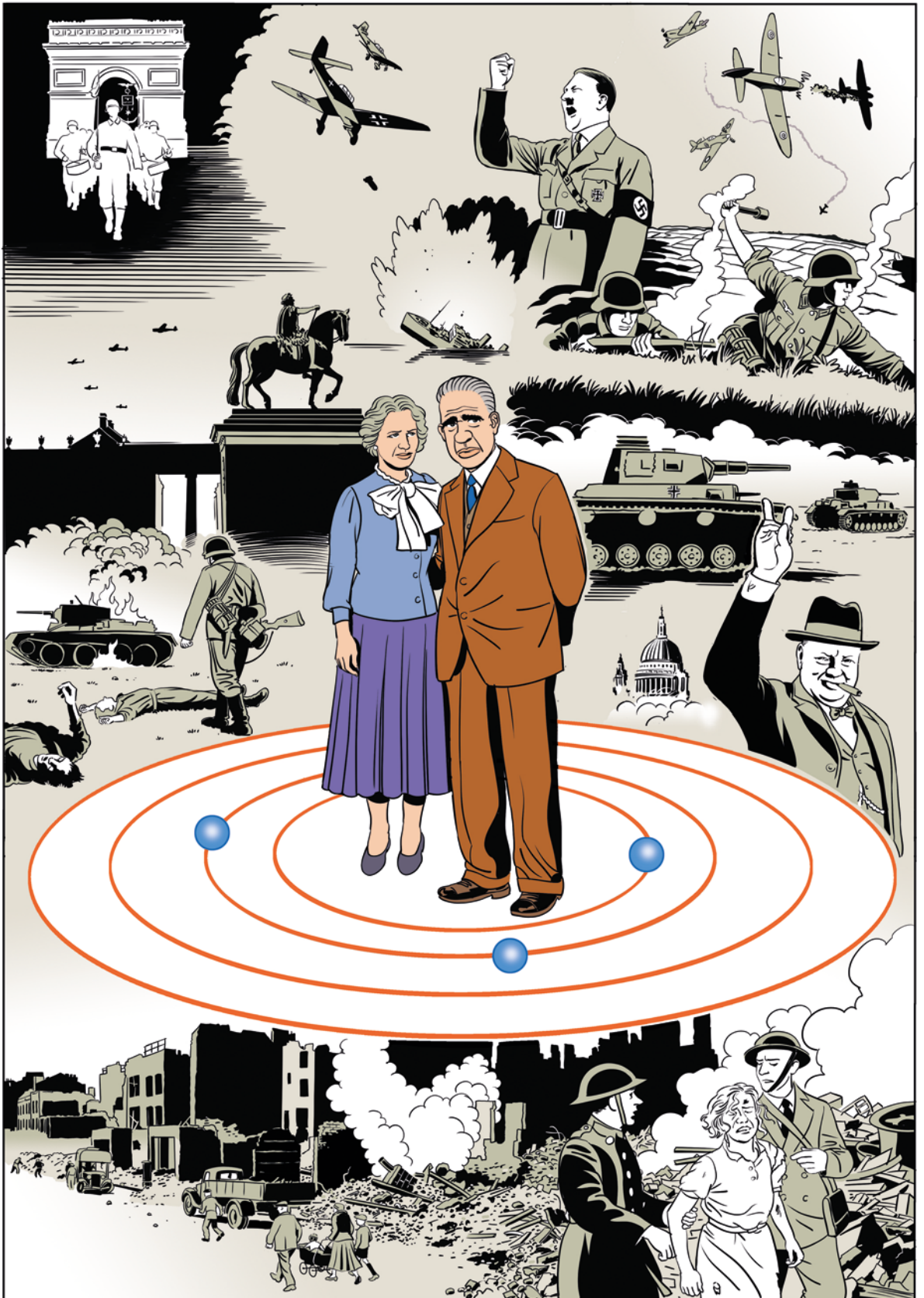
It can only happen in the isotope uranium-235, which constitutes just 1% of naturally occurring uranium. John Wheeler and I have written several papers on nuclear fission, and the first one will be published in the upcoming issue of *Physical Review*...



...on September 1, 1939.

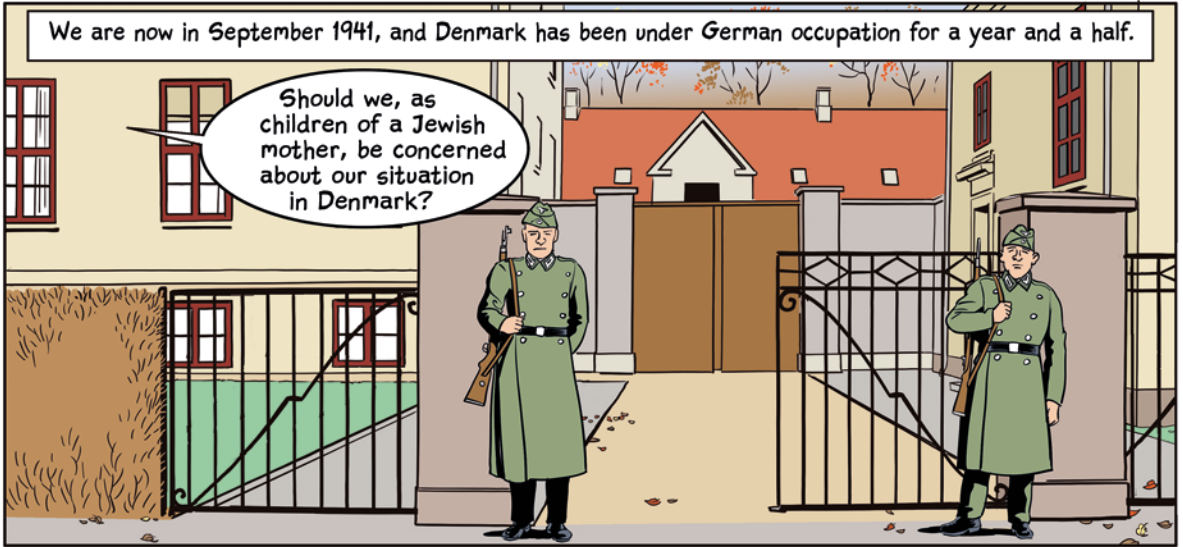


The illustration shows a line of soldiers in uniform marching down a street. The ground is covered in blood, bodies, and debris, including a broken car and a person lying face down. The scene is a stark contrast to the scientific discussion above.



We are now in September 1941, and Denmark has been under German occupation for a year and a half.

Should we, as children of a Jewish mother, be concerned about our situation in Denmark?



We should all be concerned, Harald. But right now, I am most worried about the meeting I am going to have with Heisenberg.

Is he in Copenhagen?



Yes, supposedly to give a lecture. But he has also visited the institute. It's as if he doesn't understand the Danish sentiments when he suddenly shows up and speaks enthusiastically about the great German victories.

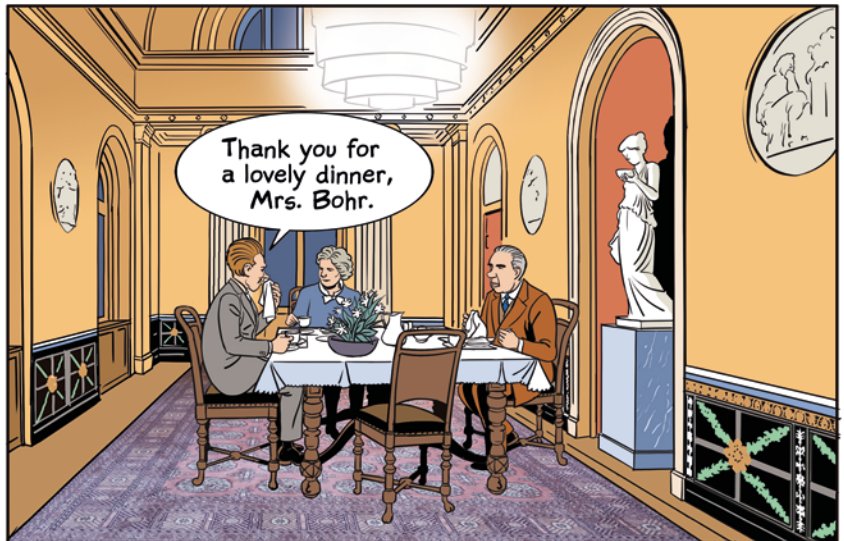
What does he want to talk to you about?



He's coming to dinner at my place. We'll see then.



Thank you for a lovely dinner, Mrs. Bohr.





We have a blackout. So don't fall and break your leg.

Uh... of course.

What I wanted to say is... uh... how do you view a physicist's moral responsibility in areas that can serve military purposes?"



What do you want me to respond to that?
I feel a responsibility for the physics in my homeland. Germany will soon win the war, and although the Nazis view quantum physics with suspicion...

...I am confident that they will change their perception.



Really? But do you know of physicists who deal with... um... you know... the uranium issue? What I mean is... it can have very serious consequences in military technology, right?



Do you really think uranium fission can be utilized for weapon construction?

As the leader of the project, I know that it's theoretically possible, but... um... well...



Heisenberg. I don't want to hear any more!

But...



There is nothing more to say.

Bohr. I...

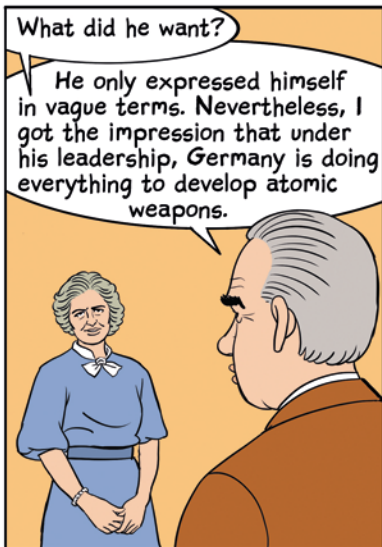
Let's head back.





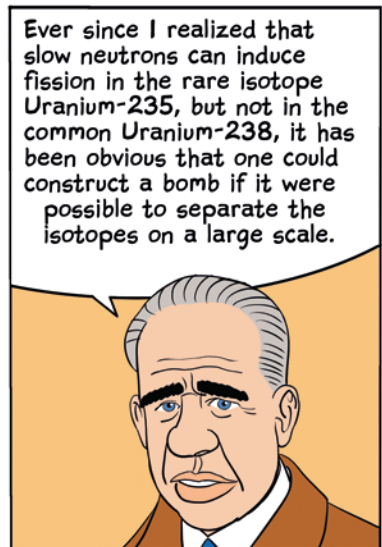
You look upset, Niels. Where is Heisenberg?

Gone back to his hotel.



What did he want?

He only expressed himself in vague terms. Nevertheless, I got the impression that under his leadership, Germany is doing everything to develop atomic weapons.



Ever since I realized that slow neutrons can induce fission in the rare isotope Uranium-235, but not in the common Uranium-238, it has been obvious that one could construct a bomb if it were possible to separate the isotopes on a large scale.



Fortunately, the challenges seem so enormous that it is hardly feasible. What primarily distresses me is that Heisenberg—of all people—has allied himself with a murderous criminal regime.

Sooner or later, we will be forced to leave the country, Niels.

Two years later.

October 1943.



We're climbing to thirty thousand feet. Inform our passenger in the bomb bay.

Hello, hello, professor. Put on your oxygen mask.



Hm. The helmet they gave me is too small.

I feel kind of elevated.

And maybe a little night-blind.



Why isn't he answering?

Is the intercom not working? Or has he not put on the helmet at all?



This is definitely a quantum leap that means something.



In the quantum universe, they would never be able to determine the position...

The Germans want to know where they can find me.

...without simultaneously losing knowledge of my velocity.



Verdammt!

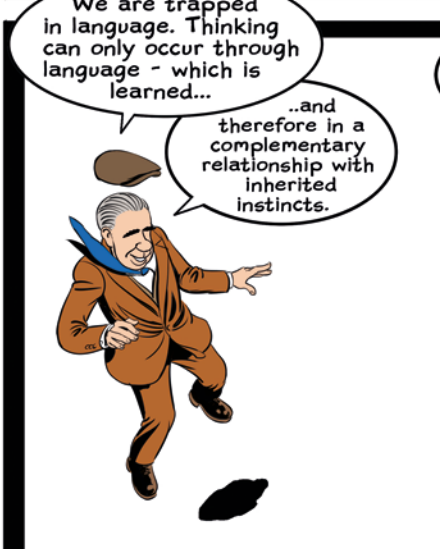
Teufel!





But complementarity can also...

...be understood psychologically.



We are trapped in language. Thinking can only occur through language - which is learned...

...and therefore in a complementary relationship with inherited instincts.



If we try through self-observation to analyze our own feelings ...

...the feelings suddenly are no longer the same.

Well - look!

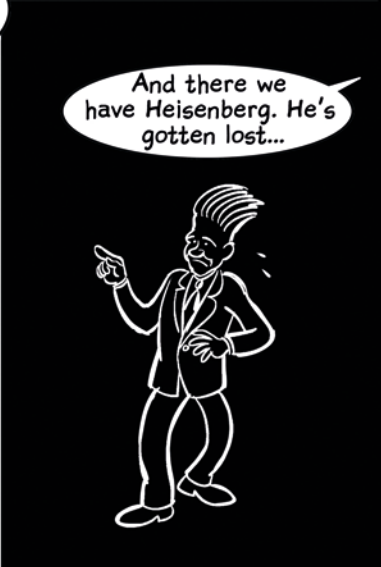
$$\Delta M \frac{\partial \varphi}{\partial t} T > \Delta p_x > \frac{h}{\Delta x} ; \frac{\Delta E}{c} \Delta \varphi T$$
$$\Delta M \Delta \varphi T > h ; \frac{\Delta \varphi}{c^2} T = \Delta T$$
$$\Delta M = \frac{\Delta E}{c} ; \Delta E \cdot \Delta T > h$$

Now I am within the confines of my faithful blackboard at the institute.

A.E. ↔ N.B.



Heh heh. There are some of my good colleague Gamow's caricatures. That's Dirac and Pauli.



And there we have Heisenberg. He's gotten lost...



...and has earned himself a blind man's glasses and cane.

Is... is this reality ...

...or a drawn analogy?

