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COVER: High voltage electron microscopy of whole cells has revealed fine details of cell structure. This low magnification image shows the flat cells used supported on a gold grid. Magnification 1,000 times. See p. 250. (Micrograph: J. J. Wolosewick and K. R. Porter)

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LETTERS

Fractal recalculation

In the article "Fractals: A World of Nonintegral Dimensions" (SN: 8/20/77, p. 122), it is stated in regard to the Koch curve: "At each stage in its construction, the length of the curve increases by four-thirds, yet *the area enclosed increases by only one-third.*" According to my calculations, the one-third increase in area enclosed is true *only for the second stage* in the construction of the curve. For each stage thereafter, the area enclosed increases by only four-ninths of the area increase of the preceding stage. Thus, after several stages, the fractional increase in total area per stage becomes very small indeed—not one-third.

Roland Rainge
New Salisbury, Ind.

(Reader Rainge is entirely correct. The area added in successive steps in constructing the Koch curve forms a geometric series. If the original triangle has a side length 1 (and area 3/4), then the area enclosed by the Koch curve is:

$$\left(\frac{\sqrt{3}}{4}\right)\left[1+\frac{1}{3}+\left(\frac{4}{9}\right)\left(\frac{1}{3}\right)+\left(\frac{4}{9}\right)^2\left(\frac{1}{3}\right)+\ldots\right].$$

The sum of this geometric series is

$$\left(\frac{\sqrt{3}}{4}\right)\left[1+\left(\frac{1}{3}\right)/\left(1-\left(\frac{4}{9}\right)\right)\right]=\frac{2\sqrt{3}}{5}.$$

This (very finite) number, approximately .693, is the area enclosed by the Koch curve.—Ed.)

Antiviral Agents

Although it is true that the development of antiviral agents has lagged far behind that of antibacterials, this is *not* primarily because "antibiotics attack bacteria in the bloodstream without hurting cells" (SN: 8/20/77, p. 116). Transient bacteremia (bacteria in the bloodstream) does accompany the early phase of many infections, but the blood-borne bacteria are quickly removed by phagocytes in the liver, spleen, and bone marrow. The main work of antibiotics is accomplished in the extracellular fluid of the infected tissues—e.g. the lung in pneumonia—and not in the bloodstream.

Bacteria may be destroyed or inhibited through a variety of mechanisms—for example, via blockage of the synthesis of the cell wall (penicillins), or inhibition of bacterial protein synthesis (erythromycin, chloramphenicol). Bacterial metabolism differs sufficiently from that of human cells to permit this type of selective interference while sparing the host cells.

Unlike bacteria, viruses are obligate intracellular parasites which utilize the metabolic processes of the invaded host cells for their reproduction. Therefore, agents which interfere with viral metabolism are also likely to injure host cells. It is this fact which is the primary obstacle to the development of selective antiviral agents, and which makes the apparent efficacy of ara-A so remarkable.

Scott A. Reines M.D., Ph.D.
Bronx, N.Y.

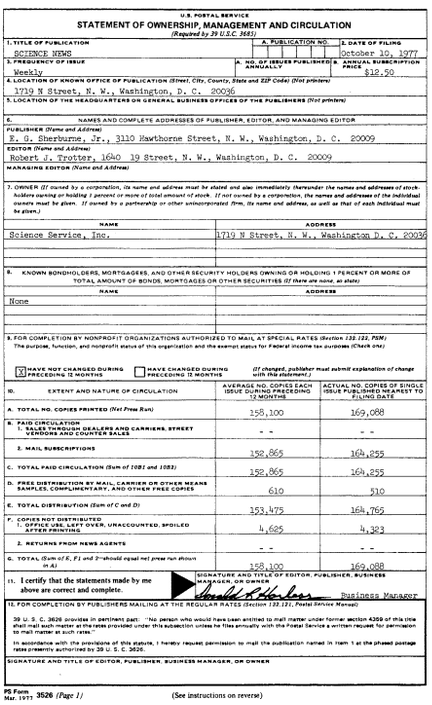
Your Friendly Dentist

Granted many people have a fear of dental treatment. The study of Kleinknecht and Bernstein (SN: 9/10/77, p. 170) failed to mention that most parents bring their children to the dentist for the first time after the child is suffering from a toothache. They are often preconditioned by the parent in terms of—"He won't HURT you"!

A dentist has to work in a very intimate relationship on one of the most sensitive areas of the body. No wonder many sensitive children react unfavorably.

Organized dentistry is not only stressing improved communication skills, but also a public education program to improve the dental health of people in this country.

Alfred C. Heston, D.M.D.
Spokane, Wash.



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