In the wake of our "knowledge explosion" religion must begin to grapple with problems which may within the not too distant future cease to be purely academic. The author of this essay, an ordained Rabbi and Research Professor of Computer Science at the University of Maryland, contributed the widely quoted article "The Sabbath and the Space Age" to our Winter 1964 issue.

RELIGION AND THE ROBOT

1. *Intelligent computers*

Since the inception of the "computer revolution" some two decades ago, the question "Can computers think" has been raised repeatedly. Certainly this question can be answered firmly in the negative as far as the computers now in use are concerned. However, there exists a field of computer science known as artificial intelligence, dedicated to the development of "intelligent" computing machines. This field has tended to be somewhat oversold, in both popular and technical circles, because of the sensational nature of its objectives; nevertheless, it has made appreciable progress during the past ten years. Examples of its accomplishments include computers which can play a good game of checkers, carry on simple conversations with an interrogator on a limited range of subjects, and learn to classify patterns. A review of representative work in this field can be found in the anthology *Computers and Thought* (E. A. Feigenbaum and J. Feldman, eds., McGraw-Hill, 1963).

Impressive as these accomplishments may be, we are still a long way from developing an "intelligent" computer. The prospect of doing so, however, is not so remote that we can afford to ignore it. Considerable thought has in fact been given, in this connection, to the problem of how to *define* "intelligence". What behavior would a computer have to exhibit before we

would be willing to call it "intelligent"? Perhaps the most reasonable solution to this problem is the one proposed by A. M. Turing in 1950 (in his paper "Computing Machinery and Intelligence", reprinted in *Computers and Thought* (pp. 11-35). "Turing's Test" for "intelligence" can be formulated as follows: An interrogator is allowed to converse, via teletype, with the computer, which conducts its end of the conversation, to the best of its ability, as though it were a human being. If the interrogator cannot detect the deception, no matter how long and how ingeniously he tries, the computer is "intelligent." From now on we shall use the term "robot" (with apologies for its science-fictional flavor) to refer to a computing machine which is capable of passing Turing's Test.

If such "robots" can ever be developed, their existence will have far-reaching implications in areas ranging from the political to the religious. A robot which can pass Turing's Test will, ipso facto, be in an excellent position to claim that it is entitled to all the rights and privileges of a human being. "Hath not a robot . . . dimensions, senses, affections, passions?" Such a robot will almost certainly demand civil rights, union hours, the right to vote. Moreover, such a robot will of course make the claim that it has free will — in fact, that it has an immortal soul. There are no scientific grounds for rejecting these claims; the soul is not directly detectable by physical means. Can they be rejected on religious grounds? If a robot demands religious rights, if it asks to be accepted as a proselyte, is it conceivable that its request could be honored?

If this problem of the religious status of a robot seems far-fetched today, it may seem much less so a few decades from now. There are no known grounds for denying the theoretical possibility that intelligent computers can be built. True, such a computer may have to be fully as complex as a human brain, many orders of magnitude beyond any existing computer, but this is merely a matter of degree. The religious issue raised by the possibility that robots may some day exist is sufficiently fundamental that it is well worth discussing today even though we may still be far from having to face it as a practical problem. Such issues deserve careful consideration even long in advance

of the need for action on them (*bi-deoraita motvinan teyuvta vehadar avdinan uvda*).

2. *What is "man"?*

Our robot problem is only one special case of a very general and basic question: How is "man" defined for religious purposes? Some other cases of this type which might conceivably arise at some future date include:

a) How much of a person's body can be replaced by artificial limbs and organs before he is no longer a "man"? Is he a "man" as long as his brain remains intact? What if his brain too is "replaced" by a complete recording of its contents in the "memory banks" of an "intelligent" computer? (The computer might then claim to be the original person; could its claim be recognized legally? Religiously?)

b) Suppose that biologists succeed in synthesizing exact replicas of human sperm cells and ova, and use them to produce a human baby without benefit of parents. Would this baby — presumably indistinguishable from a normal baby by any physical test — be regarded as a "man"? (Science fiction's first "robots", in Karel Capek's play R.U.R., were actually of this biological type; today they would be called "androids", the term "robot" being reserved for an intelligent machine.)

c) If it were possible to fertilize a female ape with human sperm, or vice versa, would the resulting crossbreed be a "man"?

d) If dolphins are as intelligent as humans, does this make a dolphin a "man"? (A related question is that of the religious status of intelligent extraterrestrial creatures; see Rabbi Norman Lamm's thought-provoking essay in *Tradition*, Winter 1965 — Spring 1966, pp. 5-56.)

In our discussion of the religious definition of "man," there are at least three criteria which might be taken into account:

1) *Human parentage.* A child born to human parents is presumably human. Is the converse true — in other words,

can nothing be human *unless* it has human parents? (To the believer in evolution, human parentage obviously *cannot* be necessary, since at some point there must have been a "human" child born to ape parents; but from our religious standpoint, every "human" is a descendant of Adam, whose own human status is the result of his special creation.) Must a "man" be a *yelud ishah* — "born of woman"? If so, there seems little hope of being able to regard robots, androids or dolphins as "men."

2) *Human form.* Adam was created *betzelem elo-him,* in the image of God. While we know that this concept is not meant literally, since God has no form in any physical sense, it may nevertheless be that a creature must have human form in order to be a "man." This would seem to eliminate the dolphin, but not the android, and perhaps not even the robot if he is packaged in a man-shaped shell.

3) *Intelligence.* The most obvious criterion for a religious definition of "man" is that a man has a soul. As already pointed out, this concept cannot be directly defined in physical terms. Is there any way at all of testing whether a creature has a soul? Without becoming too deeply involved in metaphysical issues, perhaps we can formulate such a test in terms of the phrase used by the Targum in explaining Adam's creation as a *nefesh chayah,* a living soul — namely, *ruach memalela,* "a *speaking* spirit." Indeed, the universe has been classically divided into *domen* (silent), *tzomeach* (growing), *chai* (alive) and *medaber (speaking),* referring to inanimate matter, plant life, animal life, and mankind. Of course, *medaber* is not to be taken literally — a parrot has no soul; it implies not *dibbur* alone, but (as Rashi put it) *de'ah ve'dibbur* — *intelligence* and speech. (It should be noted that in identifying *medaber* with intelligence, we are in a sense defining intelligence in a manner very close to Turing's Test, namely as ability to speak, to communicate.) If intelligence is the visible manifestation of a soul, perhaps androids, robots, and even dolphins may have souls.

For all its philosophical flavor, the problem of defining "man" has, of course, practical halakhic aspects as well. It should therefore not be surprising to find that there are in fact halakhic precedents which are directly relevant to our specific questions about human descent, human form, and intelligence. In the following sections we review some of the pertinent halakhic sources.

3. *Human form*

We first consider the question of human form. Obviously not everything which has human form is a "man" — a statue is certainly not legally human. But the converse — can a creature be a "man" if it does *not* have human form? — is somewhat less obvious. True, the human form embraces a broad spectrum of variations; see *Bekhorot*, Chs. 6-7, in connection with the "blemishes" which render a priest unfit to participate in the Temple service — but which do not render him non-human! (One also recalls the problems about people with two heads (*Menachot* 37a and *Tosafot* s.v. *o kum*), in which their halakhic status as human beings is never in doubt.) However, there certainly exist limits to what can be accepted as human form.

At first glance, a case for the necessity of human form can be made on the basis of a Mishnah in *Niddah* (3.1):

> If a woman gives birth to a creature that looks like a fish, a grasshopper, or a crawling thing, if they are accompanied by blood she is unclean; otherwise, she is clean. If she gives birth to a creature that looks like an animal or bird . . . if it is male, she is unclean as though she had given birth to a boy, and if female, to a girl. . . . So R. Meir; but the sages say, anything lacking human form is not a child.

Note that the sages do not say "if it lacks human form, she is clean"; rather, they say "it is not a child," implying on the face of it that a child which does not have human form, even though born to a human mother, is not legally human. (The Mishnah's concept of human form is explained in the Talmud as referring to the face; a child with a human face is human,

no matter how deformed the rest of its body, while a child with an animal face is not, even if the rest of its body is perfectly human. Incidentally (see Ravad, *Issurei Biah* XI, 12), today even a woman giving birth to a child with an animal face would be regarded as unclean, on the grounds that "we are not experts on forms"; however, this reasoning permits us to regard the child as human only for purposes of legal stringency, but not where leniency would result.

Plausible as this conclusion may be, it is not borne out in practice. When the case of a woman who had given birth to a monster was raised about a century and a half ago, the decision — which has not been disputed since — was that the child must be regarded as definitely human. To quote a brief excerpt from the responsa of Rabbi Eleazar Fleckeles of Prague (1754-1826), *Teshuvah Me-Ahavah*, No. 53:

> (The question:) . . . A man of this region came to me and told me that his wife had given birth to a boy . . . on his head is a sort of large red crown, his eyes are red and high up on his forehead . . . his mouth is crooked and immediately below the eyes . . . and the rest of his body is human. . . I suggest that there is a basis for [permitting the child] to die, [namely] comparing the case to [that of a woman who] gives birth to a child that looks like an animal, where the sages say 'anything lacking human form is not a child". . . .
> (The answer:) . . . I do not understand how these cases are related: the sages only said that it is not a child as regards the fact that its mother is not unclean, but not as regards causing it to die. . . In conclusion: Let no man, by any means, stretch out his hand to hurt [the child], or to cause its death indirectly; to do so comes under the heading of murder.

If killing a child which does not have human form is murder, the child is certainly legally human. We thus see that for a creature born to a human mother to be considered a "man", human form is *not* necessary. On the other hand, we can draw no logical conclusions from this about cases where there is no human mother. In fact, the Talmud (*Niddah* 23b) also briefly considers the case of a creature which has human form but an animal mother. However, this case is considered only with regard to the *kashrut* of the unborn offspring if the mother is slaughtered. There is no suggestion that such an offspring, if

born alive, might be regarded as human in any respect. In short: human form is neither a necessary nor a sufficient condition for being legally human.

4. *Intelligence*

To further narrow down the possible criteria for a legal definition of "man" in the halakhah, we next consider the factor of intelligence. Here we are led at first glance to the encouraging conclusion that some degree of intelligence is a necessary condition for being legally human. More precisely, one can only require the *potential* for intelligence, since a newborn infant is certainly legally human in every respect (see Mishnah *Niddah* 5:3) in spite of its low intelligence. We quote briefly from the responsa *Halakhot Ketanot* of Rabbi Ya'akov Hagiz (1620-1674), Pt. II, Nos. 37-38:

> If one kills a deaf-mute or an idiot, since they are not responsible persons (*benei mitzvot*), he is not culpable. . . [Similarly as regards] violating the Sabbath [to save their lives] . . . One can conclude that they are not called "man" except to the extent that they are liable to be confused [with true men by virtue of their] human form, just as an ape is. . . However, it is difficult to regard [a deaf-mute] as an animal. [since he has at least] weak intelligence . . .; the matter requires further study.

This responsum is cited by the *Minchat Chinukh* (Mitzvah 32), who gives no indication of disapproval.

However, in practice, the suggestion of Rabbi Hagiz that a person who lacks intelligence may not be legally human is not accepted. For example, *Mishnah Berurah* (329, *Biur Halakhah,* s.v. *ela*) states:

> As regards a deaf-mute and an idiot, of course one violates the Sabbath [to save their lives], and indeed [murdering] them carries the death penalty. . . I do not understand why the author of the *Halakhot Ketanot* was in doubt [about this] . . .

(The fact that one who kills a deaf-mute or idiot incurs the death penalty is also taken for granted by Rabbi Ya'akov

Emden in his responsum quoted in Section 6 below.)

In short: As regards persons of human parentage, intelligence is *not* a necessary condition for human legal status. Thus human parentage is a *sufficient* condition for such status, even in the absence of human form or intelligence. The logical possibility still remains, however, that human parentage may not be *necessary*.

5. *Animals*

Can a natural creature not of human parentage ever be legally human? Here the indications are in the negative. We have already pointed out that the offspring of an animal mother is not human even if it has human form; of course, the possibility that it might have human intelligence has apparently not been considered. However, there are two very interesting borderline cases:

a) *Adnei ha-sadeh*

In Mishnah *Kilayim* 8:5 we read *"Adnei ha-sadeh* is a wild animal; R. Yosi says, 'Their bodies render one unclean as though they were human corpses.' " What is this creature? *Yerushalmi (ad loc.)* renders it as *bar nash detur* ("mountain man"?), and a number of commentators explain that it is a creature which is of human form in every respect; Maimonides, *(ad loc.)* adds that it speaks in a manner similar to human speech, but unintelligibly. (Incidentally, the *Tiferet Yisrael* [*ad loc.*] suggests that it is the orangutan.) However, although this creature may have human status with regard to certain specific halakhic points (uncleanliness, in the Mishnah; see also Rash on *Sifra Shemini*, 8, with regard to its blood), it is certainly not legally human. Indeed, the commentators describe how it is hunted and killed, with no suggestion that killing it might be murder in any sense.

b) *Dulfanim*

An even more fascinating case is that of the creatures called *dulfanim* by the Talmud (*Bekhorot* 8a): *"Dulfanim* procreate like humans. What are *dulfanim?* R. Yehudah said, 'benei yama' (sea people)." At first glance this passage is simply comment-

ing on one aspect of the fact that dolphins (?) are mammals, not fish. However, Rashi and Tosafot (*ad loc.*) both read *mi-benei adam* where we have *ki-venei adam,* so that the passage becomes "*Dulfanim* can *interbreed* with humans." Rashi, incidentally, explains *benei yama* as mermen: "There are fish in the sea which are half in human form and half in fish form; they are called *sir ne*". (Compare R. Gershom, who translates it as *adam shel yam;* and see *Chulin* 127a: "Everything that exists on land exists in the sea.") Regrettably, the legal status of *dulfan*-human hybrids does not seem to have been raised. The fact that these intriguing possibilities involve the *dulfan* is of particular interest in view of the current suspicion that the *dolphin* may have human-level intelligence. But in any case, we have no evidence to suggest that a *dulfan* might be legally human — though of course neither is there any definite assertion to the contrary. It is certainly unlikely that any natural land creature could be legally human, since the Talmud would surely have mentioned any such; but this *argumentum ex silentio* is somewhat less convincing when it comes to sea creatures (and, incidentally, very much less convincing when it comes to extraterrestrial creatures).

6. Golems

We now consider the possibility — clearly very closely related to our original robot and android problems — that there might be artificial creatures which could be legally human. Here the relevant halakhic precedent is that of the legal status of a *golem.* In *Sanhedrin* 65b we read

> Rava made a man and sent him to R. Zeira. R. Zeira spoke to him and he did not answer. Said R. Zeira, "Are you artificial? Back to your dust!"

It is worth noting that the commentators differ as to how Rava made his *golem.* In the Talmud, the *golem* story is immediately followed by another, about two *amoraim* who made a three-year-old calf, in which the *modus operandi* was the *Sefer Yetzirah,* a book of mystical combinations of letters which

have creative powers. Because of this, Rashi (as well as several other commentators) explains that Rava made the man by using the *Sefer Yetizrah*. R. Yehonatan suggests, as an alternative, that he used magic — which is permissible if done for purposes of instruction. R. Shem Tov b. Yitzhak ibn Shaprut, in his *Pardes Rimmonim* (a commentary on *agadot*), begins by suggesting that it was a type of illusion, but this view is rejected by the author of the *Yad Ramah*, who points out that illusions can be effective only while the magician is present. More intriguingly, the *Pardes Rimmonim* goes on to say:

> "Sefer Yetzirah" refers to natural science. . . It was a form made out of dust, and by natural means it was made to appear like a man.

This last explanation is reminiscent of the dancing doll in *Tales of Hoffman*.

By our repeatedly used criterion that a creature cannot be human if it is permissible to kill it, it is evident that Rava's *golem* was not human, since R. Zeira destroyed it. Moreover, when we consider the variety of explanations cited just above as to how Rava's *golem* was made, we have little ground for making legal distinctions among *golems* created by invoking the Divine Name, by magic, or by natural means. This would then seem to imply that our questions about robots and androids must be answered in the negative.

However, here again the issue cannot be resolved so quickly. The matter of the halakhic status of a *golem* has also been treated in the responsa literature. It was first raised by the Chakham Tzevi (1658-1718; Responsa, No. 93), who asks whether a *golem* such as the one made by Rava can be counted for a *minyan*. (He assumes, in this connection, that if Rava's *golem* can be regarded as human, it can even be considered Jewish, since having been made by Rava it is like his child.) He concludes, of course, that since R. Zeira destroyed the *golem*, it could not have been legally human. More interestingly, he also suggests that even if it were otherwise legally human, there might be no death penalty for murdering it, since the Biblical passage which lays down the death penalty for murder uses the phrase *adam ba-adam*, "a man within a man" —

implying that if one kills a man who did not grow (as a fetus) "within a man", i.e. inside a human mother, there is no death penalty. It should be noted that the Chakham Tzevi did not immediately answer his question by pointing out that the *golem* was not of human parentage; he uses the "man within a man" criterion only as a basis for one specific halakhic point. This suggests, at long last, that human parentage may *not* be a necessary condition for human legal status — or at least, that being of human manufacture is a possible substitute for being of human descent.

This suggestion can be further substantiated by examining the other authorities who comment on the Chakham Tzevi's ruling. These include his son R. Ya'akov Emden (*Sh'eilat Ya'vetz*, Pt. 2, No. 82); R. Yoseph, Dayan of Amsterdam (quoted by Azulai in *Machzik Berakhah* on *Orach Chayyim*, 55); R. Yehudah Leib Katz, son of the author of the *Sha'ar Ef-rayim* (quoted by Azulai in *Birekhei Yoseph, loc. cit.*); and the author of *Marit Ayin* (quoted by Tirni in *Ikrei Dinim* on *Orach Chayyim*, 3); as well as Azulai himself. All agree with the Chakham Tzevi that Rava's *golem* was not legally human; however, they all give additional reasons, exemplified by this quotation from R. Ya'akov Emden:

> A deaf-mute, an idiot and a child do not count [for a *minyan*], even though they are Jews, and are regarded as Jewish in every respect except for [observance of the] commandments, and one who kills them is culpable . . .; it is thus hardly necessary to state that this man [created by Rava] does not count for a minyan *since he had no intelligence whatsoever*. . . It was as they train dogs to go on errands. . .; [Rava] sent this man. . . His life is like the life of an animal . . . he is no more than an animal in human shape.

None of these authorities suggests that the *golem* could not be human because it was not of human parentage — this in spite of the fact that they were all trying to find reasons in addition to that given by the Chakham Tzevi. On the other hand, nearly all of them point out that the golem was not human *because it was not intelligent*. The implication seems clear that an intelligent *golem* — such as our robot, who by definition *could* have conversed with R. Zeira — might well

have been regarded as human.

But can there be such a thing as an intelligent *golem?* Maharsha *ad loc.,* commenting on the fact that Rava's *golem* could not answer R. Zeira, says "He [Rava] could not create the power of the soul, which is speech." This comment is often taken as implying that it is beyond human power to make a creature. Compare also R. Joseph, quoted by Azulai (*loc. cit.*), who states "Wise men have the power to [create] life force, but not intelligence." However, the *Yad Ramah* says only, "Rava was not aided from above to give [it] the power of speech," a wording which does not seem to rule out the possibility of *ever* doing so. Perhaps it would be wise to wait and see what artificial intelligence research will accomplish, rather than making a hasty decision on this point.

7. *Robot research and religion*

There are those who feel that the current efforts to build intelligent machines and to synthesize life are in themselves serious religious transgressions. (The commentary *Anaf Yosef* on *Ein Ya'akov* does indeed say of Rava's making a *golem,* "It is not proper to do this"; but the reason which he gives applies only to doing it by directly invoking divine aid. Moreover, R. Yehonatan begins his commentary on the story of Rava's *golem* with the words "It is entirely permissible.") It is suggested that those who engage in such researches are attempting, like the builders of the Tower of Babel, to usurp divine prerogatives, to vie with the Lord Himself. Certainly behind the Iron Curtain, where the computer sciences (there called by the American-coined name "Cybernetics") are held in great ideological esteem, this type of motivation does exist. But there is no reason for such attitudes to prevail. Research on artificial intelligence and synthetic life need not be, and in the Western world usually is not, inspired by anti-religious motives. There is no reason why we cannot say, with the Psalmist, "Lord, You have probed me, and You know . . . *golmi ra'u einekha,* Your eyes have seen my unformed self, my *golem.*" Let us build our *golems* in the sight of God.