Isaac Asimov

There seems no question but that the clock dial, which has existed in its present form since the Seventeenth Century and in earlier forms since ancient times, is on the way out. More common today are digital clocks, which mark off the hours, minutes, and seconds in changing numbers.

This certainly seems an advance in technology. People no longer will have to interpret the meaning of "the big hand on the 11 and the little hand on the 5"; digital clocks will indicate at once that it is 4:55.

And yet there will be a loss in the conversion of dial to digital, and few people seem to be worrying about it.

When something turns, it can turn in just one of two ways, either clockwise or counterclockwise, and we all know which is which. Clockwise is the turning direction of the hands of a clock, and counterclockwise is the opposite of that. Since throughout the day we often stare at clocks (dial clocks that is), we have no trouble in following directions or descriptions that include those words.

But if dial clocks disappear, so will the meaning of those words for anyone who never has stared at anything but digitals. There are no good substitutes for *clockwise* or *counterclockwise*. The nearest you can come is by a consideration of your hands. If you clench your fists with your thumbs pointing at your chest and look at your forefingers, you will see that the forefinger of your right hand curves counterclockwise from knuckle to tip, while the forefinger of your left hand curves clockwise. You can then talk about a right-hand twist and a left-hand twist. But people don't stare at their hands the way they stare at clocks, and this will never be an adequate substitute.

Nor is this a minor matter. Astronomers define the north pole and south pole of any rotating body in such terms. If you are hovering above a pole of rotation and the body is rotating counterclockwise, it is the north pole; if it is rotating clockwise, it is the south pole. Astronomers also speak of direct motion and retrograde motion, by which they mean counterclockwise and clockwise, respectively.

ACTIVE READING

RECOGNIZE CAUSE AND EFFECT Asimov has just finished discussing the first effect of the switch from dial to digital. Look ahead. How does Asimov signal the next effects?

Here is another example. Suppose you are looking through a microscope at some object on a slide, or through a telescope at some view in the sky. In either case you may wish to point out something to a colleague. "Notice that object at 11 o'clock," you may say—or 5 o'clock, or 2 o'clock, or whatever.

Everyone knows the location of any number from 1 to 12 on the clock dial and easily can use such a reference to find an object.

Once the dial is gone, location by *o'clock* also will be gone, and there is no good substitute. Of course, you can use directions instead: northeast, southwest by south, and so on. However, this would assume you always know which direction is north. Or, if you are arbitrary and decide to let north be straight ahead or straight up regardless of its real location, it still remains true that very few people are as familiar

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CONNECT In what other situations might you use a clock face to point out the location of something?

with a compass as they are with a clock face.

Here's still another point. When children are learning to count, once they master the first few numbers, they quickly get the whole idea. You go from 0 to 9 and 0 to 9 over and over again. In other words, you go from 0 to 9, then from 10 to 19, then from 20 to 29, and so on until you reach 90 to 99, and then you pass on to 100, when the whole thing starts again. It is very systematic, and once you learn it you never forget.

Time is different. Since the early Sumerians[2] couldn't handle fractions very well, they chose 60 as their base because it can be divided evenly in a number of ways. Ever since, we have continued to use 60 in certain applications, the chief of which is in the measurement of time. Thus, there are 60 minutes in an hour.

If you are using a dial, that doesn't matter. You simply note the position of the hands, and they automatically become a measure of time: "half past 2," "a quarter past 3," "a quarter to 10," and so on. You see time as space and not as numbers.

With a digital clock, however, time is measured only as numbers, so you go from 1:01 to 1:59 and then move directly to 2:00. It introduces an irregularity in the number system that is going to insert an unnecessary stumbling block into education. Just think: 5.50 is halfway between 5 and 6 if we measure length or weight or money or anything but time. In time, 5:50 is nearly 6; it is 5:30 that is halfway between 5 and 6.

What shall we do about all this? I can think of nothing. There is an odd conservatism[3] among people that will make them fight to the death against making time decimal and having 100 minutes to the hour.

But even so, what can be done about the lost meaning of *clockwise*, *counterclockwise*, and *o'clock* as points of reference? It will be a pretty problem for our descendants. ❖

The Persistence of Memory [Persistence de la mémoire] (1931), Salvador Dali. Oil on canvas, 9½" × 13". The Museum of Modern Art, New York. Given anonymously. Photograph © 1998 The Museum of Modern Art, New York.

1. **arbitrary** (är′bĭ-trĕr′ē): making a choice on the basis of what is convenient rather than what is reasonable or natural.
2. **Sumerians** (sōō-mîr′ē-ənz): the people of one of the earliest human civilizations, which flourished from 5,000 to 4,000 years ago in the Middle East.
3. **conservatism** (kən-sûr′və-tĭz′əm): unwillingness to change.

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