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## THE SABBATH IN THE SPACE AGE

### *Introduction*

The Jewish religious law (*Halakhah*) relating to Sabbath observance consists primarily of injunctions against performing certain actions on the Sabbath. The detailed development of this branch of the *Halakhah* requires that three fundamental questions be answered: Which actions are prohibited? What degree of causation constitutes performance? When is the Sabbath?

The great strides which technology has taken during the present century have led to the attachment of various names to our era, among them "The Age of Electronics," "The Age of Automation," and "The Space Age." These technological advances have inevitably given rise to novel (or perhaps only seemingly novel) *halakhic* problems. There is a natural correspondence between the three "Ages" just listed and the three key Sabbath law questions posed in the first paragraph. The development of electronics has given rise to numerous *halakhic* questions about prohibited actions which involve the use of electrical and electronic equipment on the Sabbath. Advances in automation have introduced new dimensions into the already complex *Halakhot* of causation. Finally, the advent of space flight (and on a more mundane level, of ultra-rapid means of transportation) has resulted in a heightened awareness of the non-triviality of the last ques-

tion: When is the Sabbath? This paper briefly reviews certain aspects of this last question. It goes without saying that there is no intention of reaching a *halakhic* decision here on any of the problems which are discussed.

*Some problems*

When the question is raised "When is the Sabbath?," the almost instinctive answer is that the Sabbath is a period of time defined by certain astronomical phenomena involving sunset and twilight (or their computed times of occurrence, when the sky is not visible), and that it recurs with every seventh repetition of these phenomena. If one adheres to this "obvious" point of view when confronted with space age situations, it is easy to draw absurd conclusions. Five specific problems of this type are:

- (a) An astronaut in an equatorial-orbit satellite sees the sun set approximately every ninety minutes. Does he keep the Sabbath for 90-plus out of every 630 minutes?
- (b) Another astronaut in a polar-orbit space station sees the sun continuously at the times of year when the plane of his orbit is tangent to the earth's orbit, and has a ninety-minute cycle during the rest of the year. When does he keep the Sabbath?
- (c) The inhabitants of a lunar base have month-long intervals between sunsets. Do they keep the Sabbath for one month out of every seven?
- (d) On Mars the day is a little over  $24\frac{1}{2}$  hours long. Do the colonists keep the Sabbath according to the Mars day or the Earth day?
- (e) An interstellar expedition has lost sight of the sun; when does its "day" begin and end for *halakhic* purposes?

Obviously, many other *halakhic* questions which depend on the time of day can also be raised in these situations; the discussion which follows, however, will be confined primarily to the Sabbath problems involved.

*Terrestrial parallels*

While exact terrestrial counterparts to space-age Sabbath situations may be difficult or impossible to find, it is very important to

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realize that parallels to these situations do exist on mundane levels. These parallels are ipso facto precedents on which *halakhic* solutions to the “new” problems can be based. Some important precedents of this type will now be reviewed briefly.

Imagine a ship which sets out to circumnavigate the world at latitude  $60^\circ$  south, starting just east or west of longitude  $180^\circ$  and proceeding eastward or westward at the very reasonable rate of  $15^\circ$  of longitude per 24-hour day. The complete circumnavigation thus takes 24 days, during virtually all of which time the International Date Line is not crossed. When do the passengers keep the Sabbath during the first three weeks of their voyage? (Their closeness to the Antarctic Circle is irrelevant; it may be supposed, if necessary, that the trip takes place during March or September.) The natural, and presumably correct, answer is that they keep the Sabbath at seven-sunset intervals. What makes this answer non-trivial, however, is that because of the ship’s motion, the passengers clock the intervals between successive sunsets at 23 or 25, rather than 24, hours, depending on their direction of travel. This case thus appears to suggest, to the dismay of potential Sabbath-observing astronauts, that the astronomical basis for Sabbath observance suggested above is in fact the correct one — in other words, that the Sabbath must be observed in accordance with astronomical observation even if this leads to elapsed-time intervals which differ significantly from 24 hours.

What appears at first glance to be an exactly contrary conclusion can be drawn from a second important terrestrial precedent — the case of inhabitants of the polar regions. As is well known, such individuals continue to keep a 24-plus hour Sabbath at roughly 168-hour intervals even at times of the year when the astronomical phenomena which usually define the beginning and ending of the Sabbath do not occur at all.

These apparently contradictory cases can be neatly reconciled if it is realized that in both instances the Sabbath is kept for one out of every seven of the “days” by which the local community lives. In the “ship time” case it is quite easy for the passengers to live on a “sky day” schedule, since this is only an hour or so longer or shorter than the usual 24; the “sky day” therefore governs them for *halakhic* purposes, even though it may differ appreciably from

the usual 24-hour "clock day." In the polar settlement, on the other hand, it is not physically possible to live by the "sky day" throughout the year; the "clock day" thus becomes the preferred regime. This role of the local community in defining the time of occurrence of the Sabbath may be derivable from the biblical dictum "It is Sabbath . . . in all your places of settlement" (Lev. 33:3; see, however, *Mekhilta di-RaShBI* on Ex. 31:15).

It should be pointed out that the accepted *halakhic* practice with regard to the International Date Line seems to be entirely consistent with this concept of the local (Jewish) community as a determining factor in setting the date and time of the Sabbath. True, the authorities do differ as to the correct location of the line for *halakhic* purposes, with opinions ranging between the east coast of Asia and the west coast of North America. They all appear to agree, however, that a traveler who crosses the Line must observe the same Sabbath as the Jewish community at his destination, even though this contradicts his personal count of sunsets. (The sole possible exception to this rule is the first week after his crossing, when some feel that he should also observe his "personal" (sky) Sabbath — presumably only if this falls before the community's Sabbath.) The exactly opposite view might be thought at first sight to be equally defensible — namely, that the traveler should permanently keep to his own "sky Sabbath" count, observing the local community's "calendar Sabbath" count only for appearances' sake, just as a resident of Israel observes the "second days" of the festivals only in public when he visits other countries. However, significantly, this opposed view does not seem to find any support in the literature. Apparently, just as communal practice can give the clock priority over the sky in the polar regions, so can it give priority to the calendar in the case of a traveler who has crossed the Date Line.

#### *Space-age applications*

The principle of community practice just proposed furnishes a basis for settling the five space-age Sabbath problems listed earlier. In the cases of four of these problems (equatorial satellite, polar space station, lunar base, interstellar expedition) there is no practical possibility of living by the sky schedule. The individual or community in question will neces-

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sarily follow a clock and calendar schedule, probably based on some standard terrestrial time zone. (It is to be hoped that rabbinical authorities will not complicate matters at this point by insisting that all extraterrestrial groups must regulate their *halakhic* lives by Jerusalem Standard Time!) This being the case, it becomes entirely proper to observe the clock/calendar Sabbath rather than the sky Sabbath, just as in the earth-bound situations of the polar community and the Line-crossing traveler. In the case of the fourth problem, that of the Mars colony, it may similarly be argued that the colonists will live by sky time; this implies that they should observe the Martian 24½-hour sky Sabbath, just as the passengers of a west-bound ship traveling at the rate of 7½° per day observe a 24½-hour sky time (ship time) Sabbath. (Unfortunately, the Mars and ship cases are not exactly parallel. The ship's passengers, by keeping a sky week, stay in step with the fixed communities which they pass on their voyage. Similarly, the polar community, the astronaut, and so on, stay in step with ordinary communities by ignoring the sky and following the clock. The Mars colonists, on the other hand, get progressively out of step with Earth when they follow the sky week. There may thus be a difference of *halakhic* opinion on the Sabbath question when a Mars colony becomes a reality.)

A word of caution: When interplanetary travel becomes a commonplace, cases will inevitably arise in which the community practice rule is difficult to apply. Imagine a series of planets (not in our solar system!) which rotate on their axes in 24, 22, 20, . . . , 12, and 10 hours. Presumably, the community on the 24-hour planet will live by sky time; that on the 10-hour planet, by clock time. But where will the line be drawn between the two extremes? (This dichotomization problem did not arise earlier since, for practical purposes, there is a wide gap between the cases of slow, continuous earth-bound travel [ship time] and orbital speeds [satellite time].) Imagine also a 16-hour planet on which the community adapts itself, through the regular use of stimulants and sleeping drugs, to live a 32-hour day; is this an admissible community clock day for *halakhic* purposes? A final intriguing question: What are the implications for Sabbath observance of relativistic time dilation effects?

The indiscriminate application of the community practice rule can lead to doubtful conclusions even in terrestrial cases. An example is provided by the ever-recurring proposal that a regularized "world calendar" be adopted. In this type of calendar, the 365th day of the year and the 366th day of a leap year are not counted as days of the week or month. Should such a calendar become accepted, a Sabbath observer who followed the sky count would find himself keeping the Sabbath on a different day of the general community's week each year — an obviously insupportable situation. Consider, on the other hand, a businessman of today whose job requires him to make an eastward round-the-world trip once a year (and twice on leap years, for perfection's sake). This individual is actually following a "world calendar" schedule; nevertheless, the *Halakhah* does not require that his Sabbath observance get progressively out of step with that of the community. Although the parallel just suggested between a traveling individual and a non-traveling "world calendar" community may be far from compelling, it is at least suggestive of the need to define the limits of the community's freedom to follow an arbitrary clock or calendar system. (Clearly, a community would not be permitted to follow a 6 P.M. "clock sunset" throughout the year!)

It has been seriously suggested by some scholars that the *Halakhot* which are time-dependent (that is, the observance of which depends on a specific time of day, week, month or year) may actually be completely inapplicable to extra-terrestrial environments in which the concepts of day, week, month and year become radically altered if not entirely meaningless. Those who maintain this view might suggest further that just as there are commandments which depend on geography (e.g., those which need be observed only in Israel), so there are others which depend on astronomy and which need be observed only on the earth ("*teluyot ba-arets*" in a wider sense!). Admittedly, it is plausible that certain commandments, for example that of sanctifying the new moon, may apply only inside the moon's orbit (say). When it comes to the observance of the Sabbath and festivals, however, the writer feels that such a position is not tenable. The fact that many of the festivals are related to the agricultural calendar does

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not prevent their observance out of season in the southern hemisphere. The historical theme of the festivals, "in commemoration of the Exodus from Egypt," is timeless (see Talmud *Berakhot* 12*b*). How much more so is this true for the Sabbath, which has its roots not merely in history but in cosmology — "in commemoration of the Creation at the Beginning!" No, the Sabbath is not merely terrestrial, but universal; not transient, but eternal, until mankind reaches the ultimate culmination of the "day which is all Sabbath."