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Moses and His Electric Ark

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The most sacred possession of the ancient Hebrews was the Ark of Moses, the Ark of the Covenant. Its nature and function have always been mysterious. It behaved in a miraculous way, and human behavior in connection with it was extraordinary. For centuries rumors have circulated (I would call them educated guesses) that the Ark was a machine far ahead of its time — nothing other than a vehicle for the storage and discharge of electric power and light. I have examined in the perspective of modern science all the sources and all the evidence I could locate, and have come to the startling conclusion that the rumors represent the facts of the case.

What was the Ark? It was the most sacred Israelite object, designed by Moses when he was in isolation on the Holy Mountain. Its construction became one of the first tasks of the new nation Moses had assembled, led forth, and was now defining in law and practice. The Hebrew word for it is *'ārōn* — “a kind of chest or box” (writes Umberto Cassuto, a distinguished exegete).

It may once have meant something other than a box; that is, the structure had a function and may have appropriated the name of the function in later ages. The root of *'ārōn*, says Strong's *Concordance*, signifies a gathering in. It was close to “Aaron,” Head Priest, who, under the eagle eye of Moses, was in charge of the Ark. The name of Aaron thus may be closer to the function, the gathering or collection of something. What was Aaron collecting? We shall see shortly.

It is called the Ark of the Covenant because its hollow interior contained at first only two carved stone tablets. These had been engraved with the Law of the Ten Commandments and brought down from the Holy Mountain by Moses. “There was nothing in the Ark except the two tables of stone which Moses put there at Horeb.” Experts are agreed that the stones had a sacred quality imparted them not alone by their message but because they had either fallen from heaven as *bethels* or meteorites or were some recent strange “sapphire-like” melt of the rocks atop Mt. Horeb.

The Ark measured $2\frac{1}{2}$ by $1\frac{1}{2}$ by $1\frac{1}{2}$ Mosaic cubits. This is about the size of a modern junior executive's desk. Its volume of $5\frac{5}{8}$ cubic cubits would hold about 512 liters, according to the historian of measures, Livio Stecchini. “The volume of the Ark is a cartload of bar-

ley,” he says, and it became the sacred measure of the cartload, ordained in heaven, handed down by Moses, and administered and enforced by priests and Levites.

The Ark box was gold outside and gold inside with a layer of hardwood in between. The lid of the box, the *kappōreth*, also of wood overlaid with gold, held at each end a cherub of gold. These cherubim faced each other with their wings spread out. In between them, over the lid, when He chose to be among His people, hovered Yahweh. This was His “mercy seat,” in the anachronous English translation. Here He manifested Himself to His people and, it is important to stress, to their enemies.

The limitations of space on the *kappōreth* or cover-piece of the Ark define in part the sculpture. Unlike the winged lions and bulls, griffins, and other animals fashioned as cherubim in Assyria and elsewhere, the Ark's cherubim were probably two-footed beings with unisexual human features. A Jewish legend says that the cherubim had the faces of boys. The Egyptians used twin-winged goddesses in a similar way, but perhaps this was later. Because they were facing Yahweh, the cherubim could not be seated or squatting, but, says the legend, they stood with their faces elevated to Him, and with their wings spread as wide as a covering of the box, so that, in effect, two platform levels would be present, one on the ample but separated wings, the other on the lid of the box.

Martin Buber, apparently dissatisfied with biblical description, writes in his *Moses* that “the Royal Covenant is followed by the building of a throne,” generally speaking. But “we have no reliable reports as to the original appearance of the Ark. . . . We do not know why the description ‘Throne’ for the Ark was avoided.” What bothers Buber is that it is *not* a throne, *not* a shrine, although it is like the litters carrying the throne of God that the Beduin tribes possessed. It is yet a “genuine migrating sanctuary.” It comes from the time of Moses, as various archaeological findings have proved. The Catholic scholar, De Vaux, traces the Ark back to an authentic original Mosaic construction.

The learned Buber, admirable for many scholarly and civic qualities, is at his wits' end when he approaches the obvious. He laboriously formulates the question: “Was there a moment in the life of Moses that drove him, overpoweringly, to unite and mould the elements familiar to him from extended observation and knowl-

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edge of tradition, and to make some new formation out of them?" Buber goes on:

He said, to be sure, did that man, that God goes before them and that He makes His presence known by one or another sign; but the sole firm and unshakable fact was, in the last resort, that the God could not be seen; and all said and done you cannot actually follow something which you cannot see.

Buber is now rationalizing why the Israelites should sometimes have preferred a young golden bull to an empty litter. In the face of the most explicit references, *which he himself employs*, that the Ark was occupied, or would be, when Moses made it, he abandons his inquiry into its design.

Hugo Gressmann, the German scholar, author of two books that deal with this subject, one on Moses and one on the Ark, was also baffled by the apparent "emptiness" of the vehicle of Yahweh. He insists that there must have been a little figure of Yahweh, or an animal sculpture, or at least a meteoritic stone that rested or could be placed beneath the wings of the cherubim. His perplexity is understandable but wrongheaded. Things that can sometimes be found elsewhere and later are not definitive of the Ark of Moses. And how, when the Bible says repeatedly that Yahweh sits upon the cherubim, is a figure emplaced beneath them to be accounted for? The answer must be that Yahweh, the Electric God, was both present and invisible. And sometimes He was bigger than at other times.

Still we are not quite ready to explain the mystery. We have to ask first how the Ark was deployed and what were its functions.

The Ark was used in holy processions. It is thus sung in Psalm 24: "Raise your heads, O ye gates; Raise yourselves up. . . . That the glorious king may come in! . . . Yahweh, strong and powerful!"

The Ark is employed in battle: "When the Ark would set out, Moses would say, 'Arise, Yahweh, and let Your enemies be scattered; and let those who hate You flee before You.'"

The Ark is depended upon to provide oracles: the boy Samuel ministered to Yahweh and, as he lay near the Ark in the Temple, the rare light of Yahweh called upon him again and again, so that "all Israel became aware that Samuel was authorized as prophet to Yahweh."

The Ark is a guide in relocating the camp: "They went marching from the mountain of the Lord for a journey of three days, and the Ark of the Covenant was marching ahead of them to search out a resting place for them."

The Ark is a weapon of psychological warfare. Joshua had the Ark paraded around the besieged and terrified people of Jericho on six successive days, "and seven priests carrying seven rams' horns were walking, continually blowing the horns," and then on the seventh

day's circuit of the walk, the defenses collapsed amidst a great hubbub.

The Ark is the seat of Yahweh who causes despair when absent, joy and high morale when present: the divine presence luminesces from the pillar of cloud, writes Buber, and from between the two cherubim "visible to the people. . . as the radiation of the divine substance, as the *kabod*. . . always visibly directed towards or pointing to the tent."

What can promote all of these activities? It is a great riddle: what is it that is a hollow box, is called an ark, can be carried only by devoted and skilled porters, is most sacred, is a golden overlaid hardwood vehicle designed by a master of "all the knowledge of the Egyptians," has a golden lid and cherubim spreading their wings above it, functions to build morale, lead the way, take part in battle, and control unruly people, and, finally, supports the *visible* presence of an *invisible* God?

Now to answer the riddle.

The Ark was an electrical system. It was basically a capacitor or condenser that could gather, store, and discharge electricity. Moses and his Levites could manipulate its electrical functions.

Thirty-three hundred years before modern scientists broke out in a rash of experiments with "the electric fire," Moses had mastered the elements of electrostatics. He was using the knowledge to direct the Exodus, to win battles, make miracles, suppress revolt, and forge the idea of an Israelite nation. He was creating a new kind of God, Yahweh. His most famous invention was the Ark.

The best way to explain the Ark is to compare it with the Leyden Jar, a seemingly simple device that excited the world of electrical science in the 18th century. Everything that the Ark is said to have done was unwittingly copied in the beginnings of modern science. Hence we can move back and forth over a gap of 3,000 years and find analogous occurrences.

The invention of the Leyden Jar in 1745 aroused great scientific and public interest. The jar, which has found its way into hundreds of classrooms in elementary physics since then, was independently contrived by two scholars. One was the German scientist E.G. von Kleist. The other, Peter van Musschenbroek, was a Dutch scholar, at the University of Leyden. Innumerable ingenious applications were possible. Working with materials and instruments available to Moses, the new scientists literally played with every device and scheme that, in my view, were employed by Moses.

So secular were the new scientists and so futuristic their pride, that they hardly ever thought of searching among ancient records. A few years after the invention of the Leyden Jar, Georg Wilhelm Lichtenberg (1743-99), one of the founders of electrical science, called attention to the resemblance of the jar to the Ark of the Covenant, to the "Powerful One of Jacob."

Three hundred years later, a distinguished electrophysicist, Maurice Denis-Papin, asserted that, as an electrical capacitor, the Ark was capable of producing from 500 to 700 volts. This is quite enough to electrocute humans and animals as well as to perform many other electrical operations such as apparitions, smoke, and fire-making. However, neither scholar had in mind the effects upon the Ark of the electrical turbulence of the Exodus period, a condition deduced by Jerry Ziegler in 1977 from many circumstances and the Bible itself.

The Leyden Jar collects electricity. A glass jar is coated with a conducting metal foil or lining on the outside, and another on the inside; the glass, which will not conduct a charge effectively, insulates the one conductor and its charge from the other. A metal rod affixed to the inner foil protrudes above the mouth of the jar helping to gather the atmospheric charge. A spark will be discharged if a heavy difference of voltage builds up between the two conductors, or by a conducting contact, like a wire, between the two, or by a deliberate or accidental interposition of a hand or another resistant or short-circuiting medium.

The voltage between the stored charges is dependent upon the electrical condition of the earth and atmosphere, the material of which the conductors are made, their shape and size, and the time elapsed for the accumulation of charge. Various means can be taken to enhance the electrical potential, and therefore the force of the discharge. Benjamin Franklin in 1752 charged a Leyden Jar by attaching to it a silk thread that could conduct electricity from a kite that entered a thunderstorm. He was taking a great risk.

Franklin did not escape unscathed from his experiments. On one occasion he was knocked unconscious when he made an accidental connection while hooking up two Leyden Jars to electrocute a turkey. Franklin was a humane man who liked turkeys — he once nominated the turkey for the American national bird in preference to the eagle totem — and was probably seeking a less painful way of butchering them. The device, it needs be said, does not display its charged condition to the eye; it is an invisible power of “an invisible god.”

Musschenbroek, foreseeing such accidents, had said: “The hand and the whole body is struck in such a terrible fashion that it is hard to describe. In a word, I thought the end had come.” He advised a friend to “never repeat this new and terrible experiment.”

The arc or spark will jump the gap as often and as rapidly as the voltage can build up. Writes Priestley, the early English electrician, “If the knobs of two wires, one communicating with the inside, and the other with the outside of the phial, be brought within four or five inches of one another, the electrical spider. . . will dart from the one to the other in a very surprising manner, till the phial be discharged.” It can become almost a column of fire to the naked eye.

In the presence of prolonged discharges, an ionized cloud of dust will gather around, concealing the discharge in the daytime and making it less visible at night. There are ways of placing an arc apparatus more advantageously to produce electrical phenomena, ways of guarding it, of measuring its potency, of enlarging or diminishing its activity and noises, of intensifying the surrounding cloud, of using water and dirt and various stones for visual effects, and treating, blessing, or magnetizing metals and metal alloys. One might also produce some mental phenomena by feeding and extracting ionized air to and from the device. We are dealing with a complicated technical apparatus and set of operations and effects.

Imagine the Ark as a great Leyden Jar. Its negative ground charge accumulates on the outer gold of the box and upon a metalized conducting Aaron’s rod that is affixed to the outer lining and rises from the side of the box with its crook reaching between the wings of the two cherubim. The golden cherubim are affixed to the *kappōreth* in contact with the inner lining. They draw and store positive electricity from the atmosphere. Separating the area of positive charge from the area of negative charge is the insulating wood of the box, acting like the glass insulator of the Leyden Jar.

When a pair of tongs, handled by an insulated operator, was introduced to make contact between the separated charges, a vivid strong discharge would occur. A simple manipulation of the rod and its handle would also bring the charges within firing or sparking distance. The rod would be adjustable in all directions so that weak and powerful charges might be produced on demand. Sockets and rackets of simple design, and a telescoping rod, could manage all of the required motions.

Remarkable phenomena could be induced with the Ark. Perhaps the most inspiring would be the luminous arcs of fire that would be emitted between the two cherubim and the pole, bringing into a high intensity image the presence of Yahweh at the center of the Mercy Seat. Priestley tells us that “as the electric fire may be made to take whatever circuit the operator shall please to direct, it may be thrown into a great variety of beautiful forms.”

The Bible affords images of “the Ark of the Covenant of the Lord of hosts, who is enthroned on the cherubim.” At the same time He is “the Lord, that dwelleth between the cherubim, whose name is called on it.” And another verse speaks of “the Ark of God, whereupon is called the Name, even the name of the Lord of hosts who sits enthroned on the cherubim.”

Then Yahweh is appealed to, with the words: “Thou that dwellest between the cherubim, shine forth.” Moreover, Yahweh says, “I will speak with you from above the *Kappōreth*, from between the two cherubim

that are upon the Ark, of the testimony of all that I will give you in commandment for the children of Israel."

If Yahweh sits upon the wings as a throne, then the lid below is his footstool. Thus, "Let us go to His dwelling; let us prostrate ourselves at His footstool." Hence, Yahweh when present in name, voice, or image might be above the wings, between the wing separations, and between the wings and the footstool. The variant expressions imply what Priestley said of the electrical effects he had achieved by similar devices, that they make different and beautiful figures as the charges move and sparkle. When conditions were propitious, a great leaf-like sheet of fire might define itself over the sculptured golden group as a whole. It would be three-dimensional, like a hologram.

A capacitor or condenser of the size of the Ark might be rated in many thousands of volts if atmospheric electricity were more continuous and abundant than it is today, and/or if the earth had suffered shocks and were emitting electricity in the aftermath. The difference between those days and nowadays is that the Exodus atmosphere had more than enough electricity to offer to build any usable charges without further exertion. Just as agriculture was unnecessary in the climate and ecology of Adam and Eve's Garden of Eden, electrical manufacture in Moses's time did not require hydraulic, fossil, animal, or human energy input. Electricity was a kind of geyser.

Probably the reason that Moses's electrical science died out was that the *natural* charging diminished. Religious scruples would discourage inventions to manufacture electricity, which could not then be the "divine fire." Modern scientists had foregone such scruples and, because natural electricity was not ordinarily adequate, they artificially loaded charges on their arks by a variety of generating contrivances. Nikola Tesla, the Yugoslav-American electrical genius, constructed a great condenser in Colorado and in 1899 built up from a small voltage a lightning-like charge that he then sent racing through the earth and back.

As to the source of the natural voltage of Moses's times, this was the result of a combination of conditions — prior heavier average charges in the earth, cometary near-encounters, the turbulent atmosphere, piezoelectrical flow from incessant earthquakes produced by brief interruptions of earth motions — in brief, all that made up the plagues, floods, and miracles of the Exodus and wanderings. The most perceptive historians of Judaism, from the believer, Judah Halevy, to the non-believer, Hugo Gressmann, have assigned to it the unique quality of being born as part of a catastrophe.

The Ark was a very dangerous machine. Ordinary Bible reading and anthropological training about primitive customs condition one to pass over its taboos indifferently. The people, officers, dissenters, priests,

in fact all except Moses, are warned to avoid the Ark, to approach it carefully on pain of death. The invisibility of electric charges is, of course, a major concern. The danger is unseen. People must have faith and discipline to observe safety precautions respecting electricity. Yet all of this is very recent. The Russian electrical expert, Manoilov, claims that it did not become quite clear until the 1920s "that death from electric shock could be instantaneous and without any visible signs of injury."

Some body areas are more sensitive than others: the back of the hand, the neck, the shoulders, the temples. Some persons are less sensitive to electric injury than others — perhaps this was the case with Moses. Perspiration (and all water) heightens conductivity; the minute burns that can sometimes be found in different places on the body of a person who has suffered electrocution may signify resistances in such conductive spots. Washing therefore helps to avoid or pass a shock; priests of various cultures still do so, even if only symbolically, when approaching an altar. Burns can be severe, but occur at voltages of 200 or more; meanwhile, lower voltages can cause death with little or no visible markings on the corpse. Voltages as low as 10 have been known to kill, according to Manoilov. The electrical systems of the heart or brain, if interrupted, may quickly cause life to cease, often with the disruption of breathing control, hence asphyxiation.

The electrical potency of the Ark or a similar mechanism varies with the differences in charge between air and ground. If the air is either losing charge rapidly or offering a pocket of opposite charge, the ground will rapidly concentrate a charge and discharge from a point contact. This will produce a heavy explosion, a brilliant arc, and a deadly experience for any individual or group that shortcircuits the contact. If "St. Elmo's fire" is giving off naturally from an elevated point or ship's mast, an arc machine nearby would carry a heavy static charge, capable of jumping more forcibly.

When the Ark and Altar and Tabernacle were completed, the people coming out of Egypt celebrated a feast. Amidst general rejoicing at the fine manner in which Yahweh was coming down upon their offerings at the new altar, Nadab and Abihu, sons of Aaron, priests themselves, "each took his censer, and put fire in it, and laid incense on it, and offered unholy fire before the Lord, such as he had not commanded. And fire came forth from the presence of the Lord and devoured them, and they died before the Lord."

According to a legend: "From the Holy of Holies issued two flames of fire, as thin as threads, these parted into four, and two each pierced the nostrils of Nadab and Abihu, whose souls were burnt, although no external injury was visible." The Bible implies that the two men were drunk and hence unholy before Yahweh, whence we may see in the accident the kind of negligence that does occasionally cause fatal accidents among skilled electricians.

❶ Rabbi J.H. Hertz, in one of his enthusiastic interpretations, blames the sons of Aaron for their "intoxication, unholy ambition, arbitrary tampering with the service, and introducing 'strange fire' into the Sanctuary." Hertz believes that they were struck by lightning, since their garments were not destroyed. Further he defines "strange fire" as "unconsecrated fire, not from the Divinely kindled flames on the Altar." It is a more meaningful translation than the words "unholy fire," which can mean anything or nothing. "Strange" or "alien" means that it is not the fire that is appropriate to the fire of the Holy of Holies; for the alien fire is fossil, not electric, fire. Velikovsky, the great reconstructor of Egyptian chronology and the Exodus catastrophe, is probably incorrect in guessing that petroleum fire, also fossil, could have caused the fatal accident.

Moses then explained to Aaron what the Lord was doing: "I will show myself holy among those who are near me, and before all the people I will be glorified." Says the Bible, "And Aaron held his peace." As they were carrying off the corpses, Moses, in his genial manner, tells Aaron and the remaining sons, "Do not let the hair of your heads hang loose, and do not rend your clothes, lest you die. . . ." He says that it is up to the general congregation to mourn for them. Further, he says, apparently not sure of their self-control: "And do not go out from the door of the tent of meeting, lest you die." For there was a crowd of spectators outside. Poor Aaron had to take much scolding with his bereavement and hear many safety lessons.

The Lord spoke to Moses, after the death of the two sons of Aaron, when they drew near before the Lord and died; and the Lord said to Moses: "Tell Aaron your brother not to come at all times into the holy place within the veil, before the mercy seat which is upon the ark, lest he die; for I will appear in the cloud upon the mercy seat.

Aaron apparently did heed the injunction; he died of natural causes.

The Levites, as security troops and police and, later on, in priestly functions, are closely concerned with the Ark. Still, they had their problems, as the following legend illustrates.

The most distinguished among the Levites were the sons of Kohath, whose charge during the march

through the desert was the Holy of Holies, and among the vessels particularly the Holy Ark. This latter was a dangerous trust, for out of the staves attached to it would issue sparks that consumed Israel's enemies, but now and then this fire wrought havoc among the bearers of the Ark. It therefore became a customary thing, when the camp was about to be moved, for Kohath's sons to hasten into the sanctuary and seek to pack up the different portions of it, each one planning cautiously to shift the carrying of the Ark upon another. But this even more kindled God's anger against them, and He slew many of the Kohathites because they ministered to the Ark with an unwilling heart. To avert the danger that threatened them, God ordered Aaron and his sons to enter first into the sanctuary, and "to appoint to the Kohathites, every one, his service and his burden, that they might not go in to see when the holy things are covered, lest they die." This was done because previous to this command the sons of Kohath had been accustomed to feast their eyes on the sight of the Ark, which brought them instantaneous death. But, according to this order, Aaron and his sons first took apart the different portions of the sanctuary, covered the Ark, and not till then called the sons of Kohath to bear the burden.

This legend is technically and behaviorally so clear that little interpretation need be supplied.

The last fatal accident with the Ark was reported in the time of David, hundreds of years after Moses had died and left the Jews with his unruly invention. When David was king he wished to bring the Ark to Zion where he ruled. So "David went up and all Israel. . . to bring up thence the Ark of God, the Lord, that dwelleth between the cherubim, whose name is called on it." Yahweh was still there saying "Yahweh."

A great festive party accompanied the Ark as it moved on its way, drawn by oxen. But at the threshing floor of Nacon, a man named Uzzah "took hold of it, for the oxen stumbled. . . and God smote him there because he put forth his hand to the Ark; and he died there besides the Ark of God." The electrocution frightened David; he waited three months before his second attempt to move it, and this time he installed it beside him.

In a queer incident, David is so happy at having the Ark that he dances naked around it. He was probably receiving a bath of ionized air, in a kind of ozone box or sauna, titillating the skin and exciting the respiratory and circulatory systems by way of strongly ionized oxygen. Yet he incurs the reproaches of his wife for making a public display of himself: she is punished by being made barren. ■