

Postage Stamps of the Nuclear Age

Visions and Messages



Postage stamps on atomic themes and subjects tend generally to be positive in their depiction of nuclear realities. They celebrate achievements of the peaceful atom, in particular in nuclear power production, and in basic research (reactors and accelerators), but also in transport and other areas of potential application. The number of stamps on nuclear medicine or radiation sterilization of foodstuffs is quite small, however.

The number of stamps on all subjects increased markedly after US President Dwight Eisenhower's "Atoms for Peace" Speech at the United Nations in 1953.

Postage stamps celebrate such nuclear achievements as the coming on line of research reactors, and they often suggest the critical place of nuclear power in the national economy. A number of non-nuclear nations have issued stamps which in some cases seems incongruous, for example, Zambia's stamp of a British nuclear submarine (see slide later).



The socialist world, the capitalist world and the United Nations supported the peaceful atom.

The Soviet Peaceful Atom, 1962





Touting Technological Verve and Priority



- ← The world's first nuclear power plant, Obninsk (USSR, 1955).
The failed Atommashtorg Machine Factory to “mass produce” nuclear reactors (USSR, 1981) →

This 1979 Soviet set of stamps celebrates a new Trans-Siberian railroad (BAM), the KAMAZ truck factory, investment in a massive agricultural region and ATOMMASH.



Operation Crossroads: Bikini Atoll



Another issue that postage stamps addressed was nuclear non-proliferation and focused on the explosive, violent and disruptive power of nuclear weapons. Military applications are by far the most significant in terms of budgets, personnel and institutions devoted to their development, but rarely a focus of commemorative issues.

“Operations Crossroads” (1946), two nuclear tests, destroyed Bikini Atoll and set the world on a path toward Cold War nuclear proliferation

Yet the US proudly claimed Operation Crossroads for making the nuclear world a safer place.



First Day Cover for Crossroads

Soldiers stationed at Bikini Atoll wrote letters home.



Canada's CANDU Natural Uranium Reactor



Canada actively participated in the Manhattan Project.

The CANDU (deuterium uranium) pressurized water reactor uses natural uranium fuel – without the need for enrichment. They have been built in Pakistan, Argentina, South Korea, Romania and China.



Czechoslovakia: The Socialist Peaceful Atom



The socialist nations of Eastern Europe bought into Soviet reactors, most of them pressurized water reactors (PWRs, in the Russian VVER), but in Lithuania Chernobyl-type RBMKs. The nations shared the vision of the peaceful atom being a sign of modernity and future progress.

Slovakia



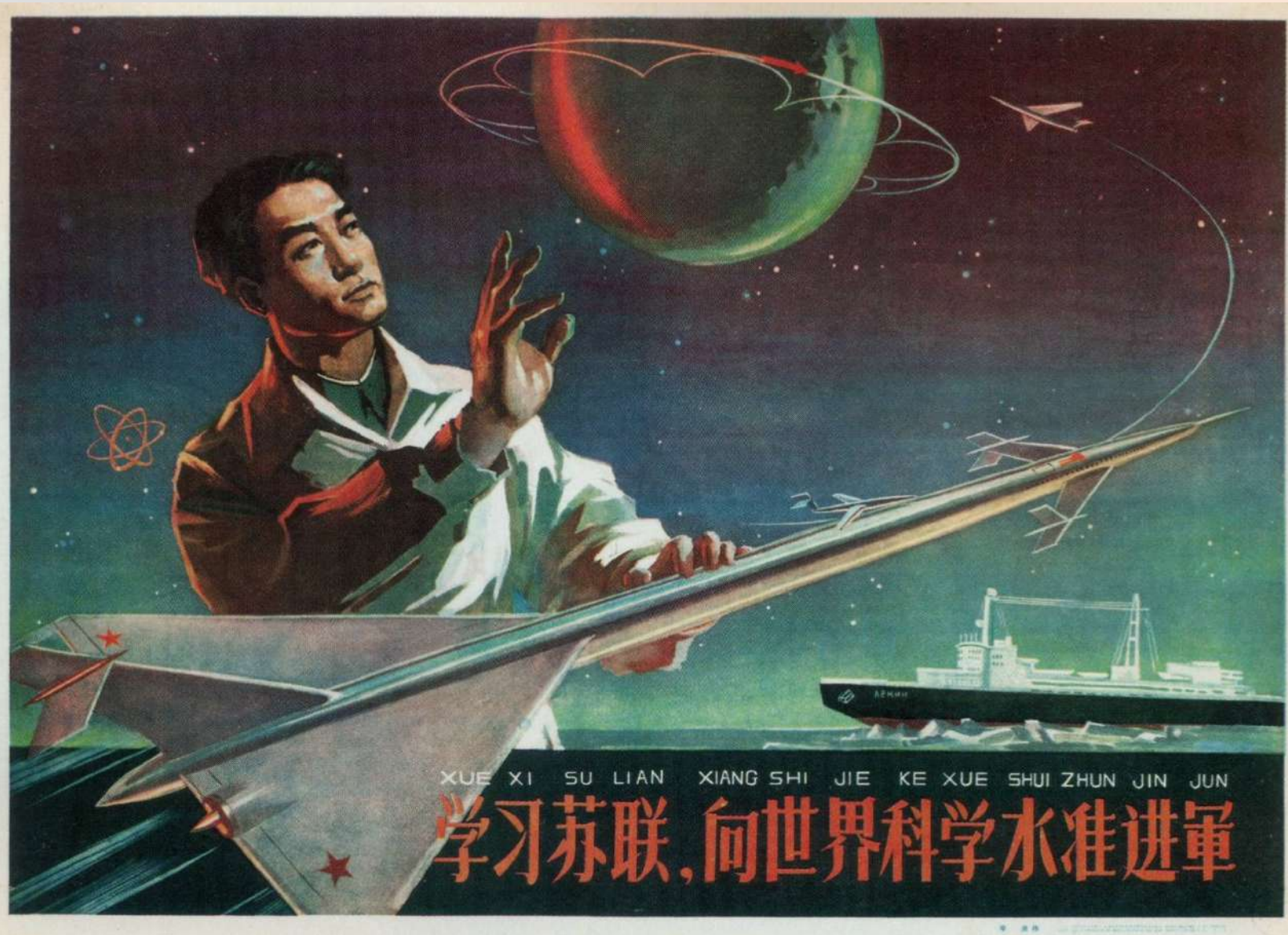
- Two Soviet-era VVER reactors at Bohunice
- Slovakia has in all four operational Soviet-type VVER reactors commissioned between 1984 and 1999 and with a combined net power capacity of 1,815 MWe. Three older reactors have been shut down, two of them in 2006 and 2008 to accede to the EU for not meeting safety standards.

North Korean People's Republic

DPR Korea Celebrates the “Grand Chollima March” in 2000. With 30 or 40 nuclear weapons, the country’s leaders see these devices as the key to preventing attack and invasion from the USA.

Donald Trump famously failed to achieve any arms agreement with Kim Jong Un.





The People's
Republic of
China: Science,
the Summit of
Socialism

People's Republic of China



There are significant numbers of PRC postage stamps that entertain themes of science, technology and economic achievement. No doubt there are others on nuclear topics.

German (West) Celebration of the Atom

Germany established a vital nuclear research program, and long had an extensive nuclear power energy sector. In the 1970s an extensive, at times violent anti-nuclear movement developed. After the Fukushima disaster, Germany announced it would close its 17 nuclear power stations by 2022.



The DDR (German Democratic Republic)

Socialist Germany hoped to continue its strong scientific tradition with the Rheinsberg NPP (nuclear power plant) that operated at low power from 1976 when closed in 1990 upon unification. Its Greifswald NPP was planned for eight Soviet VVER-440s; the first four went online 1973 – 1979, and all were cancelled and closed in 1990.



Stamps commemorating Otto Hahn (but not Lise Meitner, co-discoverer of fission); the communist Frederic-Joliot Curie, and the DDR call for a nuclear free world.

Generally, scientific achievements are heralded frequently in “socialist” postage stamps

- The 15th anniversary of the so-called (*sogenannte*) DDR



ROMANIA

Romania employs two CANDU reactors at Cernavodă, both taking decades to build; three other units have been planned...also for decades, but it is unlikely they will ever be built.

Under dictator Nicolae Ceaușescu, Romania secretly pursued nuclear weapons, although a signatory of the NPT (Non-Proliferation Treaty, 1968)



Bulgaria



The Kozloduy NPP previously operated four older reactors of the VVER-440/230 design, but under a 1993 agreement between the European Commission and the Bulgarian government, Units 1 and 2 were taken off-line at the beginning of 2004. According to one report, they were in the top 10 most dangerous units in the world. Units 3 and 4 were retired as one condition for Bulgaria to enter the EU. Units 5 and 6, 1000 MWe Soviet designed PWRs, are operating. Bulgarian leaders hope to build other stations.

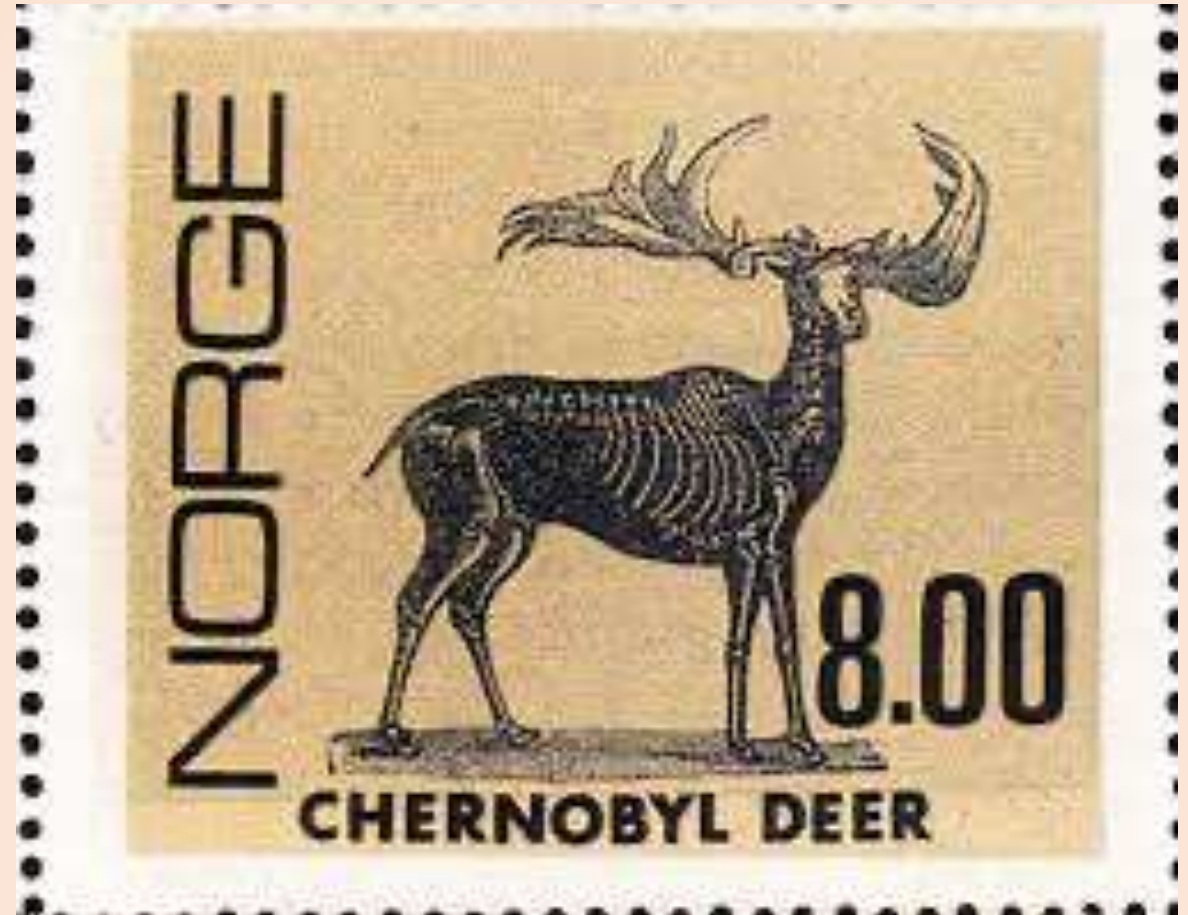
Socialist **Lithuania** built two Chernobyl-type RBMK reactors at 1500 MWe that were commissioned in the early 1980s, updated after Chernobyl, and shut down as a condition for Lithuania to enter the European Union by 2009. In the background left of this stamp (1980) one can see the cooling stacks of the Ignalina reactors, then under construction.



Norway

A major producer of heavy water, initially at Vemork.

There are no nuclear reactors for generating electricity in Norway, but there have been four operational research reactors in Norway, one at Halden (HBWR) and three at Kjeller (JEEP I, NORA and JEEP II).





The Netherland's one nuclear power plant at Borssele went on line in 1973 and operates at roughly 485 MW, producing 4% of the country's electricity. The government plans a return to nuclear power in the 2020s



Belgium's research reactors at Belgian Nuclear Research Centre – SCK•CEN – are crucial to materials testing and science as well as isotope production

Finland's Nuclear Power Program Dates to the 1970s



Finland was the first "western" country to buy Soviet reactors for its Loviisa NPP in the late 1970s. It also has two ASEA-Atom BWRs at its Olkiluoto NPP .

The country's fifth plant Olkiluoto 3 was supposed to be ready by 2010 at a cost of €3 billion. But the project has been delayed by over a decade and costs have skyrocketed to €11 billion.

With the Onkalo nuclear waste disposal facility under-construction in Olkiluoto, Finland will have the world's first permanent geological repository for spent nuclear fuel and high-level radioactive waste.



← 1978

The Republic of China (Taiwan)
research reactors

1950s ↓



Republic of China



Taiwan has 3 NPPs and 6 reactors with total capacity of 5,000 MWe, around 8.1% of national energy consumption. The reactors are two GE BWRs and one Westinghouse PWR

Energy issues often are the topic of postage stamps.



The UK issued a series of stamps in 1964 for the 20th International Geophysical Conference. Here the Dounreay Fast Breeder Reactor.

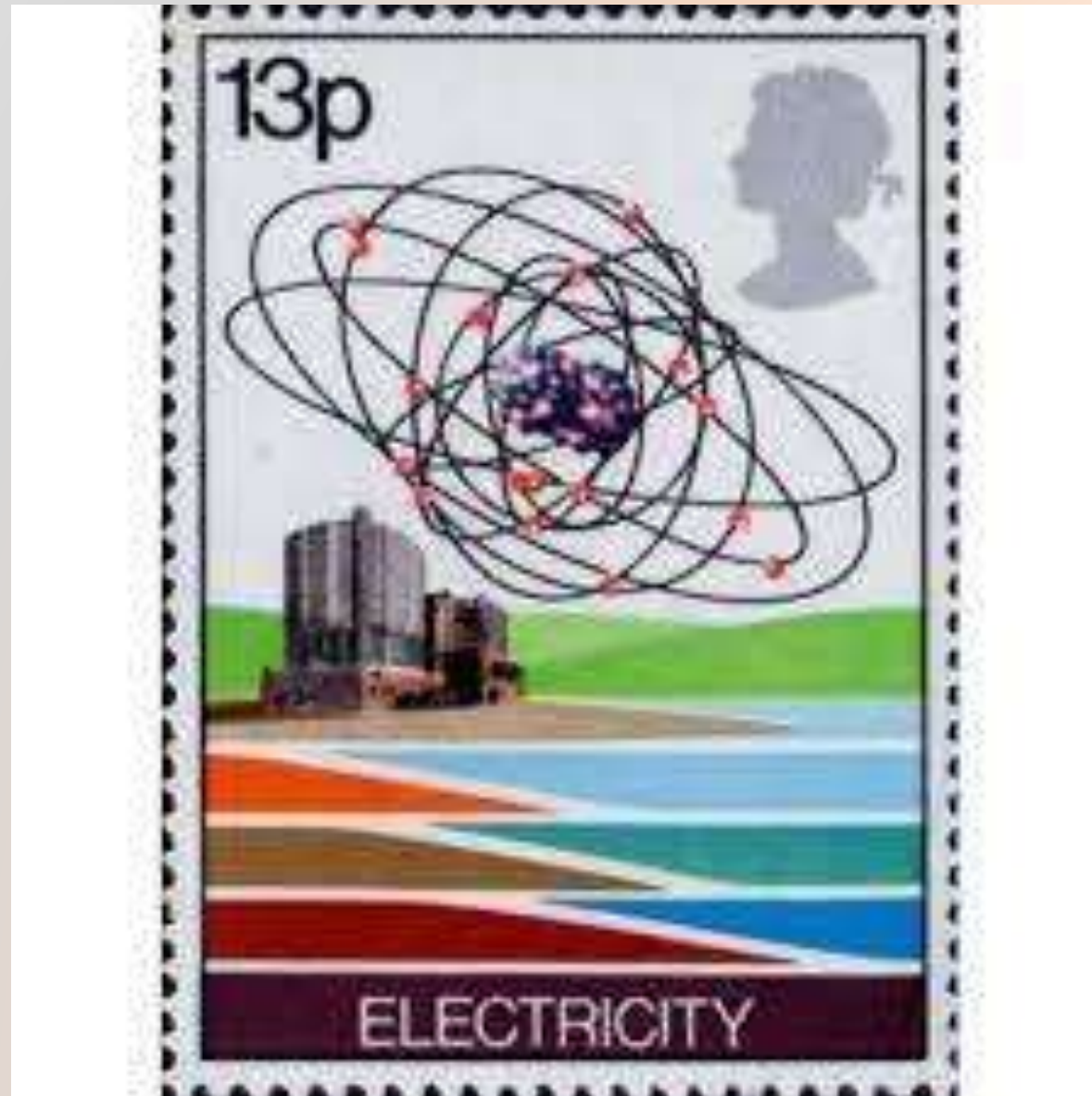
For Queen and the Atom!

The Advanced Gas-Cooled Reactor (AGR) at Windscale, England



A total of fourteen AGR reactors at six sites were built between 1976 and 1988.

Windscale was the site of a fire in October 1957 that burned for three days. It was the worst nuclear accident in the UK's history when graphite "piles" caught on fire releasing radioactivity over 100s of square kilometers.



In 1978 Great Britain issued a series of stamps on the nation's electricity resources including for coal, gas, off shore oil drilling and nuclear power.

A US first-day cover from 1977 celebrates nuclear power as contributing to energy conservation.



- Nuclear power “for the future” -- on the eve of Three Mile Island. At the time industry had already cancelled 55 plants.
- Issued during the period of the US Energy Research and Development Administration (ERDA), 1974-1977.

France: 20th Anniversary of the Atomic Energy Commission



Bangladesh, India and Pakistan Have All Pursued Atomic Power

Bangladesh has joined the world's nuclear nations with its Rooppur Nuclear Power Plant. Two Russian 1000 Mwe VVER units are nearing completion, two others are forecast.

Bangladesh seeks to lessen reliance on natural gas.



Pakistan's First Atomic Reactor



Pakistan has five Chinese commercial reactors in operation and one plant under construction. Pakistan has nuclear weapons and is not a signatory to the Nuclear Non-Proliferation Treaty.

پاکستان
PAKISTAN
POSTAGE
आकिछान

20
PAISA



Karachi Nuclear Power Plant

The Trombay (India) BARC Nuclear Center, 1965-68

The Bhabha Atomic Research Centre (BARC), currently with nine research reactors, dates to 1956. India has a massive civilian power program and also possesses nuclear weapons.





First day cover of stamp honoring the founder of the Indian nuclear program and close associate of Jawaharlal Nehru, Homi Bhabha.



China's first experimental reactor (1958).

Vietnam

Vietnam has considered nuclear power since the 1980s, first with Soviet VVERs (PWRs). Vietnam's 500 kW Da Lat research reactor in Lam Dong province, built in 1980, was commissioned 1984. This replaced an earlier US Triga Mk II reactor which started in 1963 but was dismantled by the USA at the end of the Vietnam War.





← The United Nations celebrates signing of Nuclear Partial Test Ban Treaty (NPT) (prohibiting atmospheric tests), 1963. A Soviet stamp for the NPT ↓





МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ
УНИВЕРСИТЕТ
ИМЕНИ М. В. ЛОМОНОСОВА.

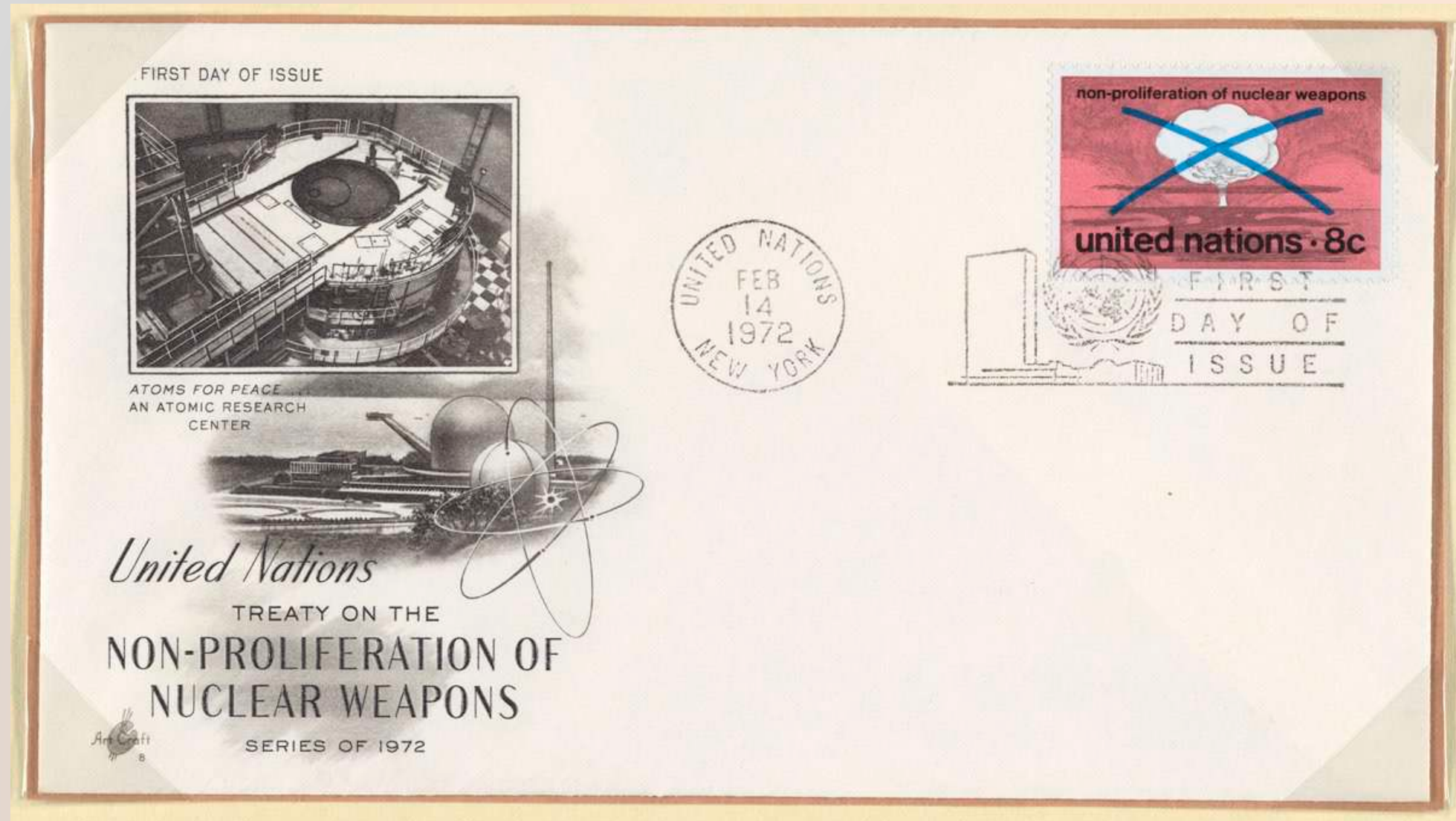


Вопрос: кем изобретен?

Non-proliferation was a major subject of postage stamps from the 1970s. Here: UN Geneva issues (1972)



Non-proliferation First-day Cover



Marshall Islands



The Marshallese, displaced from their homelands that were then destroyed by Operations Crossroads and subsequent nuclear tests, are understandably anti-nuclear in their views.



Tonga



- The Treaty of Rarotonga created the South Pacific Nuclear-Free Zone. Signed in Rarotonga (Cook Islands) on 6 August 1985, it entered into force on 11 December 1986, now with 13 Parties: Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Western Samoa.
- Strangely, in 2010 King George Tupou 5th of Tonga said the quicker the country moved towards nuclear energy the better.

Tanzania (1995) issued a stamp to memorialize the end of WW II with Hiroshima blast, and also to take note Enrico Fermi's role in building the world's first atomic "pile" in Chicago in 1942.



Micronesian philatelists honored Linus Pauling for his opposition to nuclear weapons and their testing



- Linus Pauling fought from the 1950s to stop the proliferation of weapons and their tests. He appealed to reason and science, and he also appealed to emotion. He pushed a “Scientists’ Petition To Stop Nuclear Testing.”
- Pauling rejected out of hand the spurious arguments of Edward Teller and others who claimed to design a “clean” nuclear bomb, as if one with lower radioactivity but that blast and heat were clean.
- And he lamented and protested against radiation fallout and its genetic damage.



Andrei Sakharov (1921-1989), creator of the Soviet hydrogen bomb, later a scientific dissident, supported a ban of atmospheric testing and eventually nuclear weapons entirely. He has been called the conscience of perestroika. Sakharov supported nuclear power, after Chernobyl calling for building stations underground.



Non-proliferation stamps proliferated even among the proliferators



Spain's nuclear power program dates to the 1960s. In 1967 Barcelona hosted the European Congress of Radiology jointly with the Radiological Federation of Latin Culture (Fédération Radiologique de Culture Latine)



Brazil (ca. 1976)



- Brazil has one nuclear power station. It relies more on oil, gas and especially hydroelectricity.
- Brazil acquired several centrifuges in the 1950s toward the end of enriching uranium to build a bomb, continued to operate them and build its own, and only recently abandoned the program.
- Brazil received its first research reactor for the US in 1957.
- It acquired two Westinghouse PWRs

Republic of South Africa

South Africa (RSA) has two operating nuclear power stations and a strong commitment to future expansion of nuclear energy. (It also likely tested a nuclear device during the Apartheid regime.). The RSA is twelfth in the world in uranium production.



The Joint Institute for Nuclear Energy Synchrophasotron, Dubna, Russia

- In January 1955, the USSR founded the Joint Institute for Nuclear Energy (JINR) in Dubna, Russia, to give access to fraternal socialist physicists to a massive particle accelerator, the synchrophasotron. Initially, the USSR invited China, Poland, Czechoslovakia, the German Democratic Republic (DDR), and Romania. Later all of the socialist nations joined JINR – and glorified its achievements in postage stamps.
- Here a Hungarian stamp marking ten years of partnership. Hungary itself has four Soviet PWRs (VVER-440s) at its Paks location and is negotiating with Putin for more 1000 MW units.



Soviet and Bulgarian Dubna Joint Institute Stamps





Polish and Czech stamps on Dubna, the Czech surprisingly a 60th anniversary stamp from 2016, well after the collapse of the socialist USSR. Recall that the USSR invaded Czechoslovakia in 1968.



Georgii Flerov and the Soviet Atomic Bomb



The Dubna physicist Georgii wrote Stalin two letters in 1942, urging him to start work on a “superweapon,” an atomic bomb. Flerov’s letters had a similar result to that penned by Leo Szilard and signed by Albert Einstein to President Franklin Delano Roosevelt of August 2, 1939, that urged the president to commence the Manhattan Project.

With this 2013 stamp Russia celebrates its atomic bomb history.

CERN

- CERN (founded in 1952), the European Organization for Nuclear Research (Conseil Européen pour la Recherche Nucléaire)
- CERN is the site of the Large Hadron Collider (LHC), the world's largest and highest-energy particle collider.



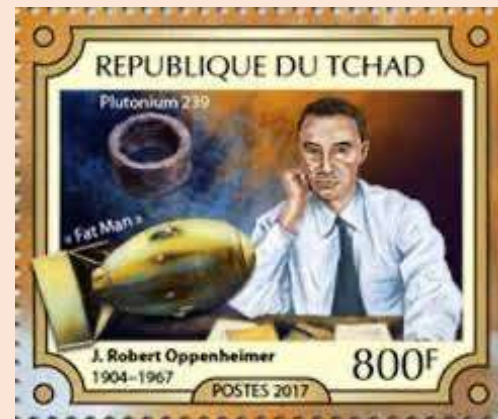
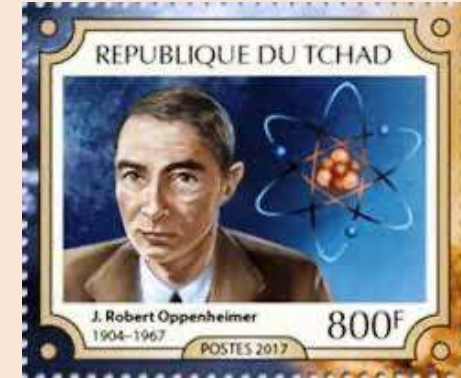


Another focus of nuclear philately has been to honor leading physicists: the Curies; Lise Meitner, co-discoverer of nuclear fission; Lev Artsimovich, a leading specialist in the Soviet atomic bomb project



J. Robert Oppenheimer, Head of the US Manhattan Project

- Enigmatic leader of the US nuclear establishment in its first years, Oppenheimer has been captured in postage stamps of Chad and Togo. He was ostracized from the US security community for his opposition to super (hydrogen) weapons and wrongly denied his security clearance by the Atomic Energy Commission and FBI.



PEER
EDWIN E. LANTIER
1900-1980



EDWIN E. LANTIER AT
BERKELEY RADIATION LABORATORY
APRIL 1950



FIRST DAY OF ISSUE

25208

Atoms
for Peace
FIRST DAY OF ISSUE

Robert Oppenheimer

Igor Kurchatov, father of the Soviet atomic bomb, pushed an expansive nuclear power program in the USSR from the 1950s until his early death in 1960. The scientific settlement in Kazakhstan that directed Soviet nuclear bomb testing was called “Kurchatov.”



Ernst Rutherford (New Zealand, 1871-1937) discovered half-lives; protons; and in his laboratory the neutron was discovered.

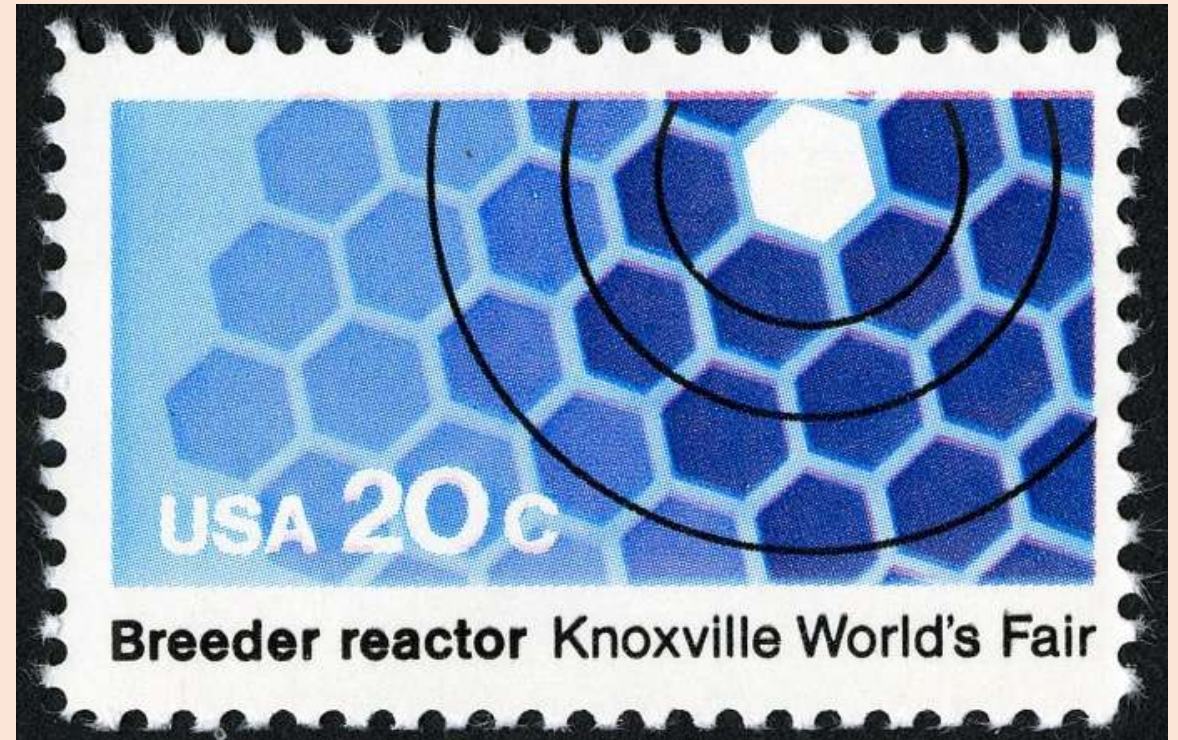


Enrico Fermi discovered that nuclear transformations occur in almost every element bombarded by neutrons, and he designed the first nuclear reactor, or pile that opened in a University of Chicago squash court. (Italy is the only G8 country without NPPs since 1990; there has been discussion since 2008 about returning to nuclear power.)



Breeder Reactors

- Liquid metal (coolant) fast breeder reactors are intended to “breed” plutonium from non-fissile uranium in order to fuel other reactors – or build nuclear bombs. France, the US, Japan, Russia, India and China have pursued LMFBRs in one form or another – and all programs have been financial disasters and rife with technical failures including sodium fires.
- The US celebrated efforts at nearby Oak Ridge, Tennessee, to build breeders at the Knoxville International Energy Exposition (1982)
- Only China and Russia have active programs in the 2020s.



Nuclear Icebreakers: Russia has won the icebreaker race.



The world's first nuclear icebreaker, the Soviet "Lenin," launched in 1957, the same year as Sputnik



- The "Lenin" suffered two significant reactor accidents and was extremely costly to operate.
- It was retired to Murmansk, Russia, where it is now a floating museum.



Russia's third generation of nuclear-powered ships is well behind schedule in launching and significantly over cost. But they are crucial to the country's goal of operating a "Northern Sea Route."



← A 1988 stamp in honor of the nuclear icebreaker "Sibir"

Monaco International Laboratory of Marine Radioactivity (1987)



Tokamaks

The tokamak design for fusion reactors (controlled thermonuclear synthesis), developed by Andrei Sakharov and Igor Tamm in the USSR in 1951, continues to be pursued through the International Fusion Reactor Project (ITER)



Nuclear Submarines



↑ First Soviet nuclear submarine, launched in 1959, and navigated under the North Pole



Nuclear submarines have great advantages of diesel submarines: they can stay submerged for months at a time without resurfacing for air or fuel, and they are quiet. The US and USSR built hundreds of them during the Cold War, joined by France, the UK, China, and others.

USS Savannah, launched in 1959



- The “Savannah” was an attempt to demonstrate the viability of nuclear shipping, not only military submarines. It was costly to operate and quickly retired.
- In service between 1962 and 1972, it is one of only four nuclear powered cargo ships ever built.
- It had limited cargo space, in fact, was poorly designed for cargo, and its crew was a third larger than comparable oil-fired ships and had to receive special training in addition to that required for conventional maritime licenses.

USS Nautilus under the North Pole (1959)



- To claim Cold War advantage, and ideological supremacy with a technological achievement, the US built the USS Nautilus (SSN-571), the world's first operational nuclear-powered submarine (1954) and the first submarine to complete a submerged transit of the North Pole (1958), whose commander announced as it happened, "For the world, our country, and the Navy – the North Pole."
- In May 1959, Nautilus entered Portsmouth Naval Shipyard, Kittery, Maine for her first complete overhaul – the first of any nuclear powered ship – and the replacement of her second fuel core.
- Portsmouth and Severodvinsk, Russia, are nuclear shipyard sister cities.

Panama's nuclear submarine (or at least a commemorative stamp for the USS Nautilus, the first submarine to transit under the North Pole)



Nuclear Submarines

HMS Churchill (Zambia (?), 2001) →



Djibouti, in the Horn of Africa, produced stamps of Russian and American submarines ↓



Medical applications



Fig. 5. **Development of the X-ray equipment:** a) Insulated high voltage cables; Uganda 1962. b) Image intensifier; Sharjah 1965. c) Fluoroscopy table; Germany 1978.

For these images and analysis, see J. Præsthholm, "The origin and development of diagnostic radiology as illustrated by postage stamps," *Acta Radiologica*, vol. 38, no. 6 (1997): pp. 930-936.

Yugoslavia



- Research in the former Yugoslavia was based at the Vinča Institute of Nuclear Sciences
- On 15 October 1958, a major accident at a research reactor resulted in one death and five seriously injured.
- Until the 1980s, all of the country's waste was kept in the open at Vinča.
- In 2010, 2.5 tons of waste, including 13 kg of 80% enriched uranium, were transported to Maiak, Russia for reprocessing in the IAEA's largest ever technical cooperation project; thousands of armed guards protected the convoys

Argentina

- Under fascist dictator Juan Peron, Argentinian scientists claimed to achieve room-temperature fusion in the early 1950s.
- Argentina pursued nuclear weapons for some years, and never signed NPT.
- The country has three operating power station, and it is in negotiations for another, perhaps with Russia, China or Canada



Japanese postal stamps focus on peaceful applications, especially nuclear power and nuclear research

- Japan began developing civilian nuclear power by the late 1950s. Here its JRR-1 reactor, 1957-64
- It was massively committed to nuclear energy to achieve energy independence from oil and gas imports.
- As of March 2020, of the 54 nuclear reactors in Japan, there were 42 operable reactors but only 9 reactors in 5 power plants were actually operating. In response to the Fukushima disaster, a total of 24 reactors are scheduled for decommissioning or are in the process of being decommissioned.
- Japan engaged a lengthy and eventually fruitless attempt to commercialize LMFBRs
- Its Kashiwazaki-Kariwa NPP is the largest in the world, with seven reactors at 8 Gwe on 4.2 km² of land, all shut down after Fukushima.





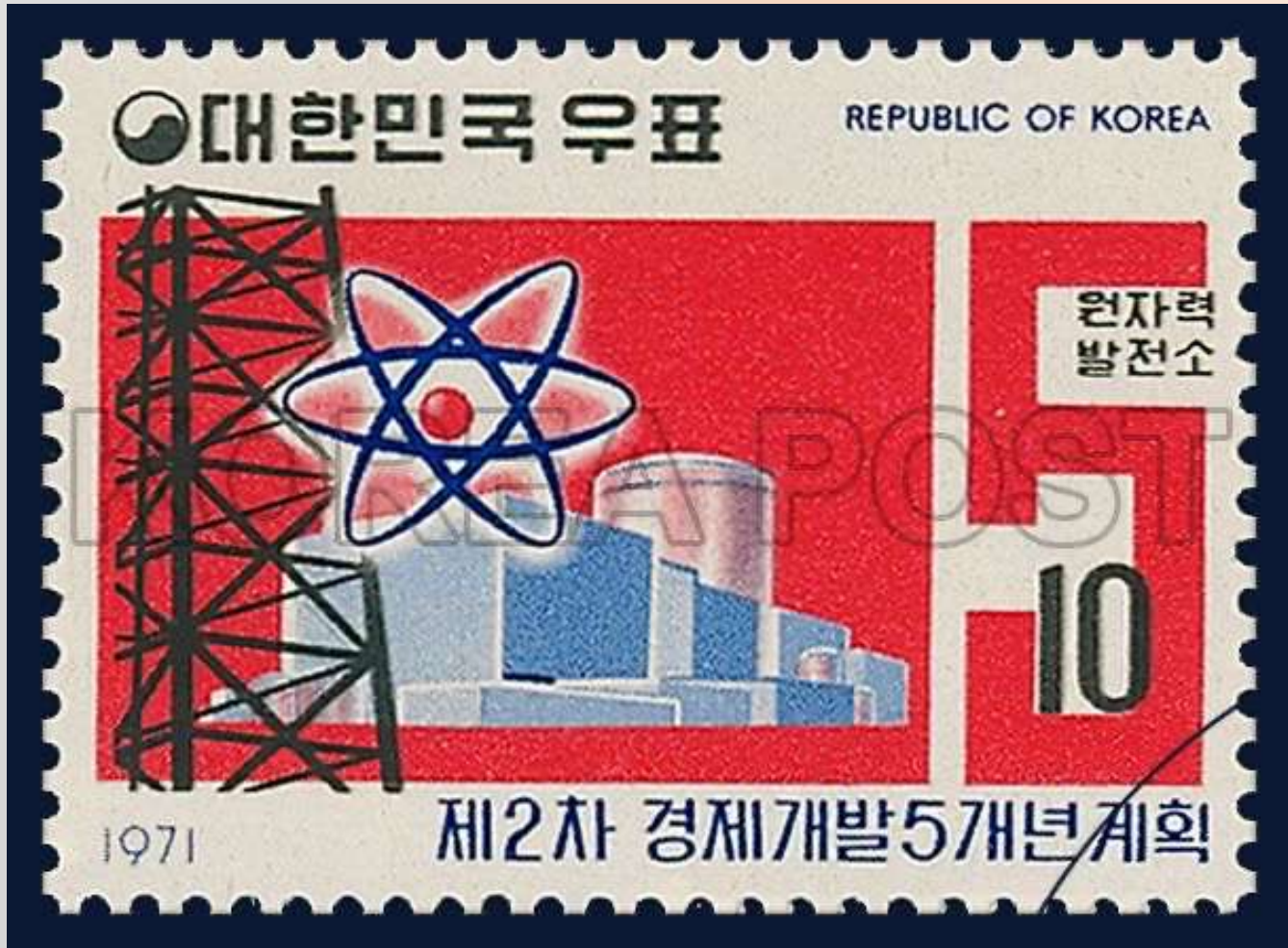
Japan had a strong nuclear physics research program by the 1930s. In November 1945 the American occupying force destroyed five operating research cyclotrons in Japan. By 1955 the US encouraged Japanese research to overcome resistance to nuclear power.

Republic of Korea: Start up of Triga Mark II research reactor in 1962, Seoul



- Korea is one of the leading nations of the nuclear world with 24 reactors providing about one-third of the country's electricity
- The current government has set forth a phase out of nuclear energy.
- But Korea is building an NPP in the United Arab Emirates at Barakah and is actively pursuing exports with other nations.





In 1972 construction of the first nuclear power plant in **Korea**, Kori 1, a Westinghouse PWR, commenced. It went operational in 1978. Eight reactors were under construction by the early 1980s.

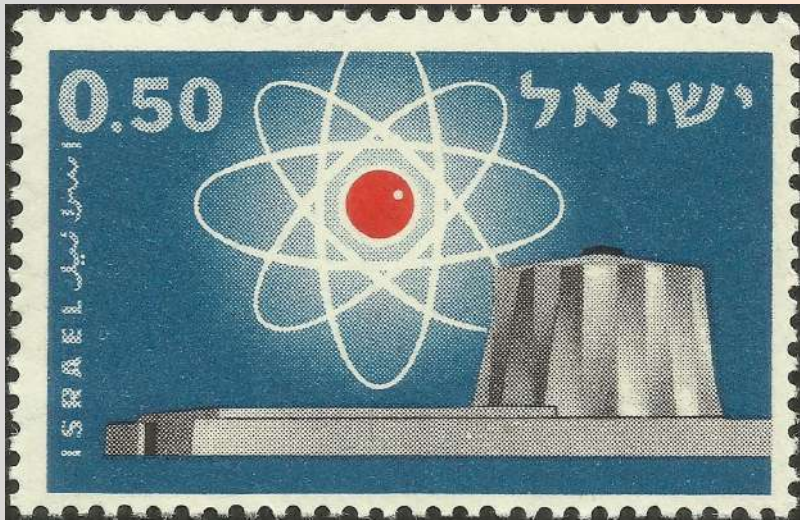
Turkey

- Turkey has pursued nuclear power since the 1960s. High costs, public concerns, and worries after Chernobyl delayed any progress. Turkey's first station, with four Russian PWRs is scheduled to open at Akkuyu in 2023.
- Some analysts worry about the seismic stability of the plant.
- In 1961, a 1 MW test reactor began operation at Cekmece Nuclear Research Center.



Israel: Soreq Nuclear Research Center, 1960

Israel celebrates the peaceful atom with results achieved on several research reactors including with isotopes. It also has nuclear weapons and is not a signatory of the Nuclear Non-Proliferation Treaty.



New Zealand

- New Zealand is decidedly anti-nuclear, with no research reactors, no power reactors, and having become a nuclear-free zone from 1984. But New Zealand celebrates the founder of nuclear physics, New Zealander Ernst Rutherford (1871-1937).





To celebrate
New Zealand being declared
free of nuclear weapons
and nuclear power.



First Day Cover

October 24 International Disarmament Week United Nations International Year of Peace

Nuclear Accidents and Postage Stamps

If most of the world's postage stamps have largely focused on the positive aspects, images or achievements of nuclear science, and others on non-proliferation, then *none* seek to celebrate nuclear accidents. But a significant number of them focus on Hiroshima, Nagasaki and Chernobyl to remind citizens of the world of these terrifying attacks and violent disasters.



On the fifth anniversary of the Chernobyl disaster in 1991, the USSR issued a commemorative stamp.



Chernobyl Tragedy

Chernobyl first-day cover, 10th anniversary of the disaster
(Ukraine, 1996)



Chernobyl commemoratives, Belarus



The nation most deeply affected by Chernobyl in terms of fallout, land lost to cultivation, and continuing human costs.

Chernobyl, Ukraine

Later commemorative Chernobyl stamps from Ukraine (30 years, 35 years).



Kurchatov Institute, 2018 ↓



Rosatom, 2015 ↓



Russia's nuclear industry is going through a celebratory, self-proclaimed Renaissance of reactor construction at home and abroad, and demonstrating ties with the "heroic" and powerful Soviet nuclear enterprise.

40th Anniversary of the end of WW II (1995), a US stamp withdrawn at Japan's request before issued



- Called by the Japanese government an “affront to the Japanese people”
- At the same time, plans by the Smithsonian Institution in Washington, DC, to display the Enola Gay, the B-29 aircraft that dropped the bomb on Hiroshima, and artifacts of the bomb's effects in Hiroshima and Nagasaki stirred protests from American veterans groups and the U.S. Congress as not depicting the heroism and glories of nuclear attack.

Russia celebrates nuclear weaponry (2017)

A stamp of a mobile nuclear missile launcher reflects the re-nuclearization of Russian military thinking in the Putin years. Here the SS-26 “Iskander” equipped with a thermonuclear warhead.

