The State & Nuclear Power

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Related: see "Technology and the State: An Introduction" in this issue.

For the anti-nuclear movement the question "What forces have pushed the development of nuclear power in the U.S.?" should be an important one. For in the cause one usually finds the cure. The fact that this question is so infrequently raised, and where raised, so narrowly answered, says something about the nature of American opposition to nuclear power at this time.

The prevalent analysis of the development of nuclear power stresses rather narrow economic interests [a] primarily the profit motives of the electric utilities, hardware manufacturers and operators, and fuel suppliers. This analysis is not sufficient however. When we look at the period of the inception of nuclear power in this country, we find hesitation and doubt on the part of private industry. There was a push behind nuclear power coming from another direction.

In examining the historical roots of nuclear power, in the decade following World War II, we are struck not by its capitalist dynamic, but by its conformity to the logic of state interests. In particular, it appears that American development of atomic power was primarily directed by the military and strategic considerations of the cold war. Nuclear power was forestalled when the state was preoccupied with the military use of the atom, and began abruptly when the state saw advantage in developing it. No understanding of nuclear development is possible without undertaking a political-economic analysis.

Though state and capital form a unity, it is a unity of somewhat independent interests. Just as the corporations direct the state to protect their interests, so, too, the state has occasion to marshal corporate energies to achieve its own ends. In the initial years of American nuclear power, politics predominated over economics.

When the War Ended

The Manhattan Project had proved the feasibility of unlocking atomic energy. In so doing it had built the first atomic reactors, and vast support installations for a uranium/plutonium-based industry. It had created a core of thousands of scientists and technicians with atomic expertise, and given hundreds of companies experience in the nuclear field. It would have been natural for the Manhattan District's momentum to have carried us into atomic power development as soon as the war ended. Yet this did not happen.

As for the companies which participated in the wartime atomic effort, most were reluctant to continue in nuclear research and development. As *Business Week* noted in their 1947 article "The Atoms Industrial Sponsors": "The atom is one bandwagon that U.S. industry has shown little eagerness to get aboard. Of the hundreds of companies involved in the bomb project during the war, few have been attracted by the postwar atom program."

The reason given for this hesitance was corporate fear of the "practically inevitable socialization [i.e., nationalization] of atomic technology—inevitable not only because of its military and potential economic significance, but

because of the huge sums which still have to be spent, without much hope of an early return, in order to exploit it." At a more general level, corporate evaluation of "what atomic energy could provide" was:

> "a practically unlimited source of electric power. It would be a little cheaper, perhaps, than power from coal; more expensive certainly than hydroelectric power…In a nation with a 2,000 year reserve of coal, such a prospect is not terribly exciting—economically speaking…"
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> —*Business Week* April 10, 1948

To business, a nuclear industry would not be profitable—and that meant "not be possible"—unless, perhaps, government did the real work in developing atomic energy, leaving the corporations to reap the harvest.

There were exceptions to this hesitance, including General Electric and Monsanto Chemical, both companies which had been heavily engaged in the Manhattan Project. Such corporate interest, especially Monsanto's, would play a contributing role in the drive for atomic power.

The Atomic Energy Commission

The atomic scientists did not push for nuclear power either, at least not in the years immediately after the war. They left the Manhattan District in droves after August 1945. Many of the scientists had formed an opposition bloc to the surprising bombing of Hiroshima, and had warned that excluding Russia from the atomic secret would only lead to an arms race and the worsening of international tensions. Reacting to the callous militarization of the atom, much of their energy was spent in the postwar fight for "civilian control" of atomic energy.

This fight took shape in 1945 and 1946. Those who favored civilian control supported the McMahon Bill, which proposed a five-person independent Atomic Energy Commission to direct the U.S. nuclear effort. Advocates of the military retaining custody of the atom recommended adoption of the May-Johnson Bill. McMahon's draft won out and was signed into law that August as the Atomic Energy Act of 1946. The AEC began functioning January 1, 1947.

The basic effect of the McMahon Act was to establish a government monopoly of ownership of atomic facilities, materials and information. At the time of the creation of this enormous state industry "few voices were raised by the exponents of private property and free enterprise", as North American Aviation atomic engineer Lee Nehrt pointed out. Business Week, in its 1948 "Report to Executives" on Atomic energy, explained the acceptance of such governmental intrusion:

> "This field, at this stage…[most businessmen] feel is inevitably governmental. They can't see any possibility now that business would want to invest much in the atom. Almost any sort of atomic research work takes large money, running into millions; the pay off is distant and uncertain…so the McMahon Act, these businessmen say, is reasonably satisfactory for the present. It gets the work done, one way or another. And when the time comes for commercialization, everyone will start even…"

The capitalists clearly were not going to attempt nuclear power on their own. Only the state could undertake such a task, and to a large extent, would have it's own reasons for doing so.

As far as any scientific desire for the "peaceful atom," the McMahon Act would prove to be far from a victory. Its author, Senator Brien McMahon had argued that nuclear superiority had allowed the U.S. to take a firm stand against Russia in Europe, and the Bill was thoroughly permeated with this cold war viewpoint. The act forbade sharing restricted data with any foreign power, except as permitted by later international agreement; restricted data being all information "concerning the manufacturing or utilization of atomic weapons, the production of fissionable materials or the use of fissionable materials for the production of power." The penalties for communicating such information included death. Even the Espionage Act had not given the death penalty in peacetime. It was obvious there was one country this clause was specifically directed against, the one country we were unlikely to make later exchange agreements with: Russia.

There might have been some hope for "peaceful" nuclear power in the appointment of David Lilienthal as the first chair of the AEC. Lilienthal was formerly the head of the largest federal power project, the Tennessee Valley

Authority. it seemed that applying the atom to the generation of electricity would be a priority for him. Whatever Lilienthal's original intentions, he would end up concentrating on bombs, not electricity. When he and the other commissioners took the reins of the US atomic program, they were shocked by the paucity of our nuclear weapons stockpile, and decided to do something about it.

After the end of World War II "General Groves [the head of the Manhattan Project] was able to hold the last scientists together long enough to make two more plutonium bombs of the Nagasaki design. These two bombs were exploded at Bikini…in July 1946, once again exhausting our nuclear armory." The propaganda value of the Bikini tests was immense, and the U.S. was able to ride on an atomic bluff. But the AEC wanted to make our nuclear might a genuine threat, and got Truman to authorize, in the spring of 1947, a crash program to create a stockpile of atomic weapons. In a predictable reversal, the civilian agency the atomic scientists and others had fought for became an annex of the military and chief perpetrator of the arms race. Plans for nuclear power faded.

The focus of the AEC on nuclear bombs was its driving motivation well into the '50s. AEC contractors were discouraged from investigating power generation, and the only two plans the AEC had in the '40s for nuclear power plants was abandoned. These two plans had not originated with the AEC, but had been drawn up in the last year of the Manhattan District. The first, the "Daniels Pile," was canceled by the AEC in 1947, because it was a design that did not breed (and therefore could not be used as a strong source of weapons-grade plutonium).

The only other proposal for nuclear power, the "Intermediate Power Breeder Reactor", lasted until 1950 when work on it was transferred to a land-based prototype of the reactor for the Sea Wolf (the US' second atomic sub). This close relation of the "peaceful" and the military atom, and the subjugation of the former to military and strategic objectives, would continue throughout the AEC's cold war period.

The Nautilus

By the close of the '40s the AEC began to draw criticism for neglecting the development of atomic power. The condemnation which had the most impact did not come from civilian quarters, however. It came in the form of a speech given by Admiral Mills, though actually written by Captain Hyman Rickover. As a result of this attack, the AEC was forced to organize a Department of Reactor Development. Rickover's friend Lawrence Hafstad was put in charge of the Department, and Rickover was made the liaison to the Navy. Rickover's immediate interest was not civilian electricity, but the creation of atomic submarines.

The idea of atom-powered subs had been proposed at the Naval Research Lab in 1939, but was shelved during the war. It was revitalized after the war by Charles Thomas, president of Monsanto. At Thomas' instigation, in 1946 a small group of military people were trained at Oak Ridge, enabling them to tackle the problems of atomic power. Rickover was the leader of that group.

The first atomic powered submarine, the "Nautilus," was Rickover's idea. But even though this first application of atomic power was for military purposes, and therefore would directly contribute to the cold war effort, the Nautilus met tremendous resistance. All energies were then concentrated on bombs, and Rick-over had to buck "the Navy, the AEC, and industry until one by one they capitulated." General Electric, for example, turned down the project (being more interested in breeder reactors at the time), and Westinghouse only accepted with reluctance.

The Naval Reactor Program directly laid the groundwork for civilian power stations, as former Atomic Energy Commissioner Murray noted: "It led not only to the Nautilus and the nuclear-powered fleet that is following, but also to the 60,000 kW industrial power reactor at Shippingport [the U.S.' first nuclear power plant]. Had it not been for the Naval Reactor Program the U.S. atomic effort would have moved more slowly than it has." It was no coincidence that the reactor for the first nuclear plant was built under Rickover and Charles Weaver from Westinghouse, "the same brilliant team that built the engine for the Nautilus." But, this would all come later.

The Cold War Sharpens

In the meantime, the cold war sharpened. Russian testing of their first atomic bomb, and the seizure of power by the Chinese Communists, both in 1949, sent a chill through U.S. policy-making circles. Then Secretary of State Dean Acheson summarized the situation:

> "Collapse of the Nationalist regime in China and the Soviet explosion made it clear that changes in power were imminent. By October [1949] the Policy Planning Staff [of the State Dept.] had started to work on a reappraisal of our situation, inquiring initially whether the situation did not require a renewed attempt on our part to get international control of atomic energy. October also saw ferment in another agency. Commissioner Lewis Strauss of the AEC had filed a memorandum proposing intensive work on the possibility of cracking the hydrogen atom and producing a hydrogen bomb."

Strauss' course of action prevailed, and on 31 January, 1950, Truman publicly announced that he had directed the AEC to develop the H-bomb.

The Los Alamos weapons lab returned to a six-day week in March of 1950, and new nuclear weapons facilities opened up (including the Lawrence Livermore Lab in '52), all drawing in the bulk of U.S. atomic expertise. Work on the only remaining AEC power reactor proposal, the Intermediate Power Breeder, was transferred to a military project in 1950, as was mentioned. The path of nuclear development continued to follow "reasons of state" [d].

Industry enters in

Paradoxically, it was during this period of a cold war motivated acceleration in the U.S. atomic effort that industrial interest in nuclear power surfaced. Through the '40s no private company had proposed to build a reactor at its own expense. But in 1950 the first serious glimmerings of private capitalist interest in nuclear power began, as a letter from Monsanto's ubiquitous Charles Thomas indicates.

Writing to the AEC June 20th, Thomas proposed that "American industry design, construct and operate one or more atomic power plants with its own capital. Power and plutonium would under such a plan be produced in the same plant from government-owned uranium…" Even this proposal, which relied much more on private capital than any other corporate proposal for some years after, depended on the government's interest in fighting the cold war. For Thomas was suggesting what came to be called the "dual purpose plant."

Dual purpose plants were nuclear stations made economically feasible by having two functions: first, the selling of atom-generated electrical power, and second, the production of plutonium for the American nuclear weapons stockpile. Monsanto, and other nuclear-oriented corporations, believed this dual function was the only way to make the plants profitable, and therefore possible, in the early years of atomic development.

The AEC was itself interested in dual-purpose plants, as July 1953 *Fortune* magazine pointed out: "The AEC's original reason for wanting to bring industry into the world of nuclear fission was to provide large stand-by capacity for weapon-grade plutonium." Here we see quite clearly the confluence of corporate and state interests (with the state in the predominant role) that would ignite nuclear power. Corporate capitalism alone could not make nuclear investments pay off, and the state, in its desire for international atomic hegemony, was beginning to feel the need for some energetic partners.

So, in 1951 the AEC set up a program of "Industrial Study Groups" for a small number of paired corporations to examine the status of reactor development and the possibility of atomic power generation. The first two study teams were composed of Monsanto and Union Electric (a St. Louis electric utility), and Dow Chemical with Detroit Edison. (The Detroit Edison group would also follow through on the dual purpose theme, in their construction in the '60s of the U.S. one and only commercial fast breeder power reactor, the now defunct Enrico Fermi plant).

Also joining in the study program in 1951 and '52 were: PG&E/Bechtel, Commonwealth Edison (Chicago)/Public Service of Northern Illinois (also a power company) and Foster Wheeler/Pioneer Service and Engineering. The program was designed for companies which were not familiar with reactors, and so, conspicuously absent were the long-time AEC reactor contractors (e.g. G.E., Westinghouse, Union Carbide and DuPont).

Also significant in 1951, was the completion of AEC's "Experimental Breeder Reactor," heralded as the first reactor to produce power to generate electricity. However, the reactor was not "on line," i.e. not connected to a power grid, and so was not a nuclear central-station power plant. The electrical output was relatively small, and its generation was an experiment subsidiary to the main purpose of the reactor. The EBR was designed primarily for the investigation of breeding, a process of great interest to a nation concerned with its stock of military plutonium.

In 1952 the AEC was again sharply criticized for ignoring the civilian power aspect of atomic energy. This time the criticism came from the Joint Committee on Atomic Energy (JCAE), the congressional committee established by the McMahon Act to oversee the AEC. In a report entitled "Atomic Power & Private Enterprise," The JCAE pointed out that the only power development project ever undertaken by the AEC (the Intermediate Power Breeder) had been abandoned in 1950, and that "since spring, 1950…there has been no major project whose purpose is to achieve a reactor directly advancing industrial [i.e. 'civilian'] power." (Cited in Men and Decisions by Lewis Straus.)

The pressure to begin a power program was building, from industry and other sections of the state, but it would take a year or two more, and an additional shove from international competition, to put the AEC in motion.

The race for nuclear power

> "The United States is engaged in an international atomic struggle whose outcome may prove far more important to the future of the world than the development of the A-bomb or the hydrogen weapon. It is a race to provide nuclear power for civilian use -and at stake are victory in the cold war and perhaps our leadership of the free world."
>
> —from February 1955 *Colliers*

Russia was not so slow to begin developing power reactors. Its advanced atomic research ground to a halt with the German invasion in 1941, but was stepped up immediately following the war. In the fall of 1949, the U.S.S.R. began its work on nuclear power. The Russians realized the propaganda value of achieving the first major application of atomic energy for peaceful purposes. [f] Such an accomplishment would place them in saintly contradistinction to the U.S., which was entirely preoccupied with building an unsurpassed nuclear arsenal.

By 1953 the American atomic weapons program had become the nation's largest industrial enterprise, with the AEC consuming 10% of the total U.S. output of electricity. Still, no decision had been made to build a nuclear central-station generating plant. The technological lead of the Russians in this field began to worry some American bureaucrats. W. Sterling Cole, then chair of the JCAE, opened hearings in 1953 on the U.S.' need to develop nuclear power. In Cole's speech to the House, the initial rationale for atomic power was clearly expressed:

> "What would happen if it was from Washington rather than from Moscow that the announcement came of the achievement of atomic power, and that the U.S. stood ready to show the rest of the world how they could obtain electrical power in plentiful quantities?…The power hungry nations of the world would be at the doors of American embassies wanting to know how quickly they could share in this giant advance. The Soviets would be forced to devote much of their effort toward catching up with our atomic power development; this would dilute the effort that Russia with her limited atomic resources could devote to weapons…We hear talk about the competition that private enterprise can bring to this field. Here is a real competition…between the United States and the Soviets to bring atomic blessings to the world. Here is the starting gun of an atomic power race, the successor of the atomic arms race, a contest deserving of our fullest effort."

To those who want to see why nuclear power got its start in the U.S., Cole's speech offers several important insights. Cole reminds us that nuclear power is the direct continuation of nuclear weapons technology, not only technically, but more important, strategically. Cole's statement also drives home the point that it was not capitalist competition that would summon forth nuclear power, but rather the competition that would summon forth nuclear power, competition between nation-states-specifically, the cold war.

Cole's emphasis of international rivalry, rather than economic forces, was not just the egocentricity of a politician. It was a view shared by the American business community at the time. Fortune magazine (July 1953) summarizes this sentiment:

> "...why should we strain so [to develop nuclear power] when by all accounts we have such low fuel and power costs and seem so well able to meet at least our more immediate future needs for electric power from the sources we already have?...There is first of all the question of our international prestige [Fortune's emphasis]...the spectacle of the U.S. concentrating all its money and attention on the purely military aspect of the atom and refusing to develop the atom's peaceful side is not a pretty one, and lends itself to an easy misinterpretation of our motives. Moreover, a peacetime nuclear-power industry in being is a weapon of national defense [their emphasis]. Nuclear power and weapon grade plutonium can always be made to go together if the necessity arises..."

If electricity from American nuclear plants couldn't protect the world from the Russians, at least the plutonium from the plants would. To business and state, nuclear plants were nuclear weapons.

The Atomic Energy Act of 1954

It was in this context that the AEC issued its recommendations to the National Security Council and President Eisenhower in 1953: "We believe the attainment of economically competitive nuclear power to be a goal of national importance...It would be a major setback...to allow our present leadership to pass out of our hands." To advance this goal, the AEC suggested the amendment of the McMahon Act to allow for private ownership of nuclear facilities. This suggestion met with the approval of the "Industrial Study Group." In reporting their conclusions on the feasibility of civilian power reactors "none was pessimistic. All agreed, however, that if private capital is to enter the atomic energy field...[there would have to be] a relaxation of the government monopoly, which in turn would mean at least some modification of the atomic energy law."

Beyond activating some cold war teammates from the private sphere, an amendment to the act was needed to make possible the gathering of other nations into an American atomic orbit. The severe restrictions on exporting atomic technology had proven embarrassing, and a hindrance to the U.S.' international maneuverings. Exemplary of this problem was the Belgian situation, in which Belgium supplied (from the Belgian Congo) three-quarters of the U.S.' uranium, but could not get reactor technology in exchange.

Belgium had a fast growing demand for energy, but little fossil fuel resources, so was extremely interested in nuclear power. The Belgian Communist Party raised a storm around the issue. Secretary of State Dulles and others feared the Russians would offer Belgium help with power reactors in exchange for uranium ore. Leadership in atomic power was becoming important to cold war battles for more than its propaganda value.

It was, all in all, an opportune time to change the McMahon Act. W. Sterling Cole—whose motivations we've already discussed—and former JCAE chair Hickenlooper redrafted the AEC proposals for the revision. In August, their "Cole-Hickenlooper" bill became the Atomic Energy Act of 1954. The most important changes were provisions for private ownership, and export, of the atom.

The Shippingport Plant

At the same time that these revisions were being made, the AEC finally announced plans for a power reactor development program. The first of the five reactors in the program would be an on-the-line power-plant, which would be built in Shippingport, Pennsylvania (though its location was only later established). U.S. News & World Report (Nov. 6, 1953) explained the decision in the repetitive words of the day:

> "The U.S. is about to build the largest atomic reactor ever attempted in an all-out effort to beat Russia and Britain [h] to the promising field of industrial atomic power...Thus opens a new phase in the world wide race for atomic supremacy."

Caught with their pants down, the AEC had no time to research the best designs for power production. Rather than building their experimental designs first, they decided the first project would have to be the full-scale plant. The four remaining reactors would be off-line, small-scale prototypes, and would be left till later.

Since the only AEC work in power reactors had been that on the "pressurized water reactor" for submarine use, they had little choice but to use this type. Commissioner Strauss put it tactfully: "We decided on the pressurized water design for this plant because its technology had been considerably advanced by the work on the submarine thermal reactor." Rickover and Weaver, fresh from their work on the Nautilus, were put in charge of the project. Rickover just transferred the design essentials of his proposed nuclear aircraft carrier reactor to the Shippingport plant.

Much later Glenn Seaborg (discoverer of plutonium, and one-time AEC chair) would call Shippingport in his book Man and Atom, a "landmark" in the transition from military to civilian interests" in the atom, though noting the apparent contradiction in the AEC's calling "upon the 'father of the nuclear Navy',

Adm. Hyman Rickover, to assume technical direction of the Shippingport project." Once we admit the AEC's military approach to the atom, in power as well as weaponry, this contradiction dissolves.

The President of the Duquesne Power Company in the spring of '54 agreed to undertake the Shippingport plant. The $30 million in private capital committed by Duquesne only covered a third of the plant's cost, however. The AEC picked up the rest of the bill. (The first so-called 'unsubsidized' plant, Oyster Creek, was still ten years away.)

Unfortunately for the U.S., from a strategic point of view Shippingport would be too late. The Russians opened the world's first central-station nuclear generating plant at Obinsk in June, 1954. The American plant would not go on line until 1957. But with Shippingport, commercial nuclear power in the U.S. had made its beginning.

From Historical Analysis to Nuclear Opposition

Just as each corporation or body of capital must compete with every other capital in the constant development of technology in order to survive, each nation-state is similarly forced to compete. [i] Only, in the case of states, always behind this technological race is the desire for military/strategic preparedness and superiority. As atomic engineer Lee Nehrt observed, competition between governments over new technologies leads to subsidies of new industries "before the profit motive gives industry the incentive to invest heavily in the development of the technology". Nuclear power followed this pattern, with the state, for its own chauvinist reasons, assuming the cutting edge development.

Once the state had laid the foundation for a nuclear industry, the drive for profit became a compelling force in nuclear development. Economic motivations are much more significant now than they were in the '50s. Even today, though, support and advocacy of atomic power cannot be blamed entirely on the corporations. Omitting the role of the state-and the real nature of the state-immediately cripples any analysis of nuclear power.

At the same time, the history of nuclear power contributes to an understanding of the nation-state, as one more indictment against it. Though any single crime does not prove the inherent viciousness of an institution, the constant repetition of atrocities on the part of the state should at least raise suspicions concerning that institution's social function (for those who are still not convinced).

Yet the American anti-nuclear movement, though willing to criticize specific governmental policies, is afflicted with a blind spot when it comes to confronting the inherently pernicious nature of the state. This blindness is the outcome of the philosophies of both the socialists and the liberal pacifists who hold sway over the movement. Central to the perspectives of both these camps is a belief in the state, and a corresponding distrust of the spontaneous energies of humanity.

To their credit, anti-nuclear socialists insist that technologies like atomic power are not the accidental product of various bureaucrats' "lack of consciousness", but rather are systematically generated by capitalism. Yes, but one must add to capitalism, the state, and the corollary to both: the submission to authority by masses of human beings. Without the destruction of all three, the existence of the technologies of death is inescapable.

Footnotes

a. An interesting exception is Barry Commoner's view. Commoner feels that the "peaceful atom" was developed to camouflage our enormous nuclear weapons program. There is certainly evidence to support this idea. Unlike most nuclear opponents, Commoner is willing to raise the question of the state's importance in the history of atomic power. It is not hard to guess the political motivations of those others who vilify the corporations, but ignore or downplay the role of the state.

b. Ironically, the American crash program to beat the Russians in the possession of the hydrogen bomb was to no avail. Though the U.S. tested the first earthbound thermonuclear device in November 1952, the first operational American H-bomb was not tested until 1954. The Russians air dropped their first H-bomb in the summer of 1953.

c. This rationale would later wane in significance, primarily due to technical problems in efficiently combining the two functions.

d. So the Russian atomic power effort was similarly the product of the cold war. If there were economic motivations involved, such hopes would soon be deflated. "When Deputy Premier Frol Koslov visited the U.S. in June 1959, he confided in a private conversation that the Soviet Union was cutting back its nuclear power program because the power costs were higher than expected. He also complained that Soviet planners had been misled by their scientists on the economic aspects." (*New York Times*, July 25, 1959)

e. *Fortune* magazine lists "extending the supplies of conventional [fossil] fuels" as a third and obviously less significant rationale for atomic power. The question of fuel/energy shortages as a justification for nuclear development was also raised by others in '53, including former AEC chair Gordon Dean. But in general, this was not a major worry in the '50s.

f. Britain, like Russia, had gotten an early start in power development. The U.S. considered the British rivals in this field, and rightly so. Not only would Britain put its first power reactors on line before the U.S., but it was quite interested in exporting this technology. However, it was not considered the global threat to U.S. interests in the way Russia was.

g. This competition is real during the early periods of development at least. In its advanced phase this competition, whether of states or capitals, assumes a spectacular form. While making a show of competition, an increasingly complete collaboration occurs behind the scenes. "The enemy of my enemy is my friend", and the enemy of all corporations and states is the potential of the unfettered mass of human beings. It is us whom they collaborate against. Yet, whatever the extent of superpower collaboration in the '60s and '70s, their competition was important in the '40s and '50s. The U.S./USSR antagonism was, at that time, a driving force in technological expansion, especially in the field of nuclear energy.

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