

War or Science

A choice for our future?

David Alexandre Ellwood

**Plenary Session 19 – The Pugwash Movement and the Renunciation
of War: Dialogue across Divides**

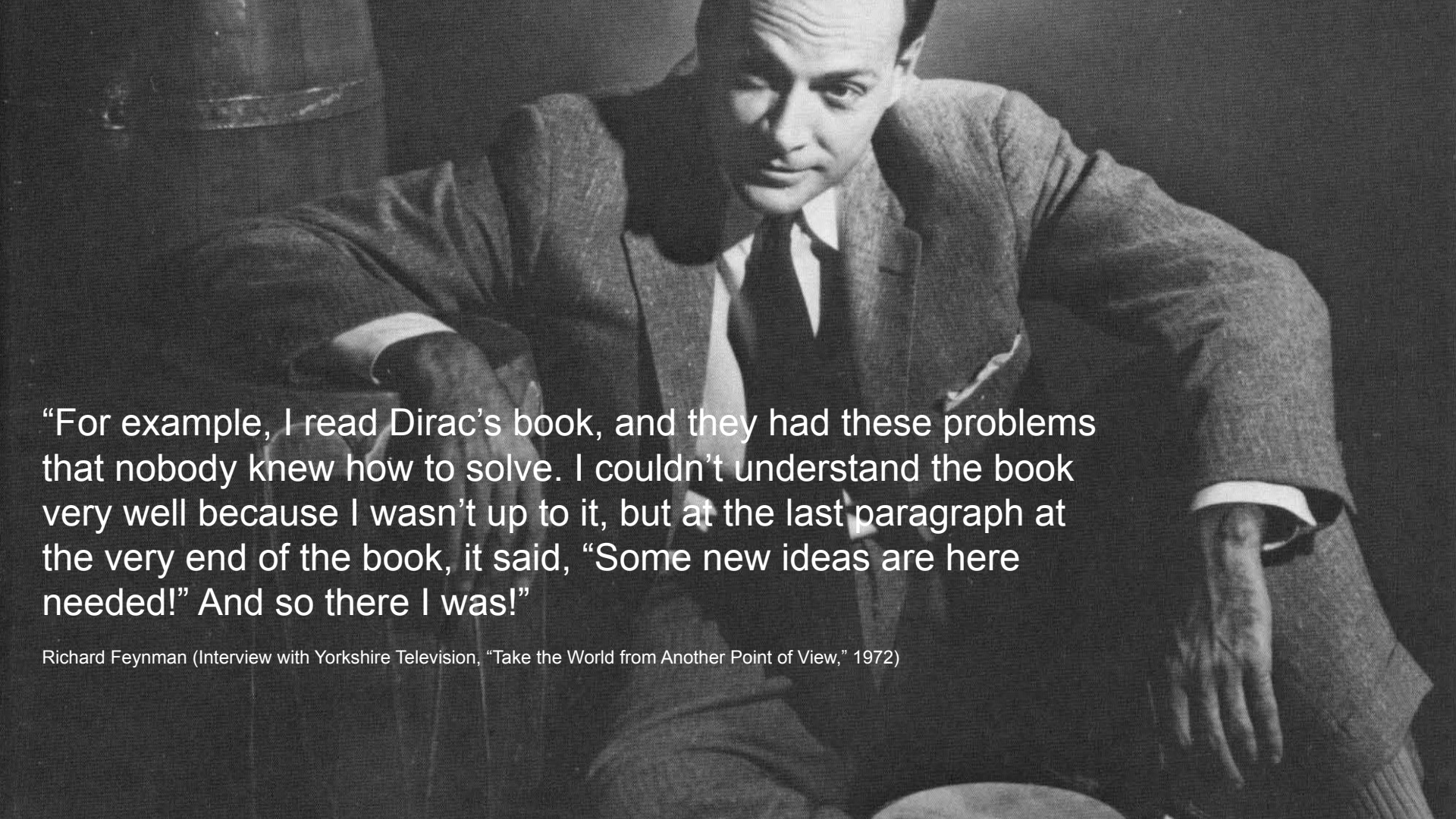
The 63rd Pugwash Conference
80 Years after the Atomic Bombing Time for Peace, Dialogue and Nuclear Disarmament

November 5 2025, Hiroshima, Japan

A black and white photograph of three men in suits walking outdoors. The man on the left is looking towards the right, the man in the center is looking down, and the man on the right is looking towards the left. They are walking in front of a building with many windows. There is some foliage on the left and right sides of the frame.

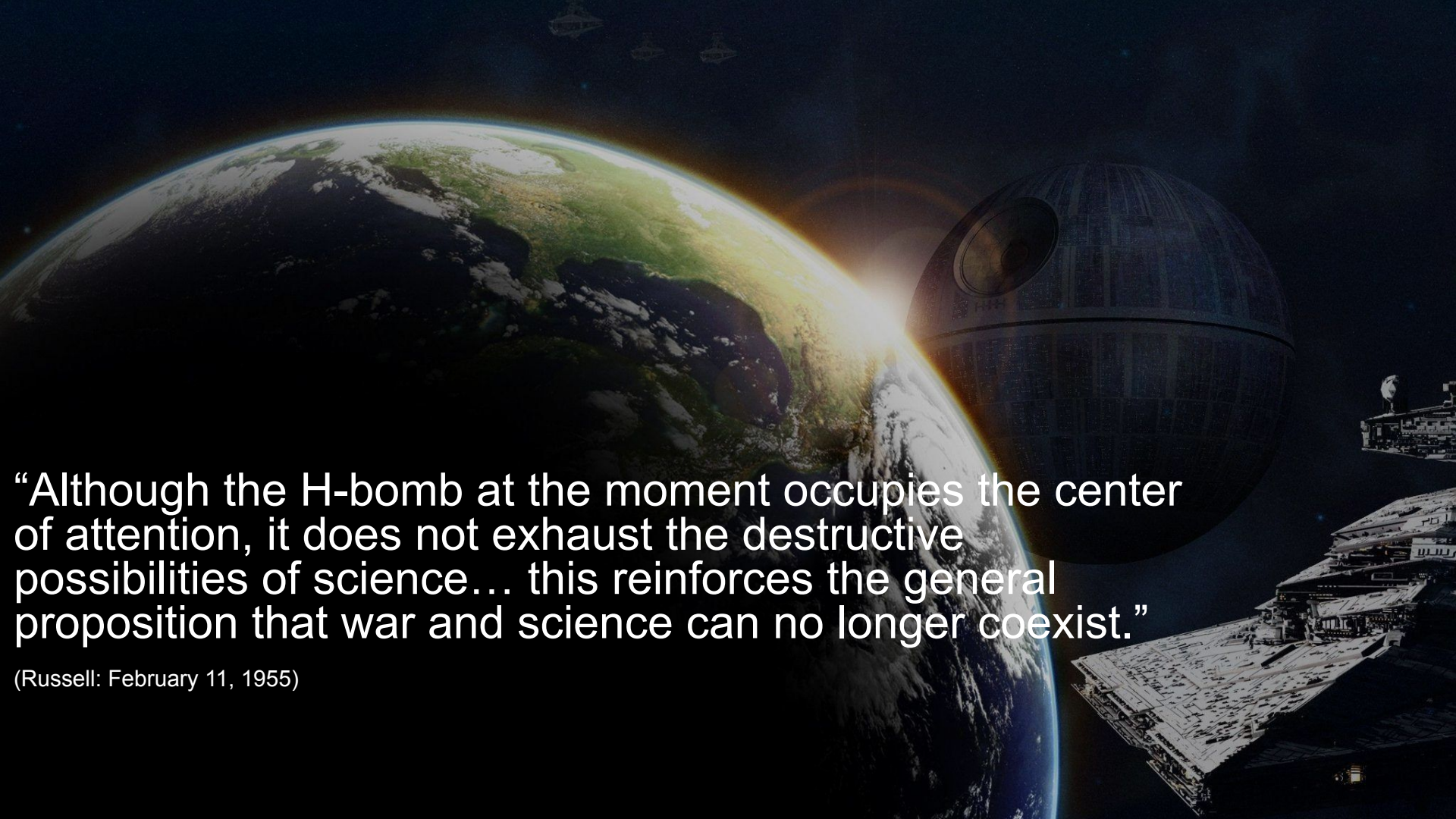
“It seems that some essentially new
physical ideas are here needed”

Dirac: The Principles of Quantum Mechanics (1930, OUP)



“For example, I read Dirac’s book, and they had these problems that nobody knew how to solve. I couldn’t understand the book very well because I wasn’t up to it, but at the last paragraph at the very end of the book, it said, “Some new ideas are here needed!” And so there I was!”

Richard Feynman (Interview with Yorkshire Television, “Take the World from Another Point of View,” 1972)

A composite image featuring the Earth from space on the left, the Death Star on the right, and the USS Enterprise in the bottom right corner. The Earth shows a bright horizon line. The Death Star is a large, dark, spherical object with a prominent circular opening. The USS Enterprise is a detailed model of the starship.

“Although the H-bomb at the moment occupies the center of attention, it does not exhaust the destructive possibilities of science... this reinforces the general proposition that war and science can no longer coexist.”

(Russell: February 11, 1955)



Hermann Joseph Muller was an American geneticist, educator, and Nobel laureate best known for his work on the physiological and genetic effects of radiation.



Hideki Yukawa was a Japanese theoretical physicist and the first Japanese Nobel laureate.



Max Born Born won the 1954 Nobel Prize in Physics.



Linus Pauling was an American scientist, engineer, peace activist, author and educator.



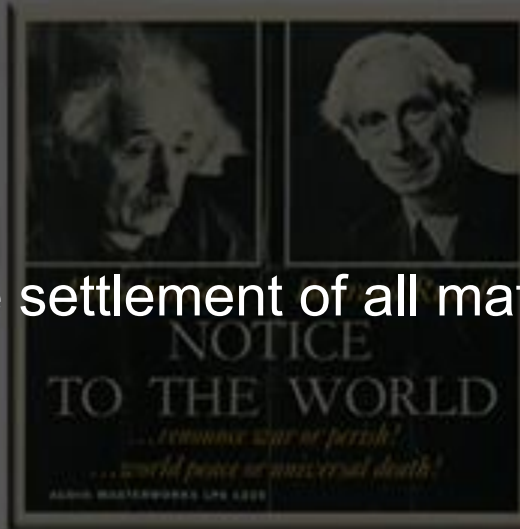
Leopold Infeld was a Polish physicist. He was a Rockefeller fellow at Cambridge University



Cecil Frank Powell was a British physicist, and Nobel Prize in Physics laureate (1950) working at Bristol University.



Frédéric Joliot-Curie was a French physicist and Nobel laureate.



Percy Williams Bridgman won the 1946 Nobel Prize in Physics for his work on the physics of high pressures



Joseph Rotblat was a Polish-born and British-naturalised physicist.

The Russell - Einstein Manifesto, 9 July 1955

‘find peaceful means for the settlement of all matters of dispute’
(Russell: February 11, 1955)

Igitur qui desiderat pacem, præparet bellum.

(Flavius Vegetius Renatus)

The EU's initiatives are about arming itself to the teeth through conventional, cyber, space, and industrial defence capabilities, including a rapid deployment capability and air missile defence system. These plans deliberately avoid nuclear disarmament, leaving that to NATO and national policies.

So nothing has changed! Nuclear deterrence remains the ultimate security backdrop: the supposedly indispensable insurance policy against existential threats, while at the same time nuclear weapons states remain "treaty bound" to pursue good-faith negotiations on nuclear disarmament (and ultimately to conclude a treaty on general and complete disarmament!)

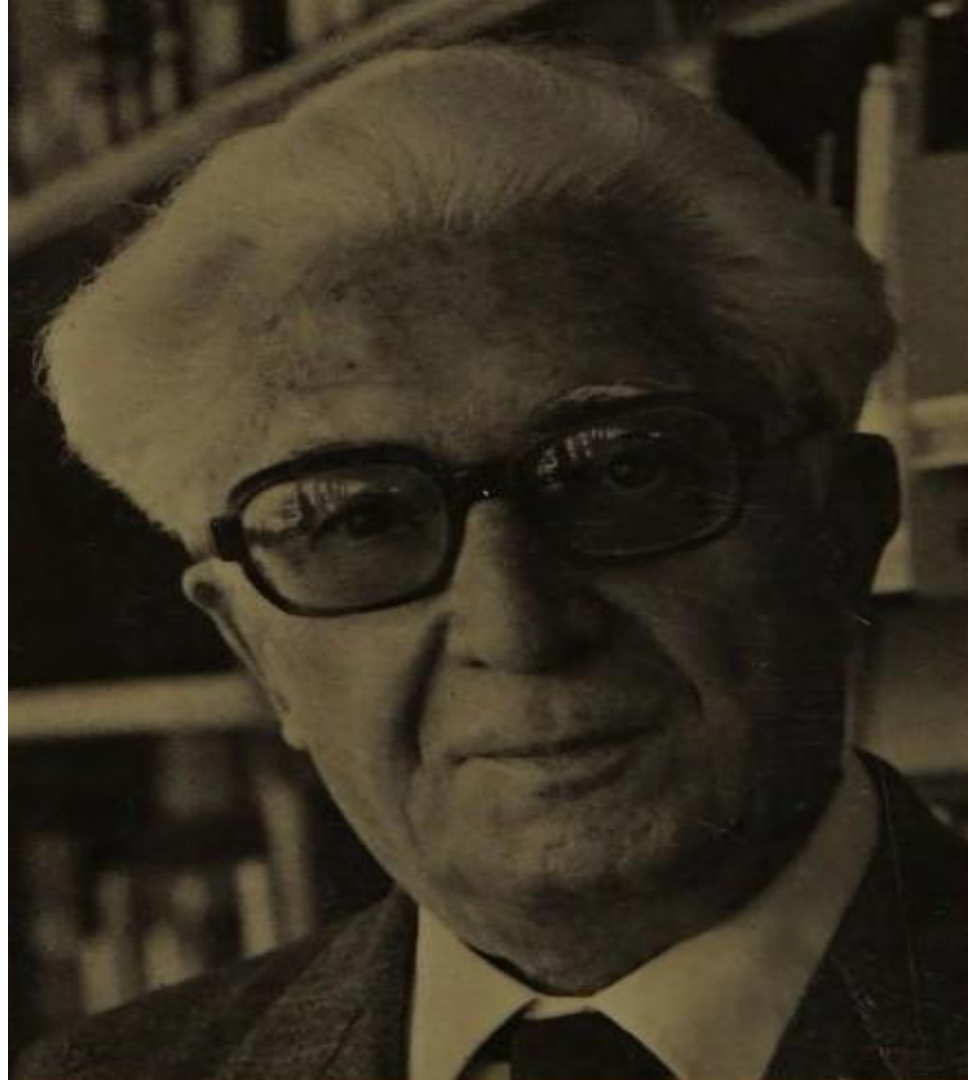
These vast armaments on land and water are being defended as a means, not to wage war, but to prevent war (. . .) there is a safer way (. . .) it requires only the consent and the good-will of the governments. Today they say (. . .) If you want peace, prepare for war. This Congress says on behalf of the people: *Si vis pacem, para pactum*, if you want peace, agree to keep the peace.

Si vis pacem, para pactum.

(Andrew Carnegie)

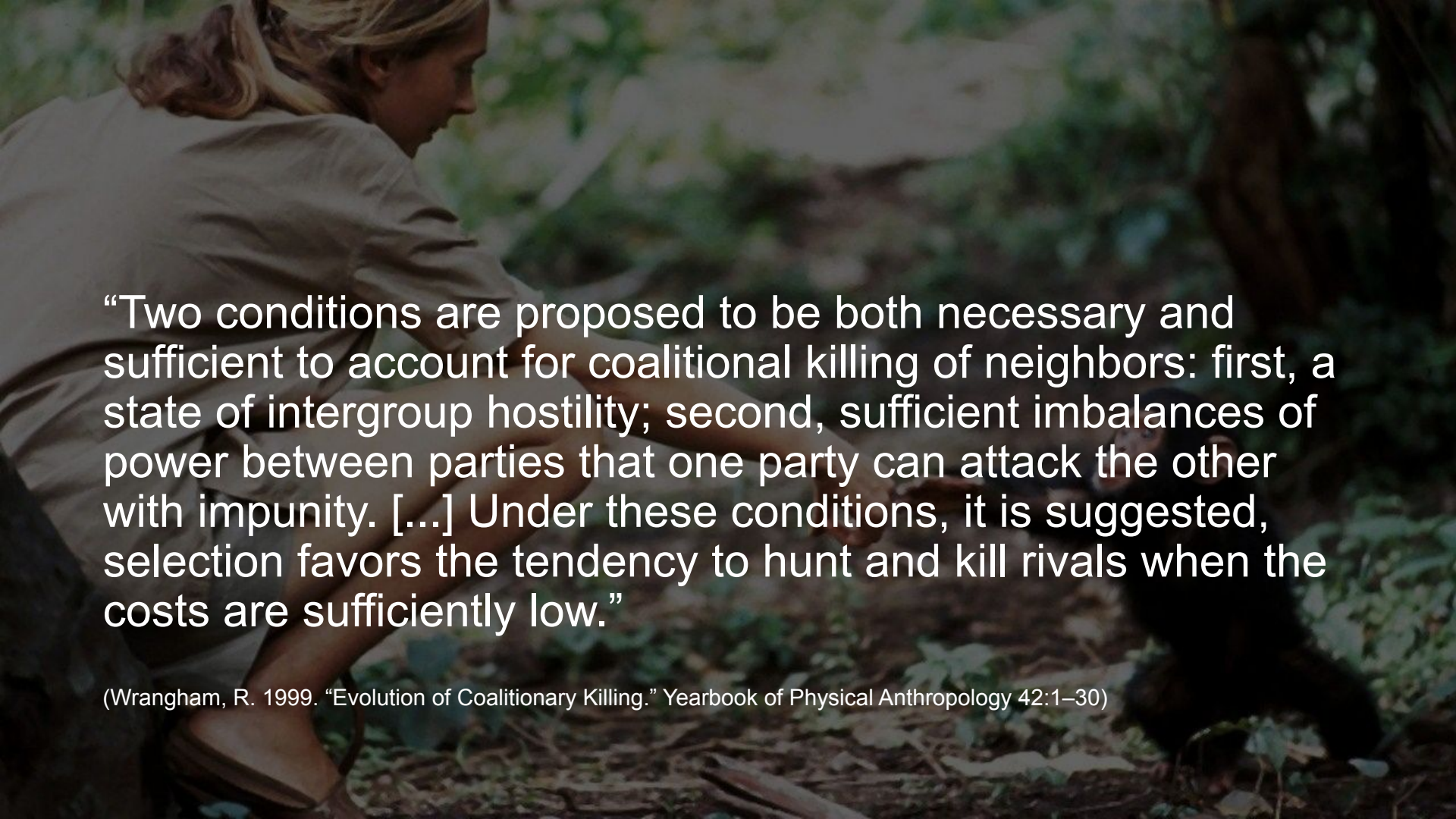
The case for universal disarmament

The Longue durée of war..



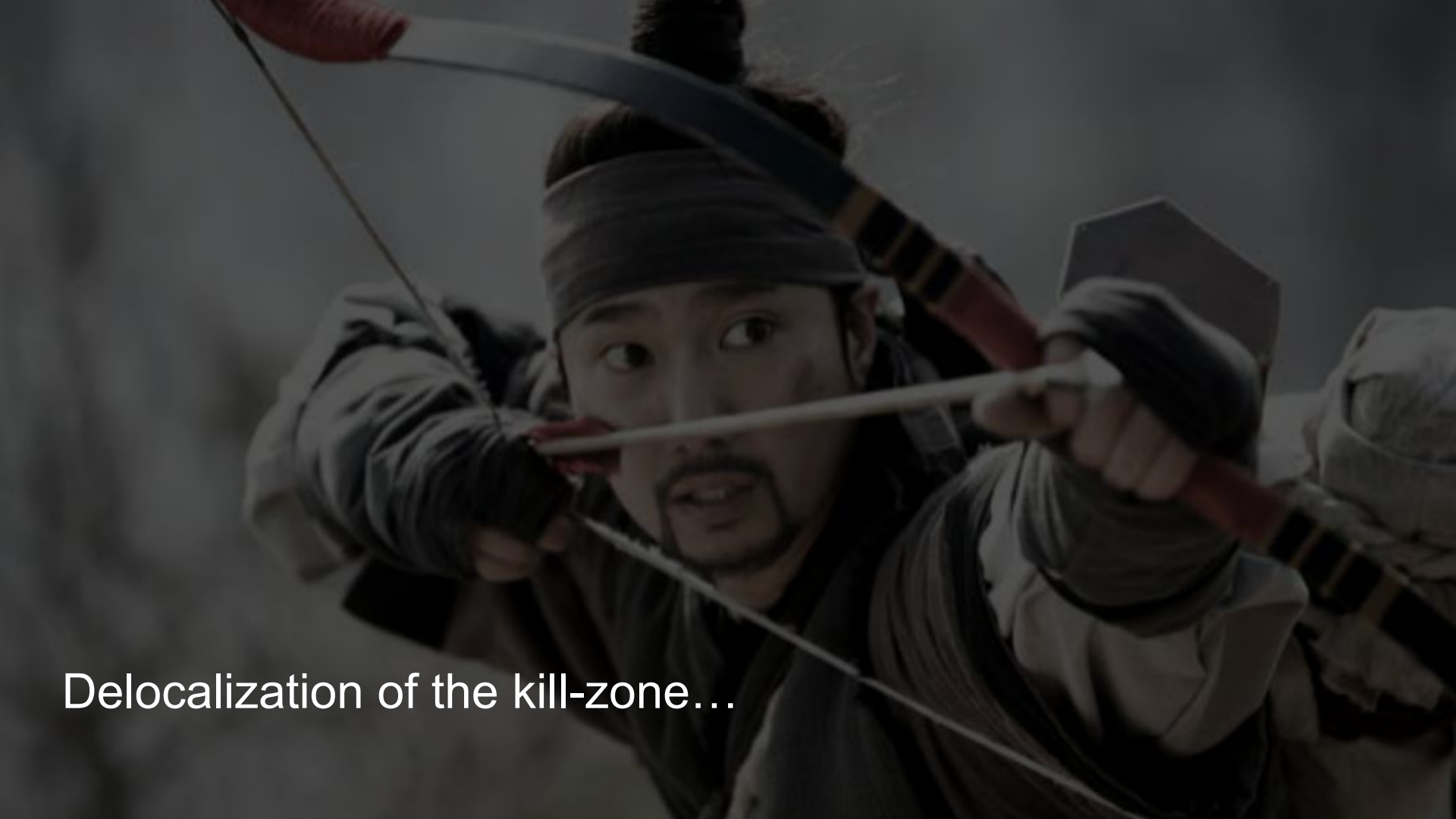


Principle of locality/local action: *An object can only be influenced by its immediate surroundings.*

A person with blonde hair tied back, wearing a light-colored long-sleeved shirt, is crouching in a forest. They are looking down at the ground, which is covered with dry leaves and twigs. The background is filled with green foliage and trees, creating a natural, outdoor setting. The lighting is soft, suggesting a shaded forest environment.

“Two conditions are proposed to be both necessary and sufficient to account for coalitional killing of neighbors: first, a state of intergroup hostility; second, sufficient imbalances of power between parties that one party can attack the other with impunity. [...] Under these conditions, it is suggested, selection favors the tendency to hunt and kill rivals when the costs are sufficiently low.”

(Wrangham, R. 1999. “Evolution of Coalitionary Killing.” *Yearbook of Physical Anthropology* 42:1–30)



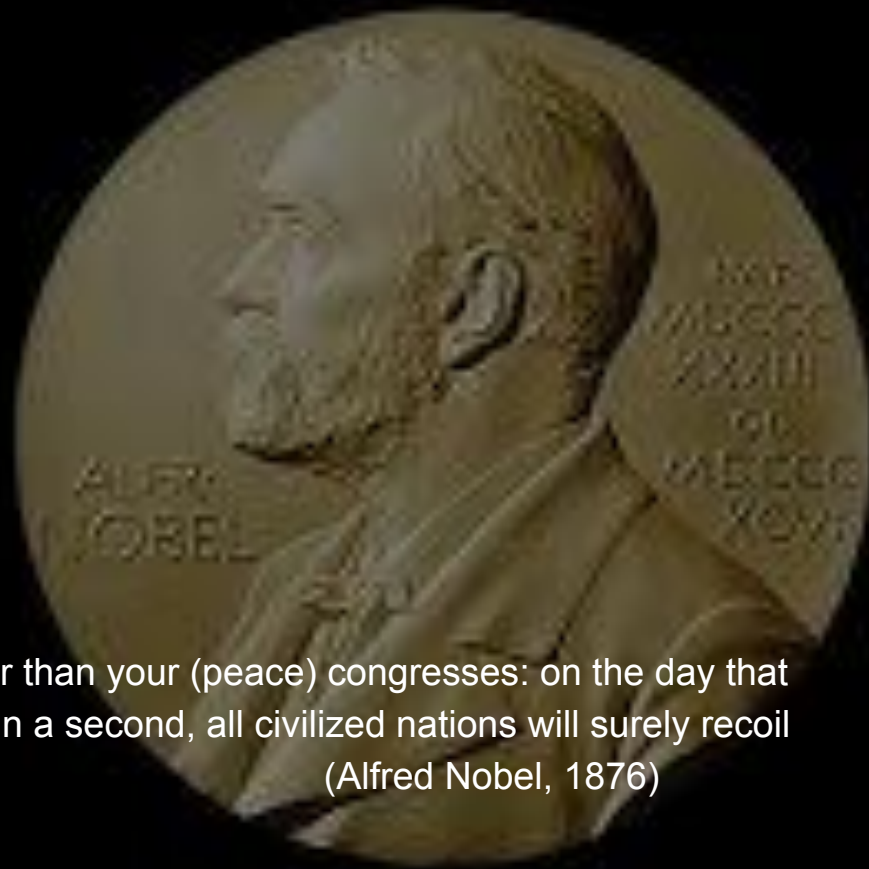
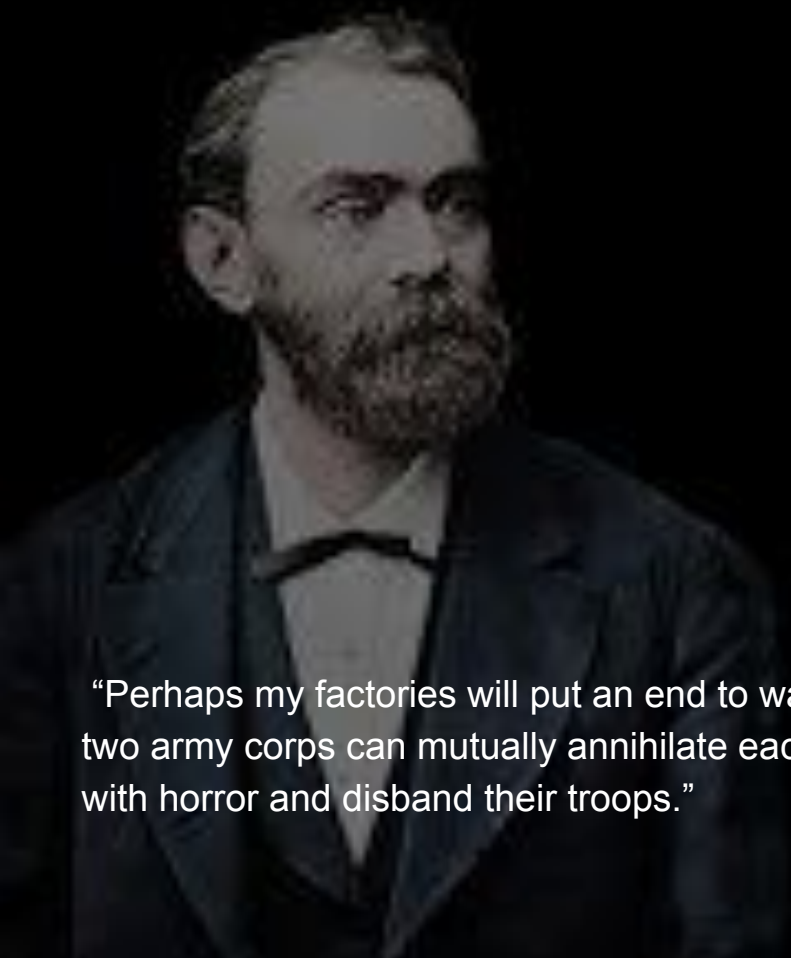
Delocalization of the kill-zone...



Fire – repurposing projectiles as triggers...

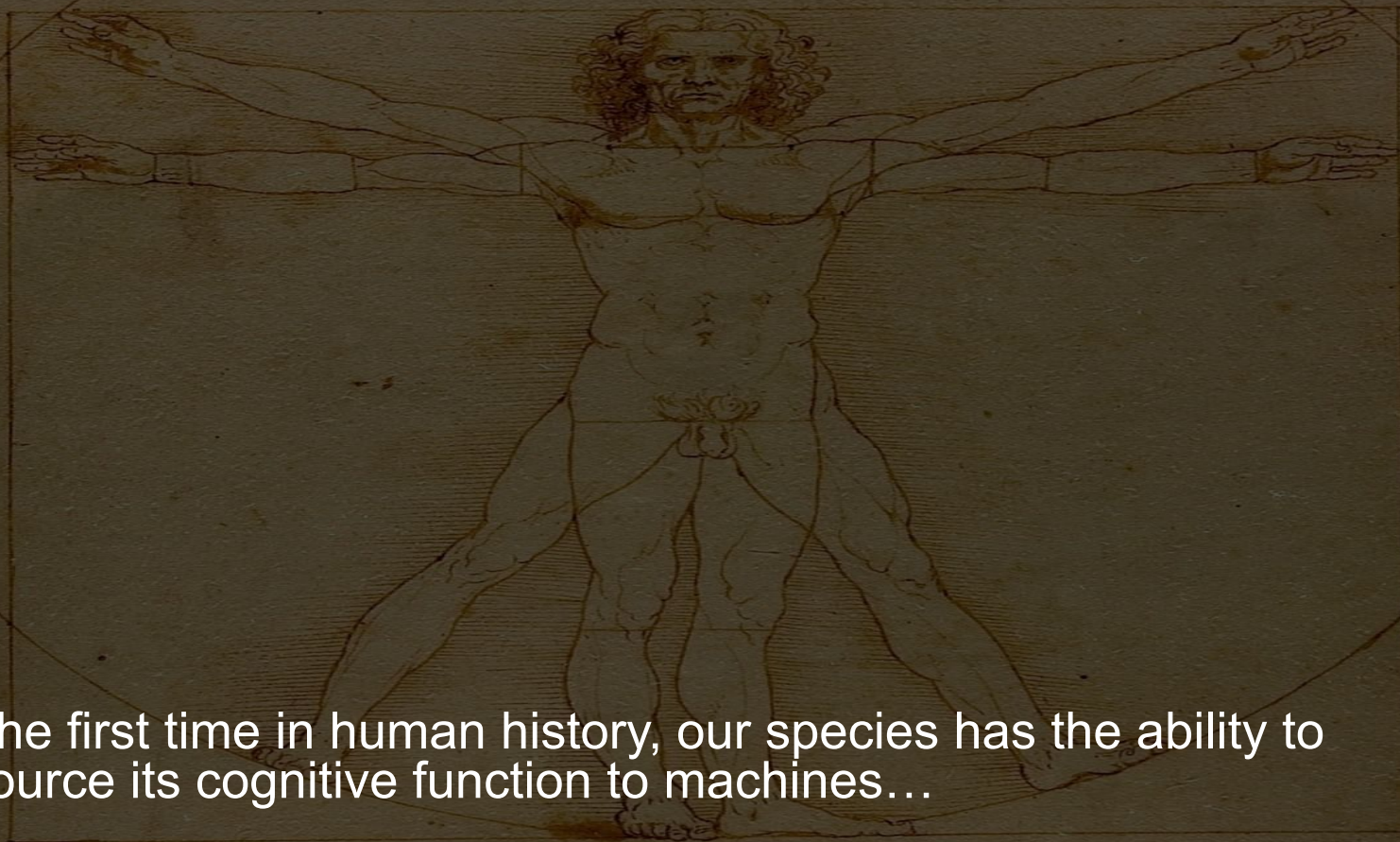
Paul W. Tibbets
Col. USAF
Pilot: The Enola Gay

Delocalization yields absolute impunity...

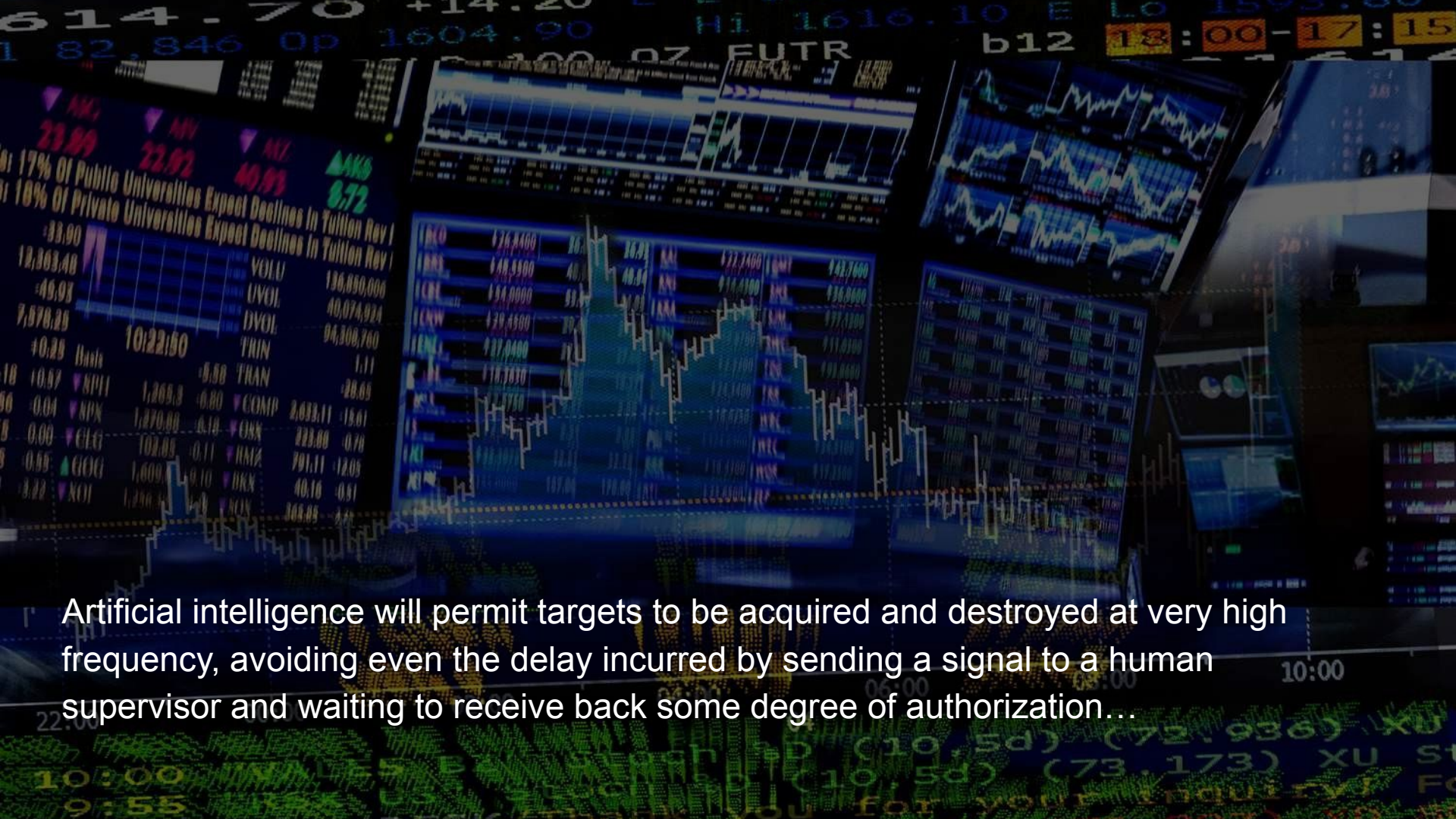


“Perhaps my factories will put an end to war sooner than your (peace) congresses: on the day that two army corps can mutually annihilate each other in a second, all civilized nations will surely recoil with horror and disband their troops.”

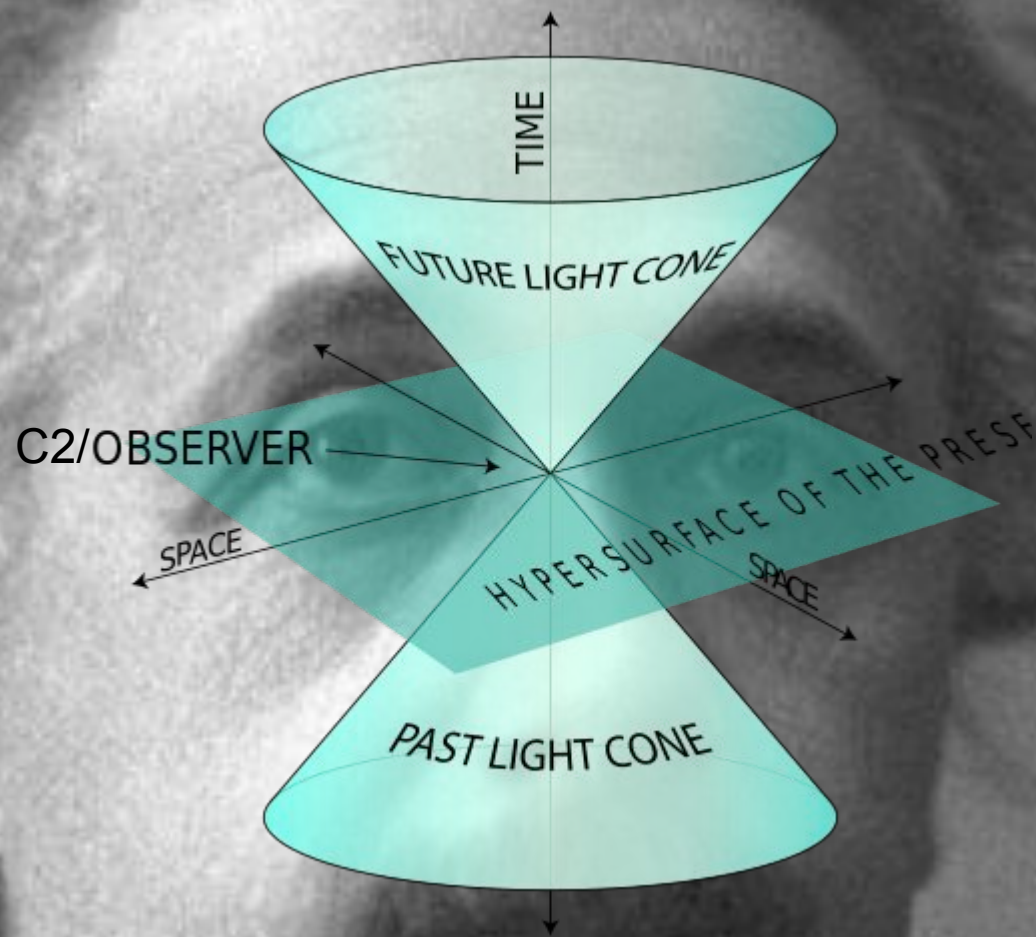
(Alfred Nobel, 1876)



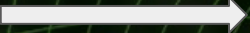
For the first time in human history, our species has the ability to outsource its cognitive function to machines...



Artificial intelligence will permit targets to be acquired and destroyed at very high frequency, avoiding even the delay incurred by sending a signal to a human supervisor and waiting to receive back some degree of authorization...



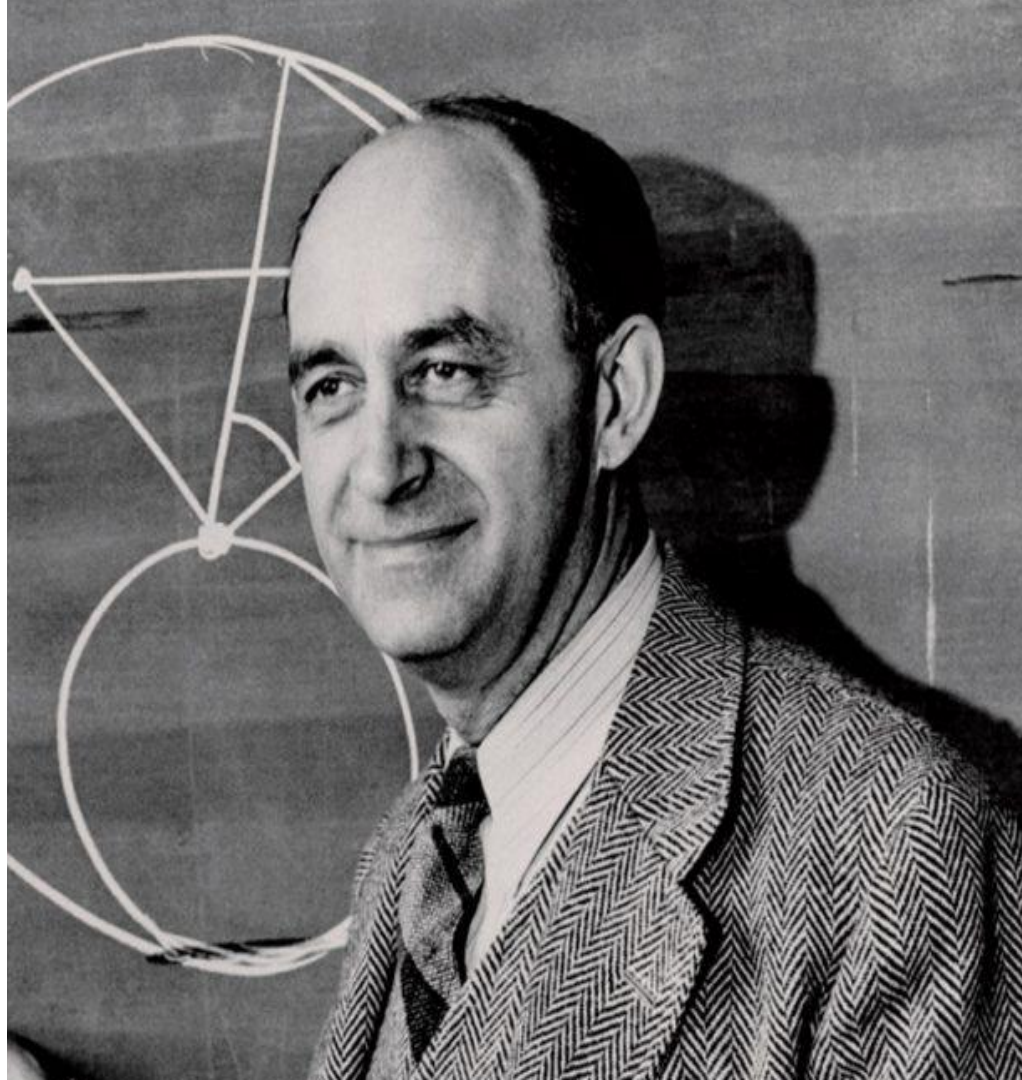
Delocalization of the kill-zone...

Mechanics  Field Theory

Weaponizing AI is like seeding our tomorrow with a field of landmines, but not ones that are fixed by geography or hidden beneath a thin layer of soil. Rather, a field of LAWS will have the potential to act without warning at some future place and time, buried deep beneath an incomprehensible matrix of data and computation. If you believe in banning landmines, you must work earnestly to prohibit LAWS before they are widely deployed. A future hegemony of a field of killer robots is a nightmare we can and must avoid!

The case of universal disarmament

*Our destiny may be written in
the stars..*



“As I planned the meeting, I realized a few day[s] ahead of time we needed an agenda. And so I wrote down all the things you needed to know to predict how hard it's going to be to detect extraterrestrial life. And looking at them it became pretty evident that if you multiplied all these together, you got a number, N, which is the number of detectable civilizations in our galaxy. This was aimed at the radio search, and not to search for primordial or primitive life forms.”

Frank Drake

$$N = R_* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$$



The **number** of technologically advanced civilizations in the Milky Way Galaxy



The **rate** of formation of stars in the galaxy



The fraction of those stars with **planetary** systems



The number of planets per solar system with an **environment** suitable for life



The fraction of suitable planets on which **life** actually appears



The fraction of life-bearing planets on which **intelligent** life emerges



The fraction of those planets with intelligent life that develop interstellar **communication**



The **length** of time such civilizations release detectable signals into space

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Frank Drake



Exponential Colonisation...

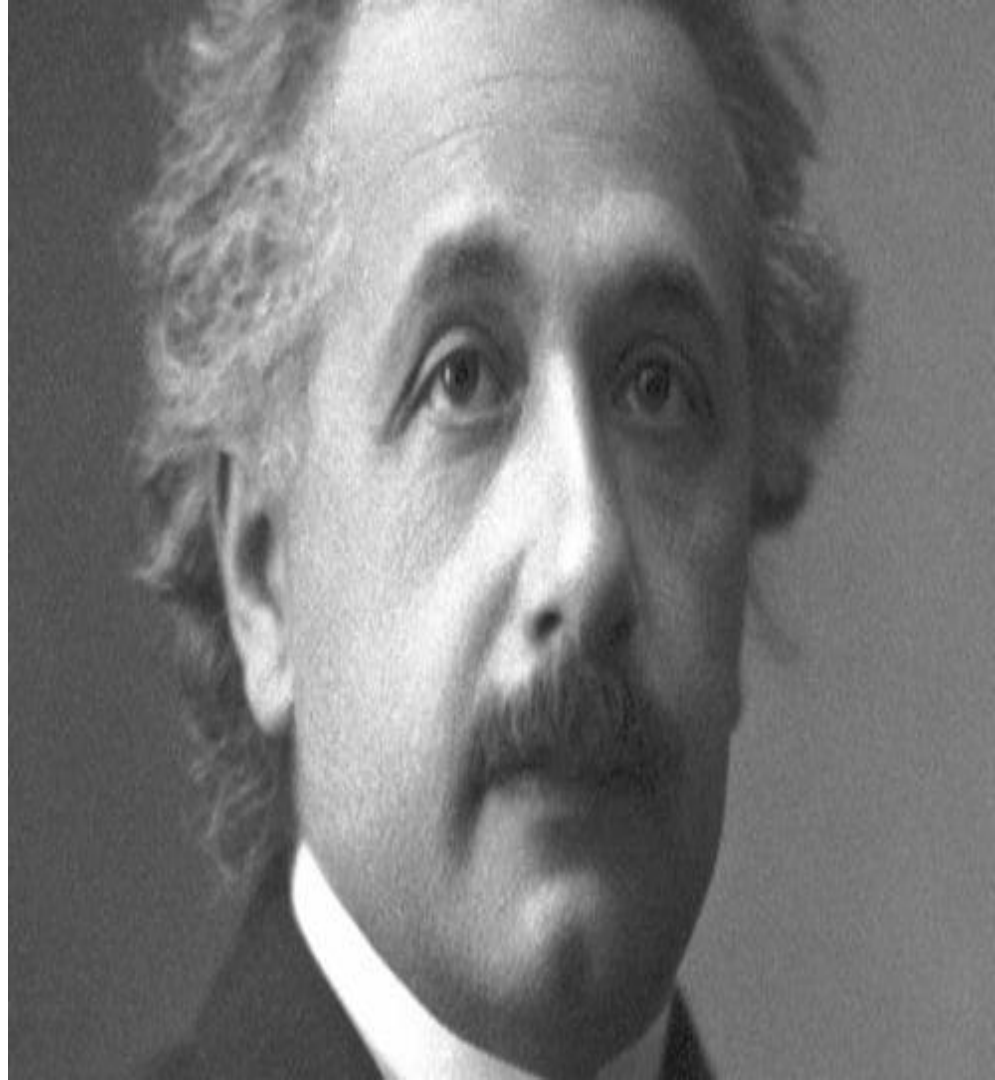
2^0	2^1	2^2	2^3	2^4	2^5	2^6	2^7
1	2	4	8	16	32	64	128
2^8	2^9	2^{10}	2^{11}	2^{12}	2^{13}	2^{14}	2^{15}
256	512	1024	2048	4096	8192	16384	32768
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
2^{56}	2^{57}	2^{58}	2^{59}	2^{60}	2^{61}	2^{62}	$2^{63} \approx 10^{19}$

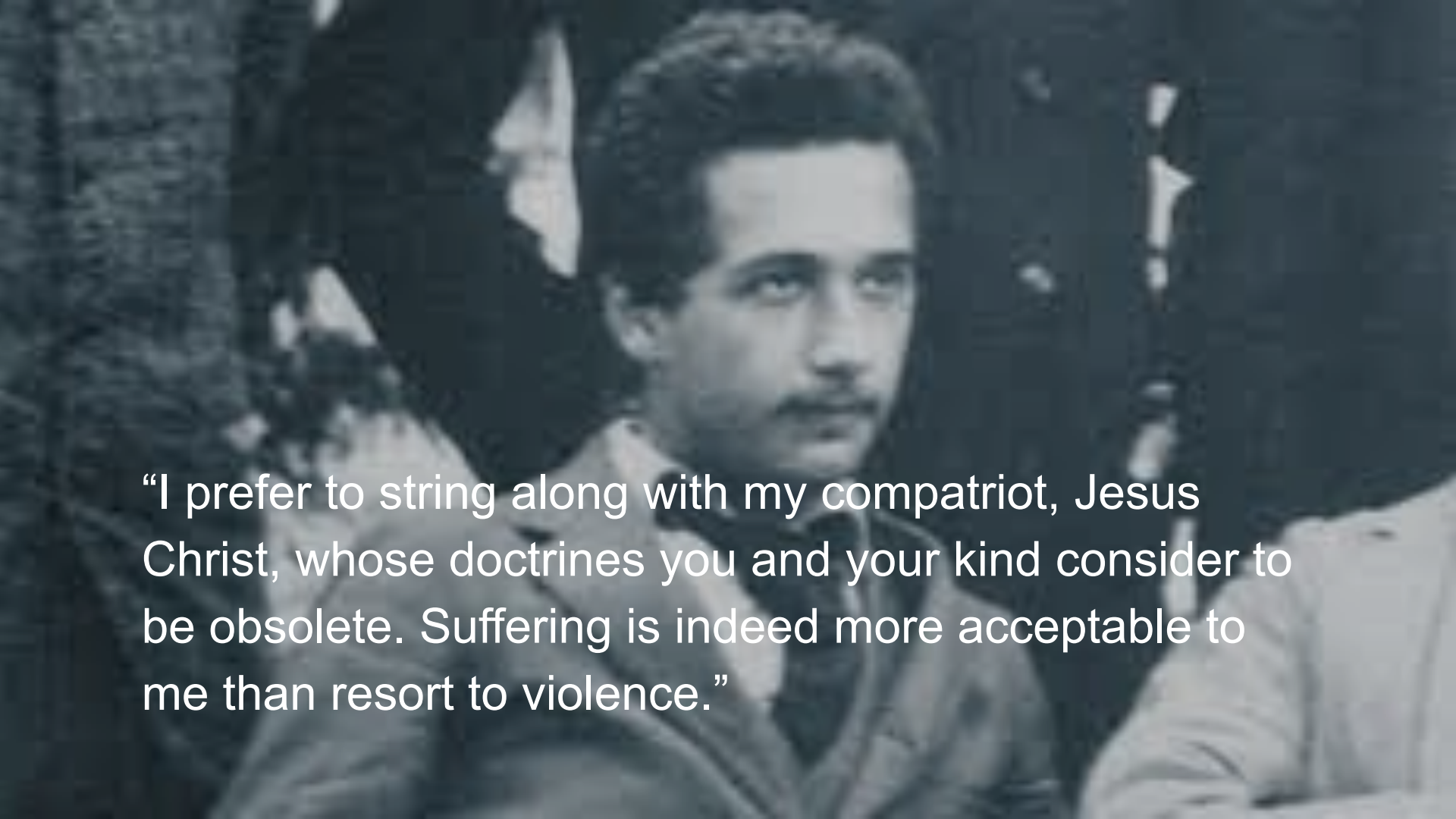
The eerie silence...Is our destiny written in the stars?



Universal Peace

Einstein's Answer..

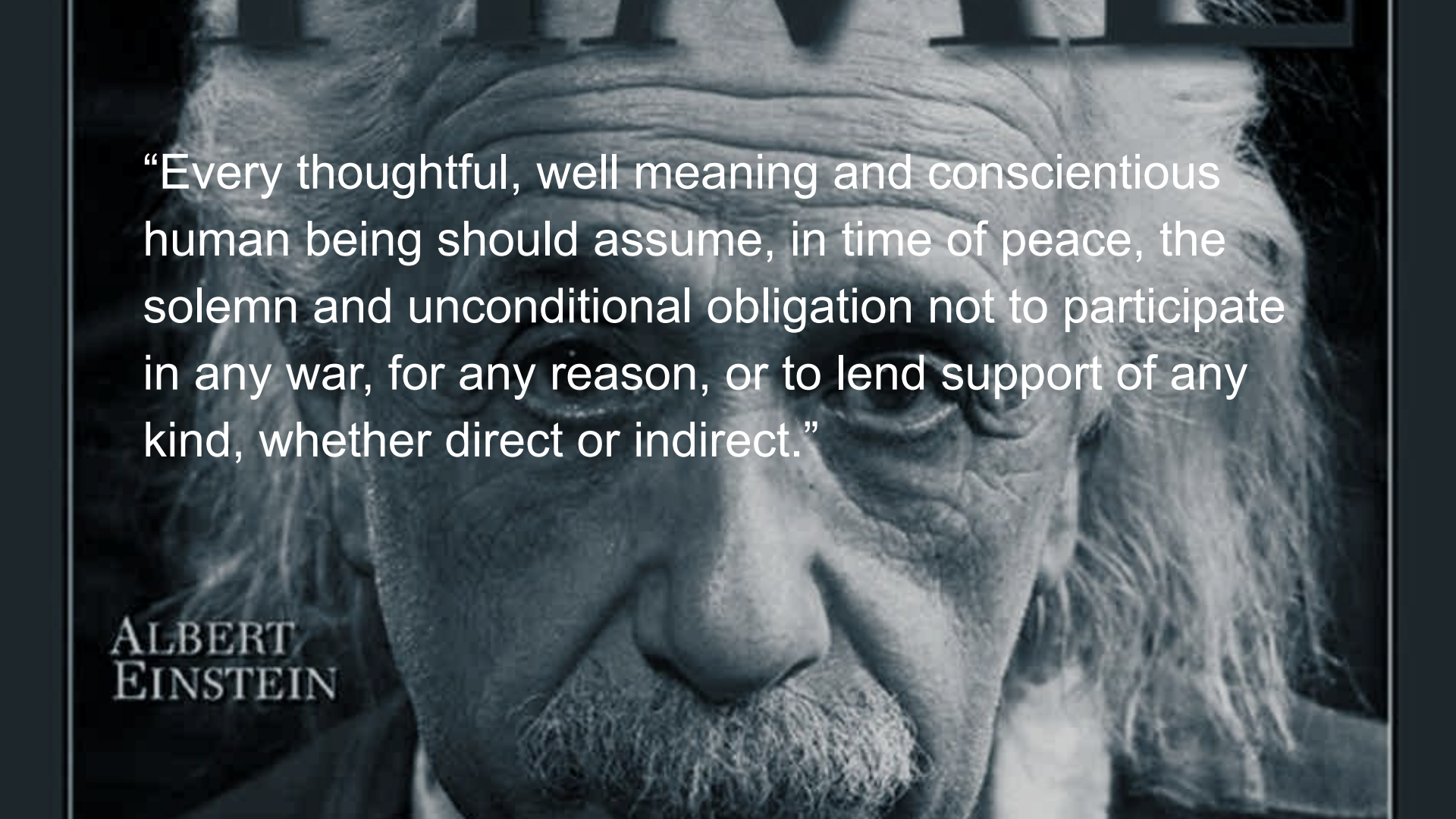




“I prefer to string along with my compatriot, Jesus Christ, whose doctrines you and your kind consider to be obsolete. Suffering is indeed more acceptable to me than resort to violence.”

“Peaceful settlement of international conflicts will be possible only when all armies and all forms of compulsory military service are abolished. As a beginning, it would be most helpful if prominent citizens were to advocate the principle of refusing military service.”





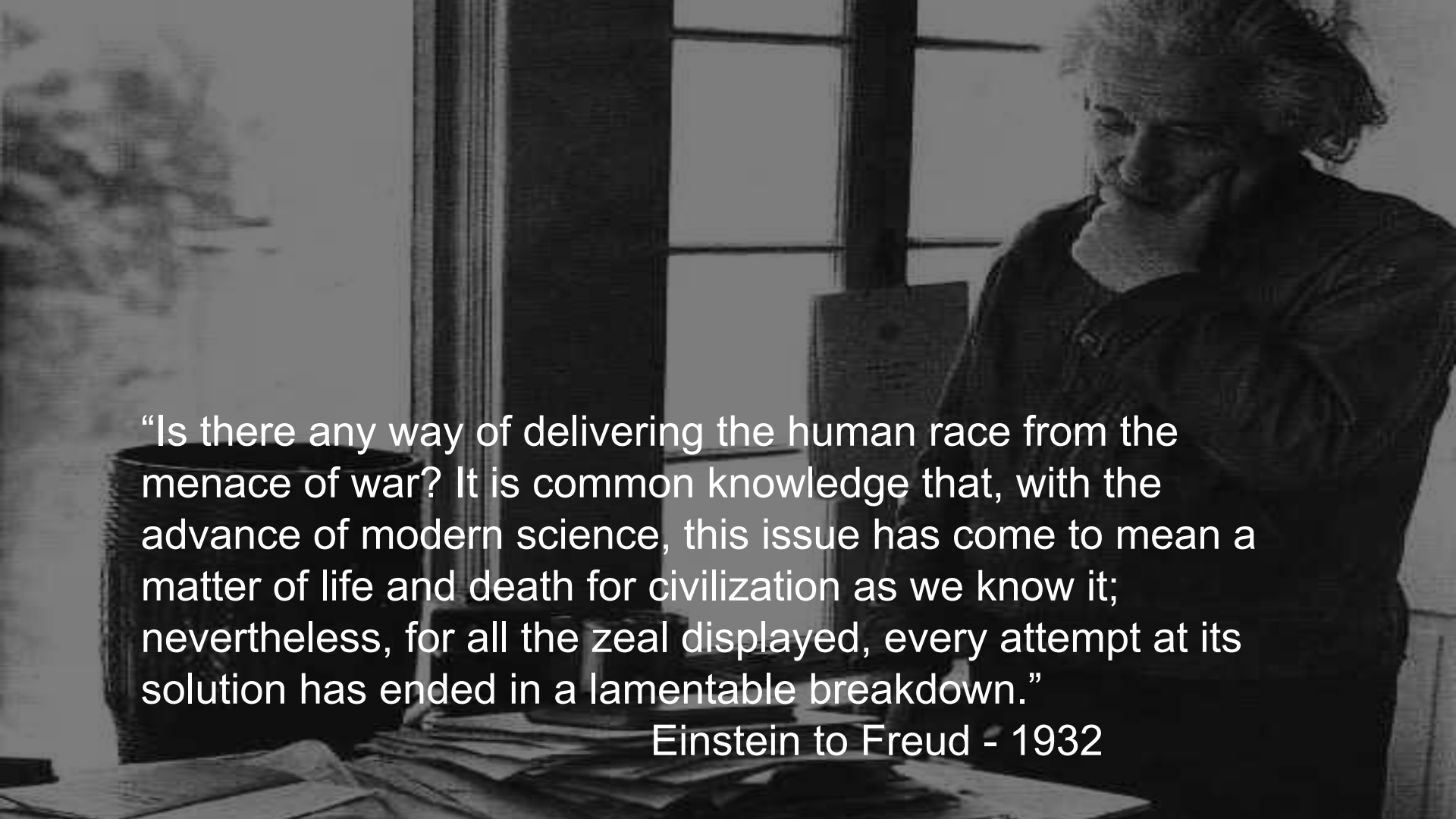
“Every thoughtful, well meaning and conscientious human being should assume, in time of peace, the solemn and unconditional obligation not to participate in any war, for any reason, or to lend support of any kind, whether direct or indirect.”

ALBERT
EINSTEIN

TIME

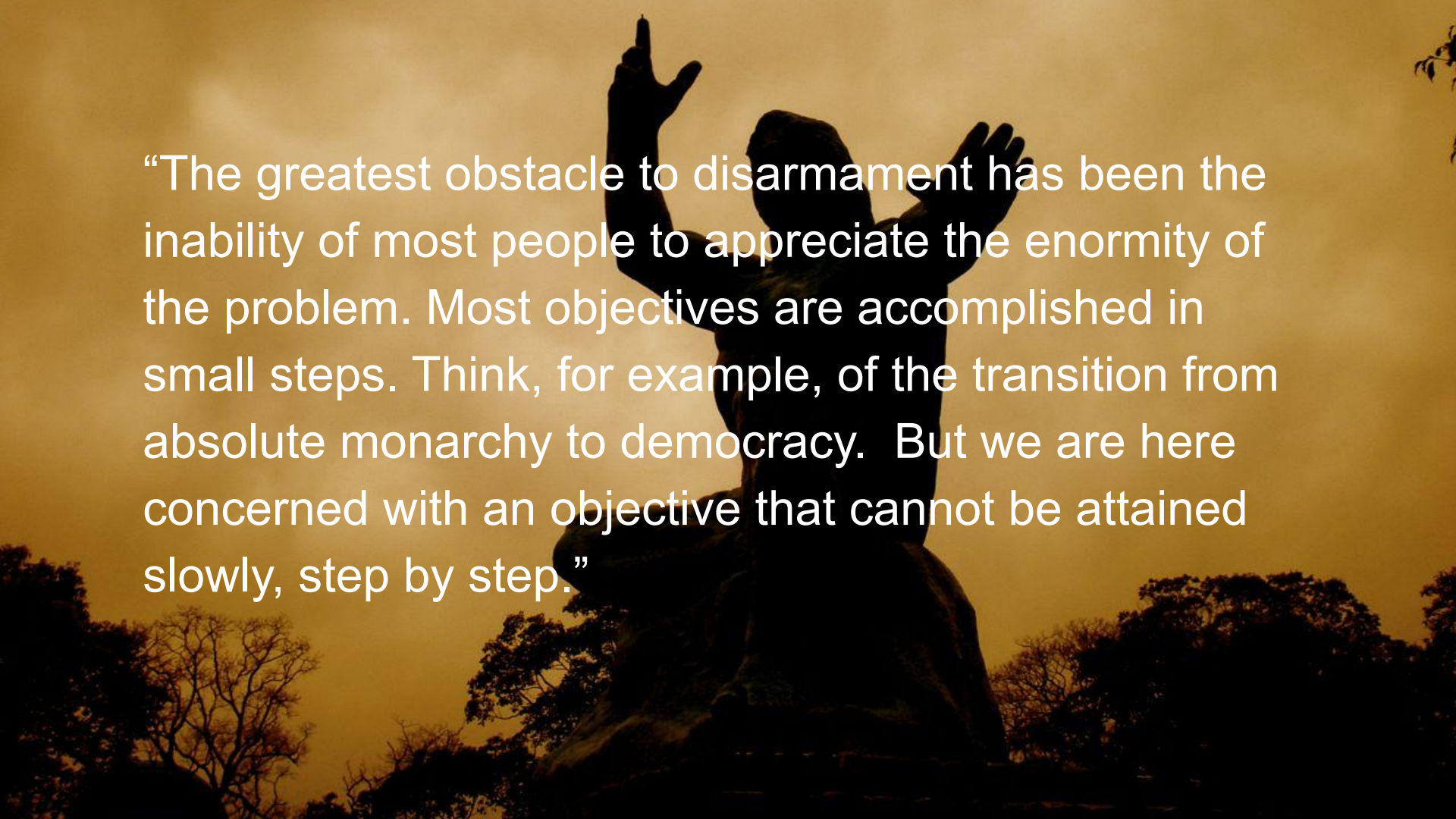
ALBERT
EINSTEIN

“I happen to think highly enough of mankind to believe the specter of war would long since have disappeared had the sound common sense of the people not been systematically corrupted by commercial and political interests operating through the schools and the press.”



“Is there any way of delivering the human race from the menace of war? It is common knowledge that, with the advance of modern science, this issue has come to mean a matter of life and death for civilization as we know it; nevertheless, for all the zeal displayed, every attempt at its solution has ended in a lamentable breakdown.”

Einstein to Freud - 1932

A statue of a person with their arms raised, set against a warm, golden sunset sky. The statue is dark and silhouetted, with the person's right hand pointing upwards and their left hand open. The background features silhouettes of trees at the bottom and a bright, hazy sky.

“The greatest obstacle to disarmament has been the inability of most people to appreciate the enormity of the problem. Most objectives are accomplished in small steps. Think, for example, of the transition from absolute monarchy to democracy. But we are here concerned with an objective that cannot be attained slowly, step by step.”



“We are at present at a crucial crossroad in history. It is for us to determine whether a way to peace shall be found or whether man shall continue along the old road of brute force, so unworthy of our civilization. If we choose the way of peace, freedom for the individual and security for society await us; if we do not, slavery of the individual and annihilation of civilization threaten us. Our fate will be the one we deserve.”