Interesting Questions

Note: I would be glad to hear from readers who have answers or other responses to any of these questions. Appropriate credit (with the reader's approval) will be given for all responses published in future editions of this book.

1. What would a sweater look like after it had been drifting in the space of our solar system for (a) two years; (b) ten years; (c) five hundred years?

2. If all the people on earth were to stand still, how many square feet would their feet cover?

"Les hommes occupent très peu de place sur la terre. Si les deux milliards d'habitants qui peuplent la terre debout et un peu serrés, comme pour un meeting, ils logeraint aisément sure une place publique de vingt milles de long sur vingt milles de large. On pourrait entasser l'humanité sur le moindre petit îlot du Pacifique." — de Saint Exupéry, Antoine, "Le Petit Prince", Harcourt, Brace, Jovanovich, N.Y., 1971, p. 68.

"Human beings occupy very little space on the earth. If the two billion inhabitants of the earth [world population in the forties] were to stand erect and slightly pressed together, as for a meeting, they could easily fit into an area twenty miles square. One could crowd the whole of humanity onto the smallest Pacific island." [my translation]

"More than 60,000 square miles of U.S. land is paved over, amounting to 2 percent of the total surface area, and possibly 10 percent of arable land." — Kunstler, James Howard, *Home from Nowhere*, Simon & Schuster, 1996, p. 67.

3. What is the area of the U.S. (measured in square feet) that has never been stood upon (a) by human feet; (b) by non American-Indian feet? (We exclude from consideration places on which it is impossible for a human being to stand unaided, e.g., the sides of cliffs.)

4. Was there ever a time when all humans on earth were asleep at the same time? ("Our Unguarded Planet!")

5. (a) Given the range of speeds of attacking aircraft, the number of rounds per second they can fire, and the ground area destroyed by each bomb they drop, what is the best way to park aircraft on the ground so that minimum damage will be inflicted on them? Why are military aircraft always parked in long rows, so that they will be most vulnerable to strafing attacks?

"In a problem first proposed in the sixteenth century, an orchard is laid out in the shape of a checkerboard, with each space occupied by a tree. The spaces are small enough that neighboring trees touch each other. Tragically, a plague invades the orchard and spreads from tree to tree, destroying the entire fruit crop. The question at the time of replanting is how many trees should be excluded from the grid to prevent a disease from spreading from one end of the orchard to the other, while still maximizing the fruit yield.

"Over the years, various attempts to answer the question have led to a best estimate that about 41 percent of the checkerboard squares should remain unoccupied." — Peterson, Ivars, *The Mathematical Tourist*, W. H. Freeman and Co., N.Y., 1988, p. 137.

(b) Why doesn't the infantry and the air force ever employ a many-against-one strategy instead of what seems to be the universal one-against-one strategy? In typical air- as well as ground-battles, each fighter plane or infantryman selects targets according to his own judgement and then attempts to hit that target. In many, perhaps most cases, this means that an enemy target

is being attacked by a single fighter plane or soldier. Suppose, instead, that "attack units" were formed before the battle began. A unit might consist of, say, two or three individuals (fighters in the case of aircraft, infantrymen in the case of ground forces). Each unit would have a leader who would establish the next target (by verbal description, by pointing). Then the entire unit would continue to attack that target until it was destroyed. Then the leader would select another target and the process would be repeated. Has this strategy been subjected to adequate test?

The question seems particularly applicable to kamikaze attacks on U.S. warships during World War II. If resources allowed only two planes to be assigned to a given ship, then one plane could attack by flying low over the water, the other by diving down from as near a vertical position as possible, thus forcing the ship's available firepower against each plane to be halved. If resources allowed a third plane, then it could attack either from directly in front or from directly behind, or from as near a vertical position as possible, in this case forcing the available firepower against each plane to be divided by three.

(c) Why, in this age of computers, don't the armies of the world provide every mortar squad with a simple but effective range finder consisting of an extensible rod of up to, say, a maximum of five feet in length, on each end of which is mounted a sight. Each sight is rotated until it lines up precisely with the target, then a computer chip records the angle of each sight relative to the rod. From these two figures, plus the known distance between the sights, it is then just a matter of elementary trigonometry to compute the distance to the target, and from that figure, and a table of the range of the mortar for each angle at which the mortar is set, it is an easy matter to compute the angle at which the mortar should be set to hit the target. Total cost would probably be no more than a few tens of dollars (civilian cost).

(d) Why weren't guns mounted in the *tail* of fighter aircraft? Anyone who watches sufficiently many World War II documentaries cannot help but ask this question. A rear-view mirror with cross-hairs could have been mounted inside the cockpit, so that, if the guns were fired when a pursuing plane was in the cross-hairs, the bullets would be highly likely to strike the pursuing plane. If the pursuer tried to stay out of the line of fire, then its own guns would not be able to hit the plane it was attacking.

6. Why have armies never been supplied with silencers for rifles and pistols? What advantage is gained by always making clear to the enemy (a) where you are (b) that you have weapons of the type that you are firing?

A reader has responded: "The silencer severely dampens the speed of the bullet and hence how far you can shoot and what you can penetrate."

7. Do any of the espionage or elite military services throughout the world, explicitly teach what might be called "The Art of Sneaking"? Consider, e.g., the problem of attempting to elude pursuers by running through a forest or, for that matter, through any busy city street. Are there better and worse ways of doing this? Is one of the better ways to use a small rear-view mirror strapped to one's head, and then run in such a manner as to keep the pursuer out of sight as much as possible? Are there psychological "shadows" in any ordinary street scene or work scene — places where all or most people never look with attention?

8. How many different objects are now being manufactured in the world? More precisely, how many different objects are now listed in all the catalogs, order books, parts lists in all the countries in the world?

9. Why are man-made things the size they are? Why are the heights of ceilings in most houses what they are, and not one or two or three inches different? Why are doorways the size they are? Why are sidewalks and residential streets the size they are? Why are bricks the size they are? Consider the extremes: bricks the size of each wall, and bricks that are "arbitrarily small". In the first case, the difficulty would be in finding the material and shaping it (putting the bricks together would be virstually no problem at all, given the lifting equipment). In the second case the difficulty would be in assembling all those tiny pieces each of which is easy to make, then doing all that mortaring. Isn't the right way to proceed that of calculating the optimal size of brick for each building project, and then building with bricks of that size? Why do we believe that the same size brick is good for all walls?

How many people would notice if, one morning, the size of every house had increased, say, 1%? These *questions* may be nothing more than *expressions*, namely, expressions of the fact that things have *a* size, i.e., that the size of some things is not constantly changing. Or they may be questions which can never have final answers, since, once you have explained why something is the size it is, I can recommend making the size a little different. Then, if you do that, along can come another person and ask why it is the size it is, and the process can be repeated.

"The U.S. standard railroad gauge (distance between the rails) is 4 feet, 8.5 inches. That's an exceedingly odd number. Why was that gauge used? Because that's the way they built them in England, and the U.S. railroads were built by English expatriates. Why did the English build them like that? Because the first rail lines were built by the same people who built the pre-railroad tramways, and that's the gauge they used. Why did 'they' use that gauge then? Because the people who built the tramways used the same jigs and tools that they used for building wagons, which used that wheel spacing. Okay! Why did the wagons have that particular odd wheel spacing? Well, if they tried to use any other spacing, the wagon wheels would break on some of the old, long-distance roads in England, because that's the spacing of the wheel ruts.

"So who built those old rutted roads? The first long-distance roads in Europe (and England) were built by Imperial Rome for its legions. The roads have been used ever since. And the ruts in the roads? The initial ruts, which everyone else had to match for fear of destroying their wagon wheels, were first formed by Roman war chariots. Since the chariots were made for (or by) Imperial Rome, they were all alike in the matter of wheel spacing. The U.S. standard railroad gauge of 4 feet, 8.5 inches derives from the original specification for an Imperial Roman war chariot. Specifications and bureaucracies live forever. So the next time you are handed a specification and wonder what horse's ass came up with it, you may be exactly right, because the Imperial Roman war chariots were made just wide enough to accommodate the back ends of two war horses. Thus, we have the answer to the original question...

"There's an interesting extension to the story about railroad gauges and horses' behinds. When we see a Space Shuttle sitting on its launch pad, there are two big booster rockets attached to the sides of the main fuel tank. These are solid rocket boosters, or SRBs. The SRBs are made by Thiokol at their factory in Utah. The engineers who designed the SRBs might have preferred to make them a bit fatter, but the SRBs had to be shipped by train from the factory to the launch site. The railroad line from the factory had to run through a tunnel in the mountains. The SRBs had to fit through that tunnel. The tunnel is slightly wider than the railroad track, and the railroad track is about as wide as two horses' behinds. So, the major design feature of what is arguably the world's most advanced transportation system was determined over 2000 years ago by the width of a horse's ass!" — *National Review*, Jan. 24, 2000, p. 15 (not necessarily quoted exactly here)

10. Why do things break in such an orderly fashion? In the case of mechanical devices, we typically first hear a strange noise or feel a strange vibration, which gradually gets worse. There is almost always a "warning". Why is Nature so kind? Why don't things *typically* break unpredictably — literally go wrong *suddenly*? Why do large machines typically break only one part at a time? E.g., in the case of a car, the brakes go, and then several months later, the water pump, then, the following year, the clutch, but very seldom all three (or more) at once.

And why is it that so often, striking a piece of faulty equipment fixes it? The fact that this phenomenon has become a standard item in certain comedy routines in no way denies its truth.

11. Suppose you are downstairs and you want to remember to bring something upstairs which is awkward to carry around: what should you do? (Assume you have a tendency to lose or forget notes you write to yourself.)

Tentative answer: Leave the thing where it is, and carry around something which is not awkward to carry around but which you will notice, e.g., an unusual item you can put in a shirt pocket.

12. Where do urban and suburban birds go when it rains or when there are strong winds? Where do they go to die?

13. Which is in a higher state of entropy: a clock which is always five minutes slow (plus or minus, say, a second a month), or a clock which is stopped? (Recall Lewis Carroll's observation that a stopped clock is precisely correct twice a day.) Which clock has the more predictable behavior?

14. Why doesn't running water freeze? Does there exist a low enough temperature at which it would freeze?

"On another occasion...a guy came into my room — I had forgotten to lock the door during the 'experiment' — and found me in a chair wearing my heavy sheepskin coat, leaning out of the wide-open window in the dead of winter, holding a pot in one hand and stirring with the other. 'Don't bother me! Don't bother me!' I said. I was stirring Jell-O and watching it closely: I had gotten curious as to whether Jell-O would coagulate in the cold if you kept it moving all the time." — Feynman, Richard, *What Do You Care What Other People Think?*, W. W. Norton & Co., Inc., N.Y., p. 56.

15. Suppose our universe is an extremely unlikely one in the set of all possible universes. Is there any scientific way to determine this from our universe alone? Imagine a person who knows nothing about dice being asked to roll a pair of fair dice repeatedly in a closed room. Suppose he rolls an extremely unlikely sequence of values, e.g., 100 two's. Would anything else in the room be different from the case in which he rolled a very probable sequence of values in the same room? In other words, as universes go, does one improbability carry other improbabilities along with it?

"Seldom has science done very well at studying phenomena of which but a single example was available. Newton's and Einstein's laws would have been far more difficult — perhaps impossible — to formulate had there been only one planet to test them against, and it is often said that the central problem of cosmology itself is that we have but a single universe to examine. (The discovery of cosmic evolution eases this difficulty, by proferring for our consideration the

very different state of the universe during the first moments of cosmic evolution.)" — Ferris, Timothy, *Coming of Age in the Milky Way*, Doubleday, N.Y., 1988, pp. 368-369.

"We never experiment with just one electron or atom...any more than we can raise Ichthyosauria in the zoo." — Schroedinger, Erwin, 1952.

"The goal facing quantum cosmologists is ... to show [mathematically] that the wave function of the universe is large for our present universe and vanishingly small for other universes. This would then prove that our familiar universe is in some sense unique and also stable. (At present, quantum cosmologists are unable to solve this important problem.)" — Kaku, Michio, *Hyperspace*, Anchor Books, N.Y., 1994, p. 254.

"'You might...be able to start a new universe using energy equivalent to just a few pounds of matter,' [physicist Alan] Guth suggested in a 1987 interview. 'Provided you could find some way to compress it to a density of about 10^{75} grams per cubic centimeter, and provided you could trigger the thing, inflation [i.e., rapid expansion] would do the rest.' And if *we* could do it, so, perhaps, could someone else have done it long ago. 'For all we know,' said Guth, who had a gift for the laconic statement of radical ideas, 'our own universe may have started in someone's basement.'" — ibid., pp. 361-362.

"...one cannot reliably calculate the odds of a particular thing having happened unless one either understands the process — that is, can properly identify and quantify all the variables involved — or has an adequate experimental data base from which to draw phenomenological information about it... — ibid., p. 373.

"To reason probabilities [of natural phenomena] without [statistics] is to fall victim to the post hoc fallacy, by the lights of which almost every event may be calculated to be unique. If, for instance, we were to ask how likely it is for you to be reading this page at this moment, we might add up all the twists and turns of your life and mine, beginning with our births and running down through a billion variables to the circumstances in which I wrote these words and you read them, and conclude that the thing is so nearly impossible that it would almost certainly never have happened, anywhere in the universe. Yet here we are." — ibid., pp. 373-374.

One way of deciding how unlikely our universe is might be through an application of the anthropic principle. That is, we might be able to determine the maximum range of certain crucial universal parameters outside of which conscious life (we believe) would be impossible. Then we could compute the ratio of this range to the total range of the parameters, and fromthat derive a probability.

"[Boltzmann surmized] that we are living in a colossal Poincaré type fluctuation from the normal equilibrium condition of the world. The reason for our participation in such a staggeringly rare occurrence is attributed to the fact that the formation of biological matter itself requires the thermodynamic disequilibrium so produced; human beings could not exist to observe the equilibrium state. The conjecture can be faulted on several grounds. First, a fluctuation which produced the *present* low entropy condition of the universe is overwhelmingly more likely than one which produced a still *lower* entropy state in the past ... Yet there are non-thermodynamic reasons why we know that the entropy of the universe was lower in the past than it is now; for example, when distant galaxies are observed they are seen as they were many millions of years ago in a condition of thermodynamic disequilibrium. Another objection to Boltzmann's suggestion is that a fluctuation just on the size of the solar system would be sufficient to ensure the existence of life on Earth, and such a fluctuation is *far* more probable than one of cosmic proportions." — Davies, P. C. W., *The Physics of Time Asymmetry*, University of California Press, Los Angeles, Calif., 1977, p. 103.

16. Which will result in the faster drying of a freshly washed drinking glass: putting the glass upside-down on the drying rack, so the droplets can run down, or putting the glass right-side up, so that the droplets can evaporate more rapidly?

17. What is the tensile strength of snow? Of mustard? Of jam?

18. What is the sound of two air molecules striking each other? What would it be like to hear a given sound as you grew smaller and smaller? Would the quality and the volume of the sound change? What does sound sound like "just before" we reach the molecular level?

"Ein kleiner Junge kommt in einen Kauflauden mit einem Pfennig in seiner Hand und fragt: 'Koennte ich fuer einen Pfennig gemischte Bonbons bekommen?' Der Kaufmann nimmt zwei Bonbons aus seinem Kasten, gibt sie dem Jungen und sagt: 'Mischen kannst du sie dir selber...'

"Der Begriff 'Temperatur' in der klassischen Waermelehre scheint einen objektiven Zug der Wirklichkeit zu beschreiben, eine objektive Eigenschaft der Materie. Im taeglichen Leben ist es ganz leicht, mit Hilfe eines Thermometers zu definieren, was wir mit der Behauptung meinen, dass ein Stueck Materie eine gewisse Temperatur habe. Aber wenn wir definieren wollen, was die Temperatur eines Atoms bedeuten koennte, so sind wir, selbst, wenn wir hierbei von der klassischen Physik ausgehen, in einer sehr viel schwierigen Lage. Tatsaechlich koennen wir diesen Begriff 'Temperatur des Atoms' nicht mit irgendeiner wohldefinierten Eigenschaft des Atoms in Verbindung bringen; sondern wir muessen ihn bis zu einem gewissen Grade mit unserer unzureichenden Kenntnis des Atoms verknuepfen. Wir koennen den Wert der Temperatur zu gewissen statistischen Erwartungswerten ueber die Eigenschaften des Atoms in Beziehung setzen, aber man wird zweifeln koennen, ob ein solcher Erwartungswert objektiv genannt werden sollte. Der Begriff 'Temperatur des Atoms' is nicht viel besser definiert als der Begriff 'mischen' in der Geschichte ueber den kleinen Jungen, der gemischte Bonbons kaufte."

"A little boy comes into a store with a penny in his hand and asks: 'Can I get any mixed candies for a penny?' The man behind the counter takes two candies out of a box, gives them to the boy, and says, 'Here: you can mix them yourself...'

"The concept of 'temperature' in classical thermodynamics appears to describe an objective feature of reality, an objective property of matter. In ordinary life, it is very easy, with the aid of a thermometer, to define what we mean when we assert that a piece of material has a certain temperature. But when we want to define what the temperature of an atom means, we find ourselves in a very difficult situation, particularly if we want to proceed from the point of view of classical physics. The fact is, we cannot connect this concept, 'temperature of an atom', with any well-defined property of the atom; instead, we must base it on our necessarily incomplete knowledge of the atom. We can relate the value of the temperature to certain statistical expectations regarding the properties of the atom, but one may well doubt whether such an expected value can legitimately be designated as 'objective'. The concept 'temperature of an atom' is not much better defined than the concept 'mix' in the story of the little boy who wanted to buy mixed candies." — Heisenberg, Werner, *Physik und Philosophie*, Ullstein Bücher, West-Berlin, 1968, pp. 141, 151. [Translation mine]

19. Who decided on the spelling of "tsk-tsk"? (I have never heard anyone ever pronounce these syllables other than "tisk, tisk", which is a long way from the sound they are intended to represent.)

20. In classical physics, work is defined as force times the distance over which that force is exerted. Thus, e.g., it is easy to compute the work we do in dragging a refrigerator across a floor. And we have no doubt in our own bodies that we have done work. But if we were able to hold the refrigerator over our heads for any length of time, we would also have no doubt that we had also done work, and much more than in the first case. Yet, according to classical physics, we have done none at all! How should we compute the work done — or, at least, energy expended — in the second case?

Over the years, I have asked this question of various technically educated people. None has had an answer, nor have I come across the answer in physics textbooks, although Feynman gives an explanation of *why* we get tired from holding up an object:

"It is a fact that when one holds a weight he has to do 'physiological' work. Why should he sweat? Why should he need to consume food to hold the weight up? Why is the machinery inside him operating at full throttle, just to hold the weight up? Actually, the weight could be held up with no effort by just placing it on a table; then the table, quietly and calmly, without any supply of energy, is able to maintain the same weight at the same height! They physiological situation is something like the following. There are two kinds of muscles in the human body and in other animals: one kind, called *striated* or *skeletal* muscle, is the type of muscle we have in our arms, for example, which is under voluntary control; the other kind, called *smooth* muscle, is like the muscle in the intestines or, in the clam, the greater adductor muscle that closes the shell. The smooth muscles work very slowly, but they can hold a 'set'; that is to say, if the clam tries to close its shell in a certain position, it will hold that position, even if there is a very great force trying to change it. It will hold a position under load for hours and hours without getting tired because it is very much like a table holding up a weight, it 'sets' into a certain position, and the molecules just lock there temporarily with no work being done, no effort being generated by the clam. The fact that we have to generate effort to hold up a weight is simply due to the design of striated muscle. What happens is that when a nerve impulse reaches a muscle fiber, the fiber gives a little twitch and then relaxes, so that when we hold something up, enormous volleys of nerve impulses are coming in to the muscle, large numbers of twitches are maintaining the weight, while the other fibers relax. We can see this, of course: when we hold a heavy weight and get tired, we begin to shake. The reason is that the volleys are coming irregularly, and the muscle is tired and not reacting fast enough. Why such an inefficient scheme? We do not know exactly why, but evolution has not been able to develop *fast* smooth muscle. Smooth muscle would be much more effective for holding up weights because you could just stand there and it would lock in; there would be no work involved and no energy would be required. However, it has the disadvantage that it is very slow operating." — Feynman, Richard P., Leighton, Robert B., Sands, Matthew, *The Feynman Lectures on Physics*, Vol. 1, Addiston-Wesley Publishing Co., Reading, Mass., 1977, p. 14-2.

Here is a possible answer to the question of how much actual *work* we do in holding up an object:

Einstein, in his General Theory of Relativity, argued that a person standing on the floor of a closed elevator cannot know if (a) the elevator is resting on the surface of the earth, or if, (b) the elevator is being accelerated through empty space, in which case the "weight" the person experiences is given by $F = ma$, where m is the person's mass and a is the acceleration he and the elevator are undergoing.

Consider now someone who is holding a refrigerator over his head. He is exerting an upward force, F, on the refrigerator equal to its weight. From the weight we can compute the mass of the

refrigerator. Therefore we can compute the acceleration, a, which, in empty space, would be required to produce such a force. But from elementary physics, we know that

$$s = 1/2\ at^2,$$

where s is distance, a is acceleration, and t is time.

We know the acceleration, a, we know how long, t, the person holds the refrigerator over his head, so we can compute s. But work, W, is defined to be force times distance. We know the force, F, we know the distance, s, so we know how much work the person does.

One counterargument that has been made to this proposed answer is that, regardless of the accelerating elevator in space, the person on earth is still doing no work on the refrigerator according to the classical definition. My reply is that either Einstein's equivalence (between person standing on earth and person in accelerating elevator) is an equivalence or it is not.

21. Why did mathematicians, rather than biologists, discover set theory? For centuries, a major effort of biology was that of classification, i.e., of working with sets. One would think that at least one biologist would have begun to wonder if there might not be an "algebra" of sets, a way of formalizing the operations on them, e.g., combining them, finding the elements common to two or more sets, finding the elements not in a subset of a set. Yet the discovery of this algebra was not made until the second half of the 19th century, and then by a mathematician, not a biologist.

22. The computation of areas and volumes is done using a standard technique of the integral calculus, namely, by breaking up the area into ever smaller rectangles, or the volume into ever thinner slices, and then finding the limit which the areas of all the rectangles sum up to, or the limit which the volumes of all the slices sum up to. And yet, if you were asked to determine the volume of water in an oddly shaped vase, you would probably get a cylindrical glass container with volume gradations marked on the side, and simply pour the water into the container and read off the volume. Similarly, if you were asked to determine the area of a splotch of paint, you might well think of drawing a rectangle with the top side missing, marking off area gradations on the remaining part of the rectangle, then "pouring" the paint into this rectangular area and simply reading off the area. To compute the length of a curve (to "rectify" the curve) normally requires approximating the curve with short straight lines, then finding the limit which the sum of the lengths of these lines approach as the lines are made shorter and shorter. Wouldn't it be simpler to just run a piece of string along the length of the curve, then pull the string straight and measure its length on a ruler?

Has this much more "sensible" approach been formalized and developed in any branch of mathematics (e.g., in topology), and if not, why not?

23. *The Timetables of History* tells us that metal mirrors were in use in Egypt as long ago as the period 3000 to 2501 b.c., although the glass mirror was not invented until 1278 a.d. Did the ancient Egyptians ever use sunlight reflected from mirrors to communicate over long distances, and if not, why not? (It would have been man's first experience of speed-of-light communication.) Why didn't this become a standard means of communication throughout the ancient world, at least in sunny climates? For that matter, why didn't it become a standard means of communication during the late Middle Ages?

(An interesting article on "optical telegraphs" in the 18th and 19th centuries is Holzman, Gerard J., and Pehrson, Bjorn, "The First Data Networks", *Scientific American*, January, 1994, pp. 124-129. In an optical telegraph, the positions of wooden arms and shutters were used to represent signals.)

Why weren't mirrors commonly used as a military weapon, e.g., to shine in the eyes of opposing gunners aboard ships? (Legend has it that Archimedes used parabolic reflectors to focus sunlight so that it set fire to ships of an invading fleet.)

A reader has responded: "The Vikings sent messages across the country by lighting ready-made fires on mountaintops. This sent a simple message fast enough. Not to mention the lighthouses in antiquity — they, too, sent messages of a sort."

24. Why do we say darkness "falls"? In hilly regions, darkness actually "rises", in the sense that the lowest points become dark first. From a physical point of view, daylight brings another bombardment of photons from the sun, so it would be far more correct to say that daylight, not darkness, falls.

25. When was execution by hanging first discovered, and, more interestingly, how?

26. Suppose the earth rumbled on its axis as it rotated. How great would the rumbling have to be for man to remain continuously aware of it, or to notice it immediately if it stopped?

27. What causes the creaks and other noises we hear in a house, particularly in an old house, at night? Is it the bending of beams due to temperature differences, and, if so, how much bending is necessary to produce the creak? Why does this bending produce a sound, and why just these particular sounds? Why does it occur only rarely, if at all, in new houses, given that beams in new houses also bend due to temperature changes?

28. How exactly do the patches of black grease which football and baseball players put under their eyes, diminish the amount of sunlight reflected into the players' eyes? Anyone with the slightest knowledge of physics — i.e., anyone who understands the basic rules governing reflection of light from surfaces — must find this practice odd indeed.

A reader has responded, "I'm told it's to make it harder for the opposing team to follow the eyes of the player and so see what he's planning. Or maybe it looks scarier."

29. Why is it that, when we walk, the left arm moves in synchrony with the right leg, and vice versa? If we attempt to walk the other way, it feels, and looks, awkward. (Do not say, "It's a matter of balance," unless you can give a convincing argument why the one way clearly aids balance more than the other, and unless you can explain why it is not particularly awkward to walk, or run, with our hands in our pockets.)

30. Is it possible that the front tires of a car "remember" the way they were turned just prior to the car stopping? If we start to back out of a parking position, e.g., in a garage which is at an angle to the driveway, in which the wheels were left sharply turned to the right or left, we feel the steering wheel seeming to be guided correctly by the front wheels. Is this purely a matter of the

initial angle of the front wheels, or of spring mechanisms in the steering gear itself, or the fact the tires are made of rubber?

"Water has an astonishingly long 'memory'; circulatory movements will persist for hours, long after the water appears perfectly still." — Gardner, Martin, *The New Ambidextrous Universe*, W. H. Freeman and Company, N.Y., 1990, p. 50.

31. (A question from childhood): Is it possible for a person (child or adult) of average strength to pump himself up, over and around the horizontal support bar of a child's swing with no auxiliary push by another person, assuming that the swing is attached to the bar by ordinary metal chains? Answer must be derived from principles of physics. (My tentative answer: no, because the higher he pumps himself above the horizontal, i.e., such that the angle ABC, where A is a point directly under the swing at rest, B is the point on the horizontal bar directly above it, and C is the seat of the swing at the height of its backward motion — the more the angle ABC becomes greater than 90 degrees, the more rotational energy is lost due to the fact that the swing drops vertically at the start and end of its forward motion.)

32. (1) Why do many people bend their wrist down when they go to look at their wrist watch? (2) What, exactly, is the reason that many people wear their wrist watch with the face on the inside of the wrist rather than the outside? It cannot be a matter of protecting the watch, since there is far more risk of damage, e.g., when lifting things, with the watch on the inside.

33. Why doesn't someone train unskilled human beings to behave like robots, then provide them with robot suits and hire them out as the real thing? Consider that for, say, $10 worth of hamburgers, vegetables, and Coke a day, an adult human male can be maintained in a condition such that he is able to do light manual labor, e.g., carry things from point A to point B despite unpredictable obstacles such as other people, traffic, closed doors. No robot in existence at present, and none foreseen for the next, say, 10 years at least, can perform such tasks. Furthermore, the development costs of the human have already been taken care of (by evolution and the man's parent(s)); there is no purchase price; there is no storage cost (he pays for that himself, or else sleeps in the streets) — just $10 a day energy costs. Any entrepreneur who could train such a man to imitate the current conception of how a robot behaves, and talks, and who could come up with a body covering that would make him appear to be a real robot, would be on the road to riches.

"Remarkable how your body turns food into energy. With that efficiency, according to experts, if you were a car, you'd get 900 miles to the gallon." — Boyd, L. M., "The Grab Bag", *San Francisco Chronicle*, 9/13/92.

If this is correct, then certainly we should investigate the possibility of paying people in the ghettos for manually generating electrical power. Wheels with handles could be installed in walls along the street, with a mechanism such as is used in vending machines and slot machines, for payment. A person needing money could just walk up and turn the handle until s/he got too tired, or had earned enough for the time being.

34. Why is it that a man who works at a painfully boring job in an office, breaks into a sweat and becomes lightheaded if he doesn't eat a big lunch at exactly his accustomed time, and, in addition, needs junk food in the morning and afternoon (fig newtons, oreo cookies, sunflower seeds, wheat crackers), whereas, on weekends or when he takes a day off and can spend his time

doing what he wants, he can go the entire day on a peanut butter sandwich eaten at no particular time in early afternoon? In the second case, he is doing more physical *and* more mental work than in the former. What is it about boredom that seems to cause such an enormous consumption of energy?

35. Why do the wheels of a bicycle which is being transported on the back of a car, spin in one direction and at a fairly constant rate when the car is going at a given rate of speed? Why don't they spin now in one direction, now in another? Considering the uniformly curved surface of the bike tire and of the spokes, why should they spin at all? (The answer, "it's because of the wind", i.e., the slipstream, is not acceptable unless you can explain how the slipstream causes this behavior.)

36. If wind is the movement of air, why is it that the smell of perfume often lingers in the air at one place for many minutes on windy days?

37. How well engineered are trees? Why do the trunks and branches of each type of tree have the physical properties they do, e.g., density, rigidity, shape? In particular, why should branches bend in the wind? Why shouldn't they be perfectly rigid? (D'Arcy Thompson's classic, *On Growth and Form*, provides answers to some of these questions.)

38. Planted in the sidewalks of certain streets of Berkeley are trees from which a very fine mist descends during the summer and fall. I have never observed any sprinklers or other obvious sources of water in the vicinity. The phenomenon occurs during the driest times of the year. What is its cause?

39. Why, in a culture in which physical beauty was so admired, was Socrates apparently indifferent to his ugliness?

"It grieves me that Socrates, who was a perfect pattern of all great qualities, should, as reports say, have had so ugly a face and body, so out of keeping with the beauty of his soul, seeing how deeply he was enamoured of beauty, how infatuated by it! Nature did him an injustice.

"...Socrates said of his ugliness, that it would have betrayed an equal ugliness of soul if he had not corrected it by schooling. But in saying this, I believe that he was joking in his usual fashion. A soul as excellent as his never fashioned itself. " Montaigne, "On Physiognomy", in *Essays*, tr. J. M. Cohen, Penguin Books, Baltimore, Md., 1966, pp. 336-337.

40. Where do socks go when we lose them in the course of doing our laundry at a laundromat? Has anyone ever attempted to answer this question with a scientific investigation? Certainly the answer is not obvious to those of us who, throughout our lives, have exerted considerable effort to be sure we have left nothing behind in the various stages of the washing process. Why do we so seldom lose both socks of a pair, or is it that we often do, but seldom notice it as much as when we only lose one?

41. A wind-up clock, e.g., an alarm clock, which has stopped, can usually be restarted simply by shaking it a few times, a phenomenon well-known to magicians, e.g., Uri Geller, who, in the 1970's, amazed unsophisticated radio audiences by exploiting this phenomenon. But what is the physical explanation? Certainly the shaking motion does not increase the potential energy of the

mainspring. Furthermore, the phenomenon can be repeated after the clock has "run down" again. What is the theoretical limit on the number of times the clock can be restarted? One can imagine a feedback device which, when the clock stopped, would mechanically shake it until it had restarted again. (But then, why not use this mechanical energy to rewind the clock?)

42. Why is there rotation in the universe? Surely it must strike us as odd that, in a universe in which there are so many one-way (i.e., entropic) phenomena — rust, decay, dissolution — not to mention other statistical and probablistic phenomena, there is also something as regular and precise as *rotation*, or more generally, periodic activity, including waves. Could there be a universe in which such periodic activity were absent — in which things weren't round, didn't spin, rotate, revolve, repeat?

43. Before dictionaries existed, i.e., before the late 1600's (Dr. Johnson's was not the first), how did people find the meaning of words they didn't know? If you think this an "obvious" question (meaning, a question which cannot have a very interesting answer), ask yourself how you would go about finding the meaning of a word if no dictionaries existed now. You might reply that the average person confronts far more new words during a lifetime in the 20th century than he or she did in the 17th, so that this second question is not a legitimate one, but, nevertheless, I think the answer to the first would reveal far more than we suspect about how books were used (and by whom) in these earlier times, and about how language was regarded.

44. Why, when we yawn, do the frequencies of sounds seem to increase?

45. What was the mean time per genuflection in ancient China and Japan?

46. Why, instead of launching rockets from earth, and thereby having to build them big enough to contain all the fuel needed to propel them into the upper atmosphere — why don't we instead use balloons to raise them to the upper atmosphere, and then use rocket fuel simply to place them into orbit? The rocket could be suspended at the center of a donut-shaped balloon, for example.

47. Sometimes, after we have spent several minutes adjusting a TV or FM antenna in order to improve the reception of a weak station, and then have given up, the reception seems to improve by itself —as though the set, having understood what we want, had finished the job for us. Is this merely a visual and auditory illusion, or does it actually occur, and if so, why?

48. Every message in a binary code — i.e., in a code made up of just two symbols, like Morse code with its dots and dashes — that a recipient receives, is really two messages: the message that the sender sent, and the message, "The transmitter and receiver are working". Similarly, every *absence* of a message is *possibly* two messages: "The transmitter has nothing to send", and "The transmitter is broken". What we would like, of course, is to eliminate the unnecessary message in the first case, and the confusion in the second.

One way to do this is simple: first, have the binary code consist of the two signals, Transmitter On (e.g., a fixed frequency tone), and Transmitter Off (nothing transmitted). Second, let Transmitter On be the normal "rest" condition for the transmitter. I.e., when there is nothing to transmit, we hear the continuous tone. This, of course, transmits the message, "The transmitter is

working," and a long silence transmits the message, "The transmitter is broken". Third, let any message be composed of Off's and On's of fixed length. Fourth, let any message be preceded by a unique sequence of Off's and On's each of different length than those in an actual message, and let each message be ended by a similar, unique sequence.

The only problem is that if the transmitter is jammed on, so that it cannot transmit Transmitter Off signals, we will never know it. So the question is, Is it possible to design one or more codes running on one or more transmitters, so that the ensemble is efficient and unambiguous in the way described above for all possible transmitter errors?

(Part of the unnecessary mystification in G. Spencer-Brown's *Laws of Form* (E.P. Dutton, N.Y., 1979.), which describes a new algebra of logic, is due to the author's use of the background as a logical symbol, as in our message transmitting system above.)

In discussing this question with friends, two ideas emerged: first, that a much better system for keeping tabs on the status of each transmitter (and receiver) would be for one transmitter to transmit a simple addition problem every fifteen minutes or so when other transmissions weren't taking place, the numbers to be selected at random each time. The receiving station would then compute the answer and transmit it back. The sending station would then transmit the answer back as confirmation. Then the receiving station would repeat the process, etc.

The second idea was that this immediately brings up a problem if the process is carried out by computer. In that case, one station could become unable to do anything *but* maintain the status checks, so that the humans could not issue a call for help. If the humans at that station were unable to shut off the computer, then the humans at the other station would simply assume those at the first station had nothing to say. So, it seems necessary that humans perform the ongoing status checks.

Probably the best resolution of these difficulties would be to decide on any of the schemes, and then have it implemented by several identical transmitters and receivers so that the probability of all of them being broken in an undetectable way at any given time would be extremely small.

49. How many pounds of feces and how many gallons of urine: does each human being/all human beings relieve himself/themselves of (a) each day? (b) in a lifetime?

50. How many gallons of human sperm do all human males on earth ejaculate each day? (The gene pool)

"Sexual intercourse occurs more than 100 million times daily around the world, resulting in nearly 1 million conceptions and about 350,000 cases of sexually transmitted diseases, the World Health Organization said today." —- *San Francisco Chronicle*, June 25, 1992, p. 1.

Assuming that each male, on average, ejaculates at least 2 oz. of sperm per orgasm (we assume that the number of males suffering from orgasmic dysfunction is negligibly small), then all human males ejaculate at least

(100,000,000 times 2 oz. sperm per day) times 1 gal./(128 oz.) =
1,562,500 gal./day.

51. What is the smallest piece of land that international law allows to be called a "country" and how was this minimum arrived at?

52. What crimes have the greatest cost/effectiveness ratio, i.e., what crimes are most worth committing, taking into account the average amount of money gained, the chances of being caught, and the average prison sentence? The posing of this single question to ghetto high school students, and then the guiding of their attempts to find out the right answer, would probably do more to develop their intellectual skills, and more to aid them in making rational career choices, than half a dozen of the courses they currently take.

53. Is it possible to exchange the contents of two cups of hot coffee without using a third cup, and if so, how? There seem to be a number of ways:

(A) Put both cups in a freezer. When the coffee has frozen, remove each clump of coffee, put them on a table, then put each into the other cup. Allow room temperature to melt the clumps. Then heat the resulting liquid.

(B) After practicing with cups of water, toss each cup's contents into the air and catch with the other cup.

(C) Find two very long, parallel, drainage paths or pipes. Simultaneously pour the contents of one cup into one path or pipe, and the contents of the other into the other, then run down to the other end of the path or pipe and catch the outflow in the opposite cup.

(D) With two tubes and membranes, e.g., Saran wrap, put a membrane on the surface of the coffee in each cup. Then use the tubes to siphon coffee from beneath the membrane in one cup to the space above the membrane in the other. (Suggested by a co-worker.)

(E) On a very large table, pour out the contents of each cup, making sure that the resulting puddles do not run into each other. Use a rag or knife or other tool to gather each puddle into the opposite cup.

54. And what *does* make the water go around when it drains in the bathtub or sink or toilet? Get any college physics textbook and work through the formulas for the Coriolis effect — which accounts for the vortex patterns of the weather, including hurricanes — and you will easily convince yourself that the same forces are far too weak to exert such a strong effect over the short distances involved in tubs, sinks, and toilets. Some obvious experiments suggest themselves: (1) Beginning with an empty tub, allow only a very little water to enter the tub and drain, then gradually increase the amount and observe how the flow pattern changes — i.e., run the normal course of events in reverse; (2) Try different sizes of round drain holes, ranging from, say, the diameter of a pencil up to, say, a diameter of two inches; (3) Do the equivalent with square drain holes; (4) Find an expert on fluid mechanics who is willing to talk to you, and discuss the possibility that a circular flow may, in fact, be the most efficient way for the typical quantities of water involved, to flow through a circular opening — for the molecules to "line up".

This subject is discussed in Martin Gardner's *The New Ambidexterous Universe* (W. H. Freeman and Company, N.Y., 1990, pp. 48-51). He concludes, "No one doubts that the Coriolis effect is responsible for the strong tendency of cyclones and tornadoes to spin counterclockwise in the northern half of the globe and to go widdershins in the other half...As for bathtub vortices, the question is still controversial, calling for bigger and better-controlled tubs before any final verdict can be rendered." (p. 51)

55. How much information does a bit really represent, given that, e.g., a 0 can refer to an entire book, and a 1 to another book?

Possible answer:

First, we must keep in mind that, according to a standard definition, one bit of information resolves the uncertainty between two equally likely possibilities.

Second, consider two different situations: in Situation 1, two people each have two online books in their computer memories, say, *Webster's Collegiate Dictionary* and the *Bible*. Each night, person A reads exactly one of these books. In the morning person B asks him, "Which of the two books did you read last night?" Person A replies with a 0 if he read the *Dictionary*, and a 1 if he read the *Bible*. If there is no pattern to person A's readings, i.e., if it is equally likely, on any given night, that he reads the *Dictionary* or the *Bible*, then when he replies to person B's question, he is giving him one bit of information.

Now suppose, following the above question, each morning person B asks, "What is the *n*th binary digit in the representation of the book you read last night?" Assume that both persons have identical representations of these books, say, in uncompressed ASCII. Assume *n* can vary from morning to morning, but is always within the range of the total number of bits in the book in question as stored on the respective computers.

Regardless of person A's answer (0 or 1), he provides person B with no new information in his answer, since person B can simply answer the question by looking at the representation of the book in his own computer memory. Person B has no uncertainty about the answer to the question when he asks it.

In Situation 2, assume that person B does *not* have copies of the two books. Furthermore, assume he knows nothing about their contents, except that, perhaps, one is a history and the other a novel. Now, as in Situation 1, he gets one bit of information via person A's reply to his first question. However, the first time for each *n*, he gets another bit of information via person A's reply to his second question. (We here ignore the fact that alphabetical characters do not occur randomly in English.) In other words, the one bit's worth of information person B gets in reply to his first question can in no way be said to "represent" the (contents of the) books in question.

A bit is a bit is a bit.

56. How exactly do the idle affluent spend their time? How do they occupy themselves, what do they say to those they live with? The question is prompted by weekend walks in upper class communities like Kensington, Calif. (near Berkeley), in which one can't help sensing that, inside some of those houses set far back from the street and deep among trees, there are people who do not go to work as you and I do. Minute by minute, hour by hour, what do they say to each other?

57. A question to be answered on whatever level you choose: are there circumstances in which something is fixed by making another, seemingly unrelated part, "better"? For example, a man decides to improve the appearance of his back yard. He cleans out the garage, rakes the leaves, cuts the grass, starts watering it regularly, plants a flower garden — and suddenly the lights in the garage start working again. Or a piece of machinery breaks down. A person who enjoys working with machinery begins by polishing the outside, then opening the cover, carefully cleaning the visible parts on the inside — in other words, he begins *caring* for it. Suddenly, the machine is working again. Or neighbors start making a habit of picking up all the papers on their street — and suddenly the crime rate drops.

58. Was the following a psychic experience? A student who had rented a room in my house left several potted house plants, one a gift from her boyfriend, for me to keep while she went to

Europe and then to her parents' house in Pennsylvania for the summer. She planned to return to the Bay Area in the fall, and work in San Francisco while she waited to be accepted in law school.

At first I kept the plants where they had been — on a chest-of-drawers next to a window in her room. In accordance with her instructions, I watered them every three days. However, three of them started to wilt and so, thinking it was because the sunlight was too strong, and possibly because they needed fresh air, I moved them into the back yard: specifically, to a board lying on the ground next to my garage, where they would be shaded most of the day.

One day she called and said she was planning to be in Berkeley on a certain day, would I mind if she dropped by. I of course said not at all. She arrived, took a few items from her room. I showed her where I had put the plants, and explained why. She said she hadn't found an apartment yet, would let me know when she did.

One afternoon about a week or so later, as I was watering the grass, I suddenly realized the plants were gone.

I looked all around the yard and in all likely places I might have put them in the house but they were nowhere to be found. In the past, the apartment building behind the house had been the residence of various burglars, including one entire family apparently raising their kids for this occupation. Four rooms had a view of my back yard, including of the side of the garage. I assumed that someone had decided their apartment would look nicer with a few potted plants, and had come over and taken my former tenant's.

I was angry at myself for having failed at such a simple responsibility — taking care of a few plants for someone who had a sentimental attachment to at least one of them — and furious at having to confront again this fact of modern urban life, namely, that people, in particular lower class people, will steal anything from their neighbors.

I posted a notice in the apartment building foyer offering $25 for the return of the plants, no questions asked, no tricks. The money would be left in an envelope on the board where the plants had been, once they were returned. I fully intended to keep my word.

No plants were returned. At one point I talked to a guy who was sweeping the garage below the building, told him what had happened. He said, apparently sincerely, that he would keep an eye out.

Each day when I went into the back yard and saw the empty space where the plants had been, I felt anger and disgust and a strong desire to move away to a place where your neighbors could at least be trusted. *And yet at least once a day, the clear, distinct thought came into my mind that they would be returned.* I wouldn't be exaggerating if I said that at times it was a conviction — or, rather, an inexplicable *confidence* — that they would be returned. Yet I hated the fact that I had these thoughts — that I allowed my useless yearning for the plants' return to express itself in this way — and so I deliberately did not write down that I had the conviction, much less tell anyone. It was my revenge against my softness.

After a week or so, I called the student's parents. I asked them to tell their daughter the sad news the next time she called. Of course I insisted on paying for replacements.

One Sunday afternoon several weeks later, the phone rang. It was the student. She had just found an apartment in San Francisco, and so had been able to call her parents. They told her what had happened. She was terribly sorry for my concern, because the plants were safe. She had picked them up but hadn't left a note because she didn't have pencil and paper. Then she forgot to call and tell me.

Never before when I have lost something, or had it stolen, have I ever had a conviction that it would be returned. I have never had any experience in my life which I thought for a moment

might have been psychic. I do not believe that anything like convincing scientific evidence of psychic phenomena has ever been presented. The question is, what could have induced my conviction that the plants would be returned? Note that, in fact, the conviction was slightly wrong, since they were never *returned*, they simply wound up in the hands of their rightful owner. Had I without realizing it detected a trace of the student's bath soap in the air? (She never wore perfume.) Had she remarked once, and had I forgotten it, that she would come and pick up the plants? Are there other questions that could be asked?

59. Why do roses have thorns? Don't say "For protection" unless you also explain why most other plants do not need that protection. Why do some of the thorns have barbs, making it difficult to extricate one's clothing once it has been caught? What evolutionary advantage is there to thorns with barbs, as opposed to thorns that merely have sharp points?

60. Is there any chance, even the slightest, that plants and trees are transmitters of electromagnetic waves? We know that the nervous systems of the higher animals are electrochemical and hence may radiate electromagnetic waves some small distance. What about plants? Of course the next question must be, What good would it do plants if they were able to communicate (a) with each other (b) with animals (c) with other creatures?

61. If ballet dancers could control the force of gravity in which they danced, what force would most of them select? Zero? That of the moon? The present one on earth? Something in-between? Suppose they could vary the force during each dance?

62. Surely among the most ridiculous questions we can possibly think up is, "Why don't we use metal (or ceramic) logs in a fireplace?" But it may not be so ridiculous after all, once we realize that such logs are capable of storing heat, which they can then radiate back into the room. So consider the extremes: use metal (or ceramic) logs only. Well, not too good, since they don't burn, hence we won't have a fire to create the heat. All right, how about no metal or ceramic logs, just wood. Well, that's fine as far as it goes, but now we don't have any means of storing heat, apart from the andirons and the back of the fireplace. Somewhere in between is the optimum. How do we find what it is?

Is significantly more heat radiated from a fireplace if we place a mirror in the back of it?

63. Why, when Artificial Intelligence researchers make robots, do they always try to give them something approximating a faculty of sight? Blind persons certainly demonstrate intelligent behavior, and they do it without this faculty. Instead of trying to solve the very difficult problem of processing visual images, why don't the researchers try to solve the much easier problem of enabling the robot to orient itself solely by means of the equivalent of a blind person's cane? Using this cane-like probe to make contact with walls, the robot could build a map of the rooms and corridors in which it was operating, and thus find its way to any prescribed goal.

64. Why don't Artificial Intelligence researchers have people attempt to imitate robots in order to, possibly, learn how to program robots?

65. Why do we like flowers? Don't say "because they are beautiful"! That is no answer at all. Why does the smell of some flowers, e.g., certain roses, seem to us the very definition of perfec-

tion? Try to answer the question in terms of evolution. Is it because we share ancestry with the bees?

66. Why is drumming so common in human societies? What does it accomplish that cannot be accomplished without it?

67. Why is wine, and indeed all alcohol, so unappealing in the morning to persons who otherwise enjoy drinking these beverages? (I exclude alcoholics from consideration here.) What chemical changes take place in our taste buds and saliva that make alcoholic beverages more appealing in the afternoon and evening?

68. "In an age of misfits, he was a misfit."— what does that mean?

69. How is it that year in, year out, people are found to do the jobs that no one ever thinks about doing, much less wants to do — sewer workers, coroners, grave diggers? How do people go about deciding to work at one of these jobs?

70. When students throw their hats into the air at graduation ceremonies at military academies, do they try to throw them straight up so they can get their own back? If not, what do they do? Forget about the old hat and buy a new one? Or not buy a new one? What does the academy do with all the unclaimed hats? Or is each student's name sewn inside each one?

71. Do spies have a code for "I forgot the code"? If so, what do they do if they forget that code? How exactly is a new code transmitted to spies in the field?

72. Where do smells go, e.g., in the bathroom? Do the smell particles gradually sink into the dust or onto the floor and other flat surfaces? If so, then why don't we detect them again when the room is swept?

73. Why hasn't the Army invented a simple, cheap mine exploder? Many possible designs suggest themselves: an easily replaceable heavy cylinder, guided by remote control, to roll over the ground. Or a totally expendable device, e.g., a cylinder made of rolled-up newspapers with a cement core. Or a special fire pattern for machine guns. Or a sonic device.

74. Has anyone experimented with using explosions to stop tornadoes? If so, what were the results, and if not, why not?

75. Why aren't new houses in earthquake country built to float on, or above, the land? For example, they could be built as the superstructures of boats floating in a permanent pool of water contained in an earthquake-resistant concrete chamber, or they could be built on top of large, inflated cushions, or on top of large uninflated cushions which would only inflate (thus pushing up the house above the shaking ground) during an earthquake.

76. Why do sweaty armpits sometimes smell like chicken soup?

77. Why do numerous sparks sometimes suddenly appear spontaneously in mid-air when a fire is burning in a fireplace?

78. If the length of time in a day, hence in a week, month, year, were gradually shortened, with the proportion of daylight remaining the same throughout the year, would the life cycles of plants increase correspondingly? Up to what point?

79. Sometimes, when confronting a problem, e.g., the growth of mold on rose leaves, we think of a possible solution, e.g., spraying the plants with peanut oil. Later, we discover that spraying the plants with oil (though not peanut oil) is in fact one of the standard attempts to solve the problem. Why is it that we think of such potential solutions in the first place, and not of others? Why does, in this case, spraying with oil, occur to us? Is there some deep, underlying, logic to the potential solutions we come up with when we have only the most superficial knowledge of the cause of the problem? This is ultimately a question about why primitive man arrived at the solutions he did for treating his own diseases, and those of animals, and of the plants he farmed.

80. Why wouldn't it be at least a partial solution to the loss of ozone in the atmosphere to send up rockets loaded with liquid ozone and then release it? Has anyone done the calculations as to how much liquid ozone, its volume and weight, would be required to make a significant improvement in the amount of ozone in the "hole" over Antarctica?

81. What would it feel like to drive down a road in which road and telephone poles and trees near the road "moved" as they normally do when we are inside a moving vehicle — i.e., the size of distant objects grew larger as we approached — but beyond a certain distance from the car, and definitely in the distance straight ahead, the change in the size of objects was just the opposite of what it should be, i.e., the objects got progressively *smaller* as we approached them? This effect could be achieved, of course, with TV or movie animation.

82. I have an old umbrella with a hole in the fabric about 1/2-inch wide at its widest point. Yet, even in moderately heavy rain, I have yet to see a single drop come through the hole. So the question is: what is the largest mesh that an umbrella material could have without allowing any water to come through in a moderately heavy rain? What shape should the openings in the mesh be?

83. Why are we almost always bored when someone tells us about a dream they had? Is it that most people simply lack the skill required to describe their dreams accurately, just as most people lack the skill to tell jokes well? Or is it a matter of literary form? Imagine Kafka's "Metamorphosis" told as a dream: "Last night I had this nightmare in which I woke up to find that I was a gigantic insect. I was lying on my back, and when I lifted my head I could see that I had a sort of dome-like brown belly that was divided into stiff arched segments..." Even if every detail were the same as in the story, most listeners I think would find the whole thing rather boring, even silly at times. Yet the original is one of the most morbidly unsettling stories in world literature.

84. We often read, in the Bible and elsewhere in ancient history, that this or that temple "was burned". But temples were made of stone. How could they be burned? Even if all the cloth hangings and wooden altars were burned, why would that in any way render the temple unfit for

immediate repair and refurbishing? Or were there rules within the ancient religions that a temple must be abandoned once any harm had been done to it?

85. Why don't people who snore, wake themselves up?

"There ain't no way to find out why a snorer can't hear himself snore." — Twain, Mark, *Tom Sawyer Abroad*

86. Why can wooden boats sink?

87. Why does a fireplace screen prevent a significant amount of heat from passing through it into the surrounding room? Is it that the screen "absorbs" heat until it is at the same temperature as the air emerging from the fireplace? But from then on the amount of heat emerging through the screen should be the same as the amount of heat emerging when there is no screen. Is that true?

88. Why do so many of us hate people who talk on cell phones in public? If you answer that the reason is that the talk is always so vapid, then why don't we hate people who talk in restaurants, where the talk is equally vapid? Is it that we can't stand the hypocrisy of someone who on the one hand clearly wants to have a private conversation, but who on the other wants all the world to know it and admire them for being able to do so using the latest high tech apparatus?

89. How do native-born Chinese who have eaten with chopstocks until, say, at least their teenage years, feel about Western knives, forks, and spoons when they first attempt to use them? Do these utensils seem "primitive" and if so, in what way? (What can you do with chopsticks that you can't do with knife, fork, and spoon?)

90. What accounts for the lightness of the thistle-like seeds that can be seen floating through the air on summer days in many parts of the country? We are accustomed to think of the ability to become airborne as being due either to wings (man-made or natural) or to a gas (e.g., hydrogen, helium) or to rising hot air (e.g., in a hot-air balloon). None of these account for the buoyancy of these seeds. Can the seeds' design be adapted for man-carrying aircraft?

91. It is well-known that susceptibility to cancer varies across the population. It is also well-known that a body's immune system is able to stop at least some cancers before they are far advanced. So the question is: what research has been done to determine the effectiveness of blood transfusions from persons with high cancer resistance (as measured not only by their own cancer-free state, but also by the low cancer rate in ancestors and relatives) to persons with high cancer susceptibility (again, as measured by cancer rate in ancestors and relatives)? What have been some of the outcomes of this research? Why is, or is not, this form of immunization a good idea for preventing cancer?

Two answers (supplied by a famous surgeon): the body will tend to reject the very antibodies that are new and that might fight the disease; also, transfusions do not remain in the blood for a long time.

92. Why, when birds walk, do their heads go back and forth?

93. Why do birds sing in the morning before dawn? What wakes them up? How much sleep does a typical songbird get? Do birds dream?

94. Why does a pot grow much hotter when it is heated with nothing inside it, than when it is heated with something inside? Is the answer related to the reason why electrical circuits and machines always need to run "under a load"?

95. What is the information content of the sound of raindrops in a gutter or on an awning? This is not a question about what message Nature might be transmitting to us via its own Morse Code, but a question related to Chaitin's algorithmic information theory: we are asking what the shortest description — the shortest program — is that can produce the raindrop pattern. (The briefer the description (the program) the lower the information content.)

96 Why don't ants stop coming to your kitchen sink when you kill lots of them (assuming the sink has been cleaned thoroughly)? How many ants — what percentage of the ant colony's population — would you have to kill for the ants to give up and go elewhere?

97. Why can't we develop microplants to absorb carbon dioxide? The plants would be a dust that was sprinkled in the air, e.g., from planes or satellites. When they had exhausted all the carbon dioxide in their immediate vicinity, they would die.

98. Is there such a thing as a high-fidelity recording of the noise in a recording? What would a low-fidelity recording of the same, sound like?

99. General George Patton, the famous WW II general, once remarked, "Fixed fortifications are a monument to the stupidity of mankind." In Iraq in late 2004 we suffered losses of at least 49 killed and 387 wounded trying to take the city of Faluja . Why wouldn't it have been a better idea simply to surround the city, cut off electricity and oil and gas supplies, and water if possible, and just starve the insurgents out?

100. Why does freezing something slow down the movement of its atoms or molecules?

101. Why does your heart beat considerably faster when you are sitting in a hot tub?

102. Why not put lightweight helium tanks or balloons in the wings and fuselages of airplanes, so that they would weigh less in air, and require smaller engines, or at least lower fuel-consumption?

103. How exactly was each myth of the ancient Greeks created? How was it put into circulation?

104. Which is more stable: a person on a motionless surfboard in still water, or a person on a rapidly moving surfboard in still water? (Note that there is no gyroscopic effect in the second case, as there is, e.g., in the case of a moving bicycle.)

105. Why is a fire in a fireplace so interesting? Why do many people find it soothing to simply look at the flames and listen to the sounds of the wood burning?

106. How hot should hot sauce be? If the sauce is very hot, then each customer will only require a drop or two, with the result that little of the sauce will be sold. The milder it is, the more that customers will need to use, although the less stimulating it will be to their taste buds. So how hot should hot sauce be to yield maximum profits?

107. One of the most commonly heard arguments against using refined sugar is that it "has no nutrients", the implication being that this is what causes all the harm that it does to the body. But every moment that we are not eating or drinking, we are in fact eating or drinking a food that has no nutrients (the null food), and yet no one uses that fact to argue that we should be eating or drinking all the time.

108. We often see a spider web strung across a path — sometimes just one silken strand. How does the spider manage this? Does he "simply" fasten one end of the strand to a branch, then go back to the trunk of the tree or stem of the plant, unreeling the strand from his body as he goes, walk down the trunk or stem, then walk to the path, continuing to unreel the strand as he goes, cross the path, walk to the appropriate tree or plant on the other side, walk up it, and fasten the other end to a branch?

109. Why are some, but not all, trees deciduous? This is not a request for a biochemical explanation of why leaves fall, but for a convincing argument (1) as to the evolutionary advantages of having leaves that fall, given that it certainly seems inefficient for trees to have to regrow all those leaves instead of keeping the ones that were already there; (2) as to why the advantages did not apply to all trees.

110. In regions with a great risk of wildfires, why isn't the fire department called *before* the fires break out? Why doesn't the fire department (1) review data showing where most fires start; (2) patrol those areas night and day, possibly with small tank trucks capable of putting out fires soon after they start? Volunteers could play an important role here. (3) have tanker planes loaded with water fly over the most fire-prone areas *each day* or every few days and dump water onto the forests. (A fireman in my town rejected this idea on the grounds that all that water would only increase the growth of trees.)

What would be the cost of these patrols and aerial dumpings of water in comparison with the cost of fighting major fires, rebuilding the homes and other buildings that are destroyed and replanting the trees?

In regions with a great risk of wildfires caused by lightning, why aren't lightning towers put up so that at least some bolts of lightning strike them, instead of trees? The towers would have to be taller than the tallest trees. The idea here is the same as installing lightning rods on the sides of house chimneys, so that bolts of lightning strike these rods, instead of the houses themselves.

Why haven't lightning towers at least been tested by now?

And why hasn't there been an ongoing practice of controlled burning in forests to get rid of grass and leaves and underbrush, in order to diminish damage to trees by fires in these areas? Why haven't heavily-forested states, such as California, carried on this practice for decades?

111. Why, at least prior to the invention of sun glasses, did infantries not use mirrors to blind enemy soldiers?

112. The Richter Scale for measuring the energy of earthquakes is logarithmic to base 32. This means that, e.g., an earthquake that is 4.0 on the Richter Scale has 32 times the energy of one that measures 3.0.

Persons living in earthquake country, where small earthquakes are frequent, often hope that the small ones will somehow "add up to" the feared Big One, and thus prevent the Big One from occurring. But if the Big One would be, say, at least 7.0 on the Richter Scale, this would mean there would have to be over 900 (32×32) 5.0 earthquakes to equal the energy of the 7.0 'quake. And so seismologists discourage such wishful thinking.

But is it possible that seismologists are overlooking what we might call the rock-on-the-inclined-plane phenomenon? Imagine a large, flat rock on an inclined plane — say, a board at an an angle. When the rock starts to slide, it will soon gain a great deal of kinetic energy. But suppose that very small changes in the height of the angle of the inclined plane are sufficient to prevent it from sliding. We have not changed the energy the rock would have if released, we have simply kept the trigger below the threshhold that would cause the rock to slide. Is it possible that a similar phenomenon prevents at least some major earthquakes?

113. Where does house dust come from? Even if you live in an area with relatively good air quality, such as Berkeley, CA, and there is no construction going on in the vicinity, and walls and ceiling are plaster or wallboard, it is remarkable the quantities of dust that accumulate on unswept parts of floors and undusted bookshelves over periods of, say, a few months. Is the reason that the house is old (about 100 years in the present case)? But then why hasn't all the dust fallen long ago?

114. It appears that adding broccoli to the boiling water in which one is cooking spaghetti, shortens the cooking time for the spaghetti. Is this true, and if so, what is the reason?

115. Military leaders often say that urban fighting is one of the most difficult kinds of military operation. Why not simply surround the city, or part of the city, in which the enemy is located, cut off water and power, and simply wait until the enemy tries to fight its way out, in which case it is easily stopped, or wait until it surrenders, or dies of starvation? As long as there is no chance of the enemy being re-supplied from the air (and there wasn't in Iraq) and as long as electronic devices can be buried in the soil to detect sounds of tunnelling (and they can, since the technology has existed for years), and as long as an ample quantity of infrared viewing devices are available to detect night activity on the part of the enemy, it is hard to imagine counterarguments to this strategy, other than the boredom of the troops manning the periphery.

116. Why aren't there horse races without jockeys?

117. As global warming increases, there are parts of the country, e.g., the San Francisco Bay Area, in which there is almost no discernible change in daily temperature in at least the early weeks of the fall season — perhaps a few noticeably cooler days, but that is all. Yet the leaves of some trees turn color as they always did in the past. What is the reason? Have we been wrong in

thinking that cooler temperatures are the cause of the leaves turning? Is there a biological clock in these trees that is not sensitive to temperature change?

118. How many trees would be saved annually if virtually all toilet paper were made from recycled paper? How much carbon would these trees remove from the atmosphere?

119. What is the evolutinary advantage to the mosquito that its bite causes itching?

120. Why do lower-class old men almost always wear white socks?

121. Why do the inside and outside of car windows become fogged on sufficiently cold nights, but the side mirrors outside do not?

122. When we are sick, e.g., with a bad cold, we lose much of our appetite. Why can't the chemical changes in the stomach and elsewhere that cause this, be the basis for a pill that would reduce appetite even in healthy people, and thus help them to lose weight?

123. Why doesn't cloud seeding, to produce rain, work all the time?

124. It takes a lot of energy to heat a steel or iron ball to a given temperature, but thereafter it seems to take less energy to keep the ball at that temperature. Can this be the basis for a heating device?

125. Why have coffee bags never achieved the popularity of tea bags?

126. Do birds dream?

127. Do flies sleep?

128. Is it (a) gauche or (b) sophisticated to put ketchup on fried tomatoes?

129. Quite often, during the showing of an old film on TV, the movements of the mouth of a speaker, and the words spoken, are not synchronous. One lags the other. What causes this? Why is it allowed to occur?

130. What's in it for the cancer cells if the patient dies? Or is that simply an unavoidable consequence of a disease that destroys the normal functioning of an increasing number of body cells? But why didn't evolution evolve a disease that only destroys the normal functioning of a sufficiently small number of cells so that the patient lives to a ripe old age?

131. Is it meaningful to speak of an ailing rose bush as having one foot in the grave?

132. Why aren't soldiers trained to *routinely* walk and run in a crouch, so that they present a smaller target to the enemy?

Why did Allied generals in World War I think that the best way to attack a line of German machine-guns in barren land, was for solders to run erect toward the line, thus presenting the largest possible target to enemy fire?

133. When fruit flies land on fly paper, they struggle for a few seconds, then become motionless. Does fly paper kill that quickly — and solely through the flies' feet? If so, how, and if not, why don't the flies continue to struggle until their strength wears out, which would certainly seem to be several minutes at least?

134. Why don't engineers put, in each satellite, a small explosive that can be remotely detonated from earth, thus eliminating the problem of space junk? Why wasn't this done starting with the very first satellites?

135. When we see photographs of distant galaxies, we are told that the dust-like stuff that is often present is — dust and gas. But how is this believable? At the extraordinary distances of the galaxies, dust and gas would be invisible. Dust would not look the same as it does in, say, a dust storm in the desert. Even if cosmologists mean by "dust", objects the size of large boulders, we still couldn't see it.

136. Where do birds who live in towns and small cities, sleep?

137. Why didn't the Romans realize that if their language, Latin, were weakly-inflected, or not inflected at all — that is, words had few or no endings to indicate grammatical function — it would be much easier to learn and to use?

138. Why is it that a structure that is specifically designed for looking out of — for seeing from — is called a "blind"?

139. Is there a clever way, using a minimum of materials, to prevent a tree, say, 15 feet tall, from falling over after its roots have become too weak to hold it vertically? An obvious first answer is by the use of three equally-spaced guy ropes attached to large pegs hammered into the ground, but this is unsightly, and an inconvenience to moving around in the yard. A second answer is to surround the trunk of the tree up to,, say, five feet or so, with long thin boards driven deep into the ground, but this may not be sufficient to support the tree in a strong wind. What is wanted is a structure having the property that, when the trunk starts to lean in one direction, there is automatically a force pulling it in the opposite direction.

140. Why don't residents in flood-prone areas, simply store sandbags already filled with sand, in their houses, or in small storage units in the neighborhoods?

141. Why do infants like to drop things onto the floor when they are sitting in their high chair? Is it just because it is amusing to make mommy pick up the things? Is it an attempt to learn about gravity?

142. Why would aliens design some of their space-ships in the form of a disk (flying saucers)?. Does the interior of the ship pivot about the center, so that the pilot is always facing in the

direction of movement? Or is there a fixed front? But then what is the value of the disk shape? One answer might be that, unlike aircraft on earth, the ships do not need the atmosphere in order to remain aloft — they do not "fly". Instead, perhaps, they have a propulsion system that enables them to move in any arbitrary direction.

143. Can anything be done to lift Haiti out of its abject poverty? I am pessimistic about the answer, because here we have an island populated by ignorant blacks laboring under the usual black loser culture, with the added calamities of not-infrequent earthquakes and hurricanes. What would the Israelis do if they found themselves suddenly condemned to live in Haiti?

144. In November, 2017, I scattered moth balls in the attic of my house in order to drive away rats and mice. That seemed to work. But within a day or so, and for weeks thereafter, the smell of moth balls was noticeable in isolated locations in the house, e.g., in the downstairs front hallway, next to the front door, in a storage cabinet next to the kitchen. The trapdoor leading to the attic had been closed immediately after the moth balls had been scattered. There are no air shafts between the attic and the lower floors. How could the smells travel to such specific locations? The storage cabinet had plaster walls and ceiling and a wooden floor, with no openings of any kind except for the door.

Because some of the chemicals in moth balls were found to be carcinogenic, modern moth balls are different from the ones I used in 2017. They seem to be less effective. The only other smells that I have heard of as being at least somewhat effective against mice are peppermint and tea tree.

Why haven't devices been designed that, when placed in the attic, can, via the pressing of a button in a room in the house, emit a sequence of sounds known to drive mice away?

A means of dealing with the the presence of mice that I have found to be occasionally effective is ear plugs.

I should mention that I cannot bring myself to kill mice with traps.

145. Will periodic rubbing of the eyes help to lower the ocular pressure of persons suffering from persistent high ocular pressure? (Certain eye drops lower the pressure in many, but not all, cases. If the pressure remains too high, blindness results (glaucoma). The high pressure is a result of inadequate drainage of ocular fluids via Schlemm's canal.)

146. Why aren't reservoirs dug in areas of frequent flooding, into which at least some of the flood waters can be pumped? Why aren't pipes used to carry water from areas of frequent flooding, to drought areas?

147. As anyone knows who orders oatmeal in a restaurant, it takes a long time indeed for the oatmeal to cool to a temperature at which it is edible.

So why not use oatmeal as insulation in houses? In winter, on cold days, it could be electrically heated, and then, with the electric heating turned off, it would keep the house warm for a considerable time at no cost.

The reader will find other interesting questions (and answers) in the series of books by David Feldman, including *Imponderables*, *Why Do Clocks Run Clockwise and Other Imponderables*, *Who Put the Butter in Butterfly? and Other Fearless Investigations into Our Illogical Language*,

Why Do Dogs Have Wet Noses? and Other Imponderables of Everyday Life, and *Do Penguins Have Knees?*

Reading

George Bernard Shaw once remarked that he couldn't remember a time when he couldn't read, but most of us can't remember a time when we couldn't do *anything* we have learned to do well. We may have memories of a time which we know preceded the time we were able to do the thing well, but we don't remember what it was like not to be able to do the thing. What was it like not to know where you lived, or not to be able to count, or add or subtract, or drive a car, or, for that matter, to talk?

In "Spiegelgeschichte" ("Mirror Tale"), Ilse Eichinger tells a character's life story in reverse, from death back to birth. As the character moves backward through childhood, her author says to her:

"Die fremden Sprachen hast du schon gelernt, doch so leicht bleibt es nicht. Deine eigene Sprache is viel schwerer. Noch schwerer wird es sein, lesen und schreiben zu lernen, doch am schwersten ist es... das Sprechen zu vergessen und das Gehen zu verlernen, hilflos zu stammeln und auf dem Boden zu kriechen..."

"You have already learned foreign languages, but it will not remain so easy for you. Your own language is much more difficult. Still more difficult will be learning to read and write, but most difficult of all will be learning to forget how to talk and how to walk, learning to stammer helplessly, to crawl about on the floor..." — Eichinger, Ilse, *Der Gefesselte*, S. Fischer Verlag, Hamburg, Germany, 1954, pp. 52 - 53. Translation mine.

"It's not easy: they teach us to read as children, and for the rest of our lives we remain the slaves of all the written stuff they fling in front of us. I may have had to make some effort myself, at first, to learn not to read, but now it comes quite naturally to me. The secret is not refusing to look at the written words. On the contrary, you must look at them, intensely, until they disappear." — Calvino, Italo, *If on a winter's night a traveler*, Everyman's Library, N.Y., 1993, p. 47.

"Whenever I have a little money, I buy books; if I have any left, I buy food and clothing." — Erasmus

"When someone has read a lot of books, we call him 'well-read', but when he has watched a lot of TV, we don't call him 'well-viewed'." — Lily Tomlin

"Outside of a dog, a book is a man's best friend; inside of a dog, it's too dark to read anyway." — Groucho Marx

"The only advice...that one person can give another about reading is to take no advice, to follow your own instincts, to use your own reason, to come to your own conclusions...To admit

authorities, however heavily furred and gowned, into our libraries, and let them tell us how to read, what to read, what value to place upon what we read, is to destroy the spirit of freedom which is the breath of those sanctuaries. Everywhere else we may be bound by laws and conventions — there we have none." — Woolf, Virginia, "How Should One Read a Book?", in *Great Essays*, ed. Houston Peterson, Washington Square Press, Inc., N.Y., 1967, p. 373.

Whether or not this is a post-literate age will ultimately be decided by future historians. Certainly literature is not dead, unlike the creative powers of academics who are so fond of making that pronouncement. But we are on the threshhold of a major change in the nature of the *non-fiction book*, one that will be advertised as being a product of the computer age, but which did not at all depend on the computer for its conception and does not depend on the computer for its implementation. I am speaking of the replacement of non-fiction books by *data bases*. The insight is very simple: any non-fiction work is, ultimately, a collection of answers to certain types of questions, e.g., a history book is a collection of answers to questions of the form, "When did *x* happen?", "Who was *y*?", "What was the sequence of events that led up to *z*?", "What are considered to be the main causes of *w*?", etc. Similarly, any textbook is a collection of answers to certain questions, e.g., in the case of medical textbooks concerned with the diagnosis of disease, "If I am presented with a patient (or a patient's blood or tissue specimen), how shall I go about determining the illnesses, if any, the patient probably has?" In the case of any mathematical subject, or mathematics-based subject, the textbook provides answers to questions of the form, "What are the main classes of problems that this subject enables me to solve?" "How do I go about solving a problem of the class *x*?" "What does the term *y* mean?" "What are some of the more important proof techniques I can use in doing proofs in this subject?"

Of course, not only textbooks but non-fiction books in general are still written in the format of another age, namely, one in which the amount of knowledge was small enough, at least in certain subjects, that it was "natural" to expect people to "learn" a subject before they used it to answer questions. School courses followed the same format: you *studied* a subject in order to *learn it* in order to be able to apply it. But the sheer amount of modern knowledge and the rate at which it is changing, makes this format obsolete. Non-fiction "readers" of the future will be question-askers, probers of data-bases. In my experience, this practice of asking questions makes only too clear how limited the typical book is for quick, and at the same time deep, understanding of the substance of a book. In reading the works of a philosopher, why shouldn't you be able to find out, quickly, all the passages, if any, in which the philosopher uses any specific traditional philosophical term, e.g., "being" (capitalized or not), "absolute", "metaphysics", "reason", "empiricism" and any other ism, etc.? In physics, why shouldn't any student be able to query the database and get a list of all the different types of energy, and their definitions? This limitation in traditional books is *a little* less severe if the book happens to have a superb, thoroughly cross-referenced index, but since most indexes are developed by drones who do not realize that the index is the most important part of the book, good indexes are rare. Of course, no one, I hope, will be *prevented* from acquiring knowledge the old-fashioned way, but they will not be required to.

Coffee Shops

Sitting in a coffee shop, you contemplate moving to a table by the window, which has better light for reading. You decide not to. Then you think: "If I *had* moved to that table, I might have

wondered who would have moved there if I hadn't. But now, having decided not to move, I can wait for the answer to that question, whereas, if I had moved, I could never know it." This reasoning, however, is faulty, in that the person who eventually chooses to sit at the table by the window, might have preferred the table you have chosen to remain at, i.e., might not be the person who *would have* taken the table by the window if you hadn't taken it before him.

What do girls talk about in coffee shops — at least in coffee shops in college towns? I am not referring to discussions pertaining to schoolwork. I mean all the other conversations, the animated ones whose words you can't hear, but that seem to go on forever. Would we be surprised or disappointed if we had recordings of these?

The ideal coffee shop: a long-overdue list of specifications for coffee shops patronized by intellectuals and students:

Must have windows along at least one wall, with tables along those windows. Window boxes with flowers are desirable. Interior should have lots of wood, suggesting an English pub, or Viennese coffee house. No "modern" look, with plastic and shiny metal tubing everywhere. Perhaps a carpet to dampen sounds.

Tables must be square, measuring an absolute minimum of 2-1/2 feet on a side, so that there is room to open a loose-leaf binder or a large book and still have room for coffee and a plate containing a donut or Danish. *A few* smaller tables, even if they are round, are acceptable for people who are not studying. But there must be *absolutely no wobbly tables*. None. To put your coffee down, spread your books and papers out, find a pencil in your backpack, open a book, press the pencil to the paper and suddenly have the writing surface drop an inch is intolerable.

There should be local newspapers available (free) for customers to read, and ideally, copies of the *New York Times*.

The temperature must be just right: warm and snug in winter, pleasant in summer.

There must be automatic door closers (which, of course, can be set to remain open during warm summer evenings) since there is nothing more infuriating than to be studying and have some typical all-American jerk rock n roller come in and leave the door open during winter.

Background music must be classical only, preferably from an FM station, unless an unusually large and well-chosen CD collection is available. (A good form of torture is to be forced to listen, day in and day out, to the same handful of trite classics: the *Canon in D*, Vivaldi's *Four Seasons*, the *William Tell Overture*, ...) On the other hand, the music must not be too highbrow, because then it is also distracting: it is difficult to concentrate on number theory problems with a background consisting exclusively of Berg, Bartok, and Stravinsky. Needless to say, there must be absolutely no rock, pop, and preferably not even jazz because the chances that the manager, much less his staff, will know good jazz from bad, are essentially nil.

Coffee must be the best. In fact, nothing less than Peet's will do. If the coffee is served in any container, e.g., a capuccino glass, which becomes too hot to hold, protectors must be provided with the glass. Non-fat and low-fat milk must be available.

Donuts, croissants, Danish pastries, and sticky buns, must be on sale. Not necessarily other food.

Clerks must speak English sufficiently well to be able to banter with customers. There should be at least one attractive young woman per shift.

It is perfectly legitimate for the management to charge a fee to students occupying tables for an hour or more if they buy only one or two cups of coffee, although so far no one has come up with a workable means for doing this. (The attempts I know about to keep turnover high have bordered on the comical: during the evening, one coffee shop plays abrasive rock n roll and then gradually turns up the volume. In addition, the lights are gradually dimmed, so that it is more and more difficult for students to read. Signs ask patrons to limit their stay to one hour. The shift manager often makes an announcement several times during the evening.)

The place must be open till at least 11 p.m,. seven days a week, year round, including holidays, especially the most depressing holidays (Thanksgiving, Christmas, New Year's).

(See also "Coffee Shops" in the first file of Vol. 5 of the author's autobiography, *Genius Without Genius*, on www.occampress.com.)

Doors

Meditation on a doorway: In the basement of an office building, I once saw a pair of swinging doors with the words "This is not" stencilled across the left-hand one, and the words "an exit" stencilled across the right-hand one. Few people who passed by, or through, those doors (and many did), probably realized the linguistic, *the philosophical*, marvel which stood before their eyes. Consider the situation when only the right-hand door is open: then we have part of a statement, namely, "This is not", followed by the *meaning* of the missing part of the sentence, namely, by the actual exit. That is, we have something analogous to the famous painting, *The Treachery (or Perfidy) of Images*, by Magritte in which, below the words, "Ceci n'est pas une pipe." ("This is not a pipe."), there is a picture of a briar pipe. This statement is true, since "This" refers not to a pipe, but to a picture of a pipe. If, however, corresponding to our case, there had been an actual briar pipe attached to the canvas, instead of a pipe painted on the canvas, then the statement would be false, as is our statement when only the right-hand door is open.

Which brings up two questions: (1) is an "exit" the opening which the door covers (this is what we have assumed), or the door itself? Clearly, it is the former, since the word "exit" is Latin for "he/she/it goes out", and one cannot go out when the door is closed.

"Q. Were you leaning up against the shut door or the open door?

"A. A shut door. How can you lean against an open door? There's a hole there. You'd fall through." — courtroom testimony quoted in Lederer, Richard, *More Anguished English*, Delacorte Press, N.Y., 1993, p. 51.

The second question is (2) Does "This" in the statement refer to the door on the left, the door on the right, or both, or does it refer to the opening on the left (when the left door is open), the opening on the right (when the right door is open) or to both openings (when both are open)? In accordance with our answer to (1), we conclude that, if "This" refers to one or both doors, then the statement is true, since a door, we have agreed, much less two doors, cannot be an exit. If it refers to one or both openings, then the statement is false.

Suppose the left-hand door is open and the right-hand one is closed. Then we have, not a statement, but a label: "an exit", which is conventionally correct, if "exit" refers to the left-hand or right-hand opening, incorrect if it refers to the door on which the label is lettered.

It is left as an exercise for the reader to determine the truth and falsity, correctness and incorrectness, of the statement/label when one or both doors are partially or completely open.

Signs

In linguistics, the canonical example of ambiguous syntax is the sentence, "Time flies like an arrow", which can be parsed in at least four ways, namely, (1) in the most obvious way, with "time" as the subject, "flies" as the verb, expressing a metaphor for the speed with which time passes; (2) with "time" as an adjective modifying "flies" (this parsing is often made clear by conjoining the independent clause, "but fruit flies like a ripe banana"); (3) with "time" as a verb (i.e., the sentence instructs you how to measure the speed of flies, namely, in the same way that you would measure the speed of an arrow); and (4) again with "time" as a verb, but in this case with the final word "does" being understood, so that it instructs you to measure the speed of flies in the same way that an arrow would (if arrows went around measuring the speed of such things).

In certain individuals, the above example soon induces an incurable malady known as "Compulsive Sign Parsing". Consider, e.g., "Dirty Laundry Basket", or the more advanced "No Parking Violators Will Be Prosecuted". The malady can develop into "Compulsive Title Parsing", in which, e.g., the title of the James Bond film, "Never Say Never Again", is parsed as:

Never say "Never" again!
Never say "Never again"!
Never [a person]: Say "Never" again!
Never [a person]: Say "Never again"!
Never say "Never" again. [Pidgin English report of what the person named "Never" did.]
Never say "Never again". [Pidgin English report of what the person named "Never" did.]
etc.

Or consider "Pedestrians Wait For Traffic Signal". Properly punctuated, it would be: "Pedestrians: Wait for Traffic Signal!" But if the sign is not a command, then we must ask what its purpose is. Clearly it is a report on the behavior of pedestrians, but who needs such information (again: we are assuming it is not an implied command)? Students of logic know that the report does *not* imply that non-pedestrians do not wait for the traffic signal. It is entirely possible that non-pedestrians (e.g., bike riders) also wait for the traffic signal.

There are signs that can be described as failing to reveal errors in their placement. Consider the sign "Please leave this box here" on a box of instructions for resetting an automatic gas-shut-off valve after an earthquake. If the box were moved, there would be no way for the casual reader of the sign to know that the placement implied by the sign was now wrong. The correct sign would need to have wording along the lines of, "This box should always be kept on top of the shelf to the right of the entrance to the front parlor at ... [address]."

Some signs become inadvertently self-referential. Consider the sign, "Do Not Remove from Copy Center" which was originally placed above a paper cutter in a copy center. Someone nevertheless removed the paper cutter, leaving the sign with only itself (or the wall on which it was mounted) as referent. This suggests that many signs which are meant to refer to objects in their locale are inherently ambiguous, since they can refer not only to the objects but also to themselves. Consider, e.g., signs like "Wet Paint". This sign raises a question: suppose that not only the walls had been freshly painted, but also the sign itself, and the painters wanted to notify pass-

ersby of this fact. Should the painters merely rely on the sign, "Wet Paint", and assume that passersby would be sophisticated enough to realize that the sign could refer to itself as well as to the walls, or should they go to extra lengths and post a sign like, "The Walls, As Well As This Sign, Are Covered With Wet Paint"? In passing, we point out that, as the paint dries, such a sign gradually becomes false.

"...somewhere in England in an open field otherwise untouched by human presence is a sign that reads: 'Do not throw stones at this sign.' " — Lederer, Richard, *Anguished English*, Wyrick & Co., Charleston, S.C., 1987, p. 46.

"Self-cancelling sign of the times in Piedmont: a door-to-door salesman peddling 'No Soliciting' signs..." — Caen, Herb, *San Francisco Chronicle*, Jan. 12, 1994, p. C1.

What exactly are we to make of the sign, "Do Not Read This Sign!"? All those who have never seen the sign, are obeying its command, in which case, what good is the sign? Similarly for those who have seen it, but who do not read English. Those who read English, and see it, are disobeying its command, in which case the sign is useless. The best the maker of the sign can do is to hide it where no one can find it. (He, of course, disobeys its command in the very making of it.)

"There's a sign over there you're not supposed to read." "What does it say?"

An unnecessary sign: "Sign"

"**Mr. Orbiter**... Good evening. Well tonight, we are going to talk about ... well that is ... *I* am going to talk about ... well actually I *am* talking about it now ... well I'm not talking about it *now*, but I am *talking* ... I know I'm pausing occasionally, and not talking during the pauses, but the pauses are part of the whole process of talking ... when one *talks* one has to *pause* ... er ... like then! I paused ... but I was still talking ... and again there! No the real point of what I'm saying is that when I appear *not* to be talking don't go nipping out to the kitchen, putting the kettle on ... buttering scones ... or getting crumbs and bits of food out of those round brown straw mats that the teapot goes on ... because in all probability I'm *still* talking and what *you* heard was a pause ... er ... like that again. Look! To make it absolutely easier, so there's no problem at all, what I'll do, I'll give you some kind of sign, like this (*makes a gesture)* while I'm *still* talking, and only pausing in between words ... and when I've finished altogether I'll do this. *(he sits upright and folds his arms)* All right?

SUPERIMPOSED CAPTION: 'THE END'

Mr. Orbiter No, no! No sorry — just demonstrating ... haven't finished. Haven't started yet. *(the caption is removed; he sits and tries to gather his thoughts then suddenly remembers)* Oh dear. *(does the gesture hastily)* Nearly forgot the gesture. Hope none of you are nipping out into the kitchen, getting bits of food out of those round brown mats which the teapot ... Good evening *(gesture)* Tonight I want to talk about ...

Cut to the BBC world symbol."

— *The Complete Monty Python's Flying Circus: All the Words*, Vol. 2, Pantheon Books, N.Y., 1989, p. 100.

How exactly do the letters on some marquees wind up at such unusual distances from each other? For example, "K arioke Bar Lunc h". Surely the wind didn't push them apart. Surely no employee who was able to get the rest of the letters right, would make such an error with two of them. Surely they didn't slide apart under the force of gravity (if that were the case, all the letters would be close together on one side or the other). What is the reason?

Consider the problem of programming a robot to read and understand signs. We might begin with the instructions, "If you see the sign 'Closed' on, e.g., the door of a restaurant or store, do not attempt to enter; but if the sign says 'Open', then you may enter." The trouble is that many such signs have "Closed" on one side and "Open" on the other, so that if the robot entered a restaurant in accordance with the above rule, it then would not be able to leave until the restaurant closed. A related problem is that of teaching the robot to recognize the difference between "inside" and "outside" (the larger an inside becomes, the more nearly it approaches being an outside).

We know that we should always turn things off when they are not being used. Why shouldn't this apply to signs? Why should signs broadcast their messages when no one is looking at them? True, this would mean that we could never look at a sign and hope to answer the question, "Is anyone besides me looking at that sign?" (We could, of course, look at other people, and from the direction in which they were looking, speculate on whether they were looking at a given sign or not.) And we would need a mechanism for uncovering the sign when, and only when, someone was looking at it, and then covering the sign afterward. And we would have to make doubly sure, in the case of large signs, that there was no way that a person, or, for that matter, a small animal, could someone slip inside the cover and view the sign — but no, that couldn't happen, because it would be too dark, and looking at something in total darkness cannot properly be called "looking at something". In any case, at least we would be consistent with our practice in other walks of life.

"Alice went timidly up to the door, and knocked.

'There's no sort of use in knocking,' said the Footman, 'and that for two reasons. First, because I'm on the same side of the door as you are. Secondly, because they're making such a noise inside, no one could possibly hear you.'...

'Please, then,' said Alice, 'how am I to get in?'

'There might be some sense in your knocking,' the Footman went on, without attending to her, 'if we had the door between us. For instance, if you were *inside*, you might knock, and I could let you out, you know.'...

'How am I to get in?', asked Alice again, in a louder tone.

'*Are* you to get in at all?' said the Footman. 'That's the first question, you know.'" — Carroll, Lewis, *Alice in Wonderland*, chapter VI, "Pig and Pepper", in *The Annotated Alice*, intr. and notes by Martin Gardner, New American Library, N.Y., 1960, pp. 80-81.

Project: make an anthology of passages in world literature which have to do with doors, gates, and other types of entrances. Such an anthology would, of course, include the well-known passage in *Macbeth*, and Kafka's parable, "Before the Law".

Interesting Sounds

Granulated sugar passing through the surface of a cup of coffee;
Steam rising from a cup of coffee, smoke rising from a cigar;
Hair growing;
Flakes of dandruff striking a piece of paper;
A spider's feet as it walks across the floor;
A fish moving through water;
A snail moving across a sidewalk;
A human corpse decaying;
A human corpse being cremated;
A fly buzzing inside a person's mouth.

Misplaced sounds: a building collapsing with a sound like pins spilling onto a table; a silent avalanche; sound of surf in a living room.

Play

"When the Greeks said, 'Whom the gods love die young' they probably meant, as Lord Sankey suggested, that those favored by the gods stay young until the day they die; young and playful." — Hoffer, Eric, *The Ordeal of Change*, Harper & Row, Publishers, N.Y., 1967, p. 93.

"A lot of what is passed off as play — educational play with educational toys; games that teach academic concepts; and puzzles for matching words, numbers, and colors — is not play at all. What is play? Play involves a free choice activity that is non-literal, self-motivated, enjoyable, process oriented.

"Critical to this definition is the non-literal — non-realistic — aspect. This means external aspects of time, use of materials, the environment, rules of play activity, and roles of the participants are all made up by the children playing. They are all based on the child's sense of reality.

"Thus two children go into the sitting room, put on their parents' coats, and sit at the coffee table. The little boy declares, 'I'm mommy at the restaurant.' The girl continues, 'And I'm daddy, and we're celebrating our anniversary.' They then pretend to eat a chicken dinner, using Lego blocks to represent food. Play is engaged in by children because they enjoy it — it's self-directed. Once they get bored, they will no longer play, or will change their play.

"Children do not play for a reward — praise, money, or food. They play because they like it. Children build a tree fort because they enjoy the activity, not the product (in fact, once the fort is built, it's soon forgotten).

"Children who compete to make the best wooden ship are not playing. Children who are told they must use the block with 'A' on it to create a word are not playing. Children who are asked to label the colors of their paints, instead of using the paint to create a picture, are not playing. And a teacher who tells a little girl, 'You can't be a daddy,' when she plays in the dress-up area doesn't

understand play." — Wardle, Francis, *Parents' Press: The Monthly Newspaper for [San Francisco] Bay Area Parents*, Vol. IX, No. 7, July, 1988, p. 4.

Running

Lecture to My (Nonexistent) Running Class

"Let me begin by asking why running appeals to so many members of us in the middle and upper class, but to so few people in the lower class. My answer is: because it is our only chance to experience the values of the middle and upper class of years ago. It is our only chance to know what it is like to work hard at something that will pay off. It is our only chance to experience the pleasure of doing something difficult that is worthwhile.

"Of course, there is a trace of old-time religion here, too: You say to yourself, ' The weather is cold and rainy, running will hurt, it will be boring,— but, if I run again today I will be even better than I am now! Why, it's impossible not to run!'

"Now the strange thing is that running is also a chance to practice for life as it exists for us in the present. A long hard run is like a day in the lives of most of us: painful, frustrating, with our inferiority all too obvious at every step. It gives us practice at getting through the doing of what we loathe — in other words, getting through a typical day's work.

"But even in these wretched lives, there are moments of happiness. And similarly with running. Running is 90% misery, 10% ecstasy. We keep grinding out the miles because every couple of months or so, we hit one of those days when it all seems to go without effort: a cool partially sunny afternoon when we seem to fly across the pavement; we can't seem to get tired even if we try; hills are merely an effort, nothing more; and besides, there's always the other side to go down, with the view before us, trees on either side, the wind in our face — we feel that we could run forever.

"But most of the time it's not like that. Most of the time we are dealing with pain: the constant shortness of breath that often seems to bring us close to nausea; perhaps leg pains on top of that. So let me say a few words about enduring pain. We don't overcome pain; we don't somehow store up incidents of having-overcome-pain so that we can call on them later; no, all we do is store up memories of the impossible that we did overcome: "Once I endured even worse than this, so it's OK. I can force myself through it." And we store up ways of dealing with pain that seem to work. Keep in mind that this kind of pain is usually associated with self-hate. We are angry at ourselves for having to struggle so much, for not being stronger. Pain by itself isn't so bad. But being in pain and hating yourself for it *is* bad. So we need to deal with both these things, pain and self-hate.

"The best way I know of to deal with them is by not allowing them to become articulated. If you let the words come into your mind — "...Still haven't mowed the lawn... Need a new roof... Still no job... Look how slow I'm going..." — you will have to work twice as hard to keep going. Even if you attempt to replace these words with counterarguments — "Hey, a guy my age, running hills — not bad... I really am OK..." — because those words will sooner or later give rise to the countercounterargument words — "Who am I kidding? I'm almost at a walk...She didn't even look at me..." The best way is to push *all* the words out of your mind. You do that by repeating something, anything that noises out the words. "Noise it out, noise it out." is a good phrase. Over and over. The rule here (as in domestic and workplace problems) is: no arguments!

"How hard should you push yourself? If you are a certain kind of overachiever, and you are still new at running, you will instinctively answer, 'As hard as I can! No amount of punishment

is too great. Far better to collapse on the street from exhaustion on a hot day, than to walk for a few blocks, and come home safe! Safe is for losers.' But with the years you may find yourself softening this rule. You may come to know yourself enough to know that it is not always weakness to stop and walk under certain conditions. Years of running can teach you to know and trust yourself that way. In fact I often wonder if, in a long race, say, more than ten miles, a runner might not do better if he stopped and rested for a few seconds. But as far as I know no one has tested this idea, or at least considered the physiological arguments pro and con. In a sufficiently long race, it might even pay to stop several times.

Two rules that will help you go far can be summarized as: "Run heroic" and "Run interesting". The first means: Run like the hero that every runner is; think of your form; try to make it as elegant as that of an Olympic runner. The second means: Whenever possible, run on interesting streets — streets with beautiful houses, for example, or long country roads with beautiful scenery. You don't need to run on familiar streets in order to know how far you've run! If you know roughly how long it takes you to run a mile (and you should) then you can let your wrist watch tell you how how far you've run *anywhere*. Far better to drive to beautiful locales than to let the prospect of running on streets that bore you to death because of the number of times you have run on them, allow you to find an excuse for not running. Make every run an adventure!

"OK, so now a few pointers before we set out.

"The first rule of jogging and running is: you can always stop. The second rule is: you will not stop as long as you feel you can go a little further. Remember: it's not an either or world: something is better than nothing. If you can't run fast, then run slow. If you can't run at all, then walk.

"On days when you don't want to run — in other words, on most days — a good trick to get going and keep going is to aim for a pace, no matter how slow, that you feel you could keep up 'all day' — a pace that enables you to concentrate on making each step perfect in itself, both in the form you run it in, and in what you think about. From there you can always speed up whenever you want to. But finding this pace and returning to it whenever you want, saves the energy you would otherwise expend on the mental cries of anguish produced by a faster pace — 'I'm no good, Christ, I can hardly put one foot in front of the other, my body's like lead, I wish I could die', etc. A variation of this is 'running on top': saying to yourself: ' I have work to do afterward, I can't kill myself today, I will finish with energy left over, that is how it will have to be." 'Running through' also works sometimes — deciding that you're going to run *past* the ending point you have set for yourself, and setting your pace accordingly. Another variation is not to think of how far you have yet to go, but to concentrate on making the next step good, something you can be proud of, try to run as many steps as possible in good form, body erect, head level, not bobbing up and own. Go for whatever beauty you can grab at each step: houses, flowers...

"One trick — this one not mine but thought up by some running coach I read about — is to try to keep just one part of your body completely relaxed: say one of your hands. It seems to help relax other parts of your body, too. Save that energy for moving yourself over the pavement.

"Another trick, particularly good on warm or hot days, is to imagine yourself in the shower at the end of your ordeal. Think of the water pouring over you like cool, liquid wind. Think of yourself drinking the bottle of cold, mineral water at the end. Then say to yourself what is true: ' It won't hurt then: *therefore* it doesn't hurt now!'

"Hills are the worst problem to most runners. After a few miles, even a small hill can come near to destroying your spirit. (Even having to step from the road up to the sidewalk can do that on a bad day.) So here's the best remedy I have found: when you approach a hill, start taking

faster breaths. I know, I know, you have tried this a couple of times, and it's always too much extra effort, you don't have the strength to do this. I thought so too. But try. You will find out that you're wrong, just as I did. Then keep up the fast breaths as you go up the hill. It works. (You may feel that if you were any good, you wouldn't need to breathe faster. That you should be able to take the hill at the same breathing rhythm as on the flat. Disregard that whole idea. You are here to win, not to be defeated by the superstitions of imagined opponents.)

"Overbreathing sometimes helps on the flat parts as well: take deep breaths, take in *more air than you need*.

"Another thing: take a multi-mineral pill before you set out, particularly if you anticipate a hard run. For some reason, minerals seem to overcome fatigue.

"And for God's sake don't worry about being overweight! I have never been able to understand the difference between a person running who is five pounds overweight, and a person running while carrying five extra pounds strapped to his hands. (There must be an optimum here somewhere.)

"Finally, never forget sex. A good sexual fantasy, say, regarding one of the high school or college girls you pass, will do wonders for your energy reserves. Imagine a whole line of them by the side of the road, cheering you on. Imagine that the deal is that if you succeed at your running goal for the day, you get to have any one of them you choose.

"As the novelist wrote, 'Ripton began wishing himself in love, seeing that it endowed a man with wind so that he could breathe great sighs, while going at a tremendous pace, and experience no sensation of fatigue.' — Meredith, George, *The Ordeal of Richard Feverel*, The Modern Library, N.Y., 1950, p. 305.

"I have told you these things because they have worked for me. All of them, with one exception, were discovered through hard experience, not from reading books. It is entirely possible that that is the only reason they work: that they are all homemade. Keep that in mind, and be ready to throw them out if they don't work for you and then go discover or create your own techniques. Any questions? Let's go!"

(End of *Lecture*...)

"I go with the genius who said he doesn't jog because 'I want to be sick when I die'." — Caen, Herb, *San Francisco Chronicle*, Mar. 25, 1991, p. B1.

History

"He is growing old: he has begun reading history."

"Since the rise of the historical profession in Western countries [the] slicing of the past into 'centuries' has dominated us in ways difficult to overestimate. At first a hundred years was described as 'a century of years'. Then by the middle of the seventeenth century the word 'century' itself had come to mean a period of 100 years. Ever since then the units of academic instruction have been wrapped in parcels, each 100 years long." — Boorstin, Daniel J., in "Foreword", *The Timetables of History*, Simon and Schuster, N.Y., 1982.

Because historians take our familiar base 10 number system for granted, they are inclined to believe that when a new century begins, a new historical epoch also begins. But one can count the

years using any number base one chooses, and I often think that one of the simplest and most powerful sources of new historical insight would be that of viewing history through a number base other than 10.

In history, as in all the liberal arts, writing is considered the central discipline.The result is that year after year, decade after decade, century after century, art keeps being confused with knowledge. Sometimes, you would hardly know that the two world histories you have before you are about the same subject! An eccentric like William H. McNeill wins the National Book Award in 1964 (for *The Rise of the West*, The University of Chicago Press, Chicago, Ill., 1963) despite the fact that, for some unaccountable reason, he refuses to give the birth dates of persons in his narrative — neither in the text nor following the name in the index! (He also seems to believe — see illustration, p. 21 — that, in the cycle of the seasons, summer (June to October), the time when crops grow and mature, is followed by spring (October to February), when crops are planted, which in turn is followed by autumn (February to June), when crops are harvested.) But the dim bulbs who review history books are likewise raised in the belief that writing is the central discipline, and pardon such incompetence because they assume it comes from some deeper understanding of the subject ("He doesn't include birth dates: what a profound scholar he must be!").

Paul Johnson, in his *A History of English People*[1], gives *neither* birth nor death dates in his text or in the index! (What can possibly excuse such arrogant eccentricity?) Furthermore, he makes statements that force the intelligent reader — or at least the reader who is not predisposed toward Johnson's conservative political views — to question the worth of the entire book — statements such as "modern England probably owes more to [Offa, king of Mercia[2]] than to any other individual." Granted that Offa established a standard coinage, and created a state that "gave expression" to the "deep-rooted English characteristics: the use of land as the ultimate index of wealth and status, and a marked preference for strong, efficient and honest government...[though] of course he built on earlier foundations,"[3] we must nevertheless question Johnson's assertion. What possible criteria can there be for making such assertions other than the opinion of the historian?

Whether liberal arts professors like it or not, there will be thinkers who will ask what the *substance* of a liberal arts subject is, as contrasted with the literary art with which the substance is presented. In other words, they will ask if it is possible to separate the What from the How. What is the substance of history, or, to put the question another way, why is there more than one textbook for each historical period?

As a first approximation, I will say that the substance of history is *events*. Events, in turn, have properties, and at any given time, historians have opinions as to the truth of the value of these properties. For example, consider the event known as the Congress of Vienna. Among its properties are: when it took place and where, who participated, what its purpose was, what if anything it produced, what the results of what it produced turned out to be. (Thus "names and dates" are properties of events.)

Imagine now a book in which all events are listed alphabetically by name, with appropriate cross-references if an event is known by more than one name. In addition, all persons participat-

1. Harper & Row, Publishers, N.Y., 1972
2. Died in 796; birth date apparently not known.
3. p. 44

ing in events are also listed alphabetically, by name, in the same overall listing. Furthermore, all dates that are properties of events, are likewise listed (numerically, following the alphabetical listing) and likewise cross-referenced.

Each person is likewise regarded as having "properties", including date of birth, date of death, nationality, historical events participated in, perhaps a brief biography, personal characteristics if known, etc.

Locations (listed alphabetically) are likewise regarded as having "properties", including: events that took place in the locations, along with dates of events; maps showing the location at various periods of history, and, if the location is a large geographical region, an indication, e.g., of how the region was subdivided at these various periods, etc.

Associated with each property is a weighting representing the informed opinion of historians as to the likelihood that the given value of the property is correct. Weightings may range from, say, 0 through 10, where 0 represents "completely unknown in the opinion of 2/3 of professional historians" and 10 represents "deemed certain by 2/3 of professional historians". Thus, e.g., the date of George Washington's birth may have a weighting of, say, 8 or 9, whereas the weighting of the various suspected causes of Queen Nefertiti's death may be in the range of , say, 2 through 5.

In short, the substance of history is what is contained in an Environment[1] for history — of world history, or of certain periods of history in certain parts of the world.

Such an Environment can, of course, be represented in a computer database, but this is certainly not necessary.

Let me emphasize that the aim here is *not* the elimination of narrative history. (Of course, the fact that people want history not to be dry, and criticize those histories that are, is proof that what they want first and foremost is that history be literature.) Furthermore, I will not be offended if academic historians and lay readers of history refer to a history Environment as a "mere" reference work. But the thinking few who have asked themselves what the *substance* of history is, will, I believe, find an answer in the Environment concept.

Why is it so extraordinarily difficult for historians to recognize the value of diagrams? (Well, the answer is easy: diagrams are not prose, hence have no academic value.) When you go to a natural history museum, even a great one like the Museum of Natural History in New York City, you see awe-inspiring assemblages of dinosaur bones, and, below each, a scientific description of the animals whose bones these were. Perhaps, in some cases, at the bottom of these descriptions, will be a time-line with an indication of when the animal lived. Fine. But what I think most people want to see in addition is a map showing how these various creatures *are related to each other* in the evolutionary tree, *along with* an indication of when they lived. Such a map is not difficult to construct: let the time line run vertically on the left, with time increasing in the upward direction; to the right, have the evolutionary tree, the branches coordinated with the time line. Superimpose the tree on a square grid, as in the case of a road map, with the vertical columns of squares identified by letters, and the horizontal rows by numbers. Then, accompanying the map, provide an alphabetical listing of the names of dinosaurs, each followed by a letter-number indication of

1. See, e.g., Schorer, Peter, *How to Create Zero-Search-Time Computer Documentation*, Annabooks, Poway, CA, 1995 (available in paper edition via amazon.com or via craigc@rtcgroup.com, and accessible online at www.zsthelp.com) and Curtis, William, *How to Improve Your Math Grades*, Occam Press, Berkeley, CA, 2002 (accessible online at www.occampress.com).

the square in which that species of dinosaur begins. Nothing could be simpler, or more helpful, for the museum-goer.

Why don't historians make it a *standard practice* to include in their books one or more timelines of important events during the period covered by their book?

It is very difficult to find editions of the four Gospels of the New Testament in side-by-side format[1]. The reason the Gospels are not readily available in such a format, is, of course, clear: it would raise questions in all but the dullest readers as to the veracity of the Gospels themselves (how could four records of the same sequence of actual events differ that much?). In short, it would discredit the historians who created these narratives. I suspect that a similar reason lies behind the practice in academic classrooms of never reading works of history side-by-side (especially not those of the currently most prestigious historians!).

If I were the dean of a history department, I would insist that every period of history be studied side-by-side in at least two leading books on the period, so that budding historians could see for themselves the outrageous license that prose as the central discipline gives to scholars working in a subject that claims to be based on something they call "fact". By reading these books side-by-side I mean reading about each event in each book, comparing what is said and what is omitted by each historian about the event, and then finding the question to be inevitable (we hope!), "But what is the *substance* of the history in this case?"

I expect that the counterargument to this proposal will be that different historians give different treatments of the same historical period because their interpretations of what actually happened and why, differ. But, come on! Let us for once be honest and admit that these interpretations, like all theories in the liberal arts, are nothing but the naive conjectures of the literary mind about the nature of the real world —

"McNeill challenges the Spengler-Toynbee view that a number of separate civilizations pursued essentially independent careers, and argues instead that human cultures interacted at every stage of their history." (back cover, *The Rise of the West*, The University of Chicago Press, Chicago, Ill., 1963)

— and are on a par with Chance the Gardner's profundities regarding the U. S. economy, in the film *Being There*:

"*Chance (Peter Sellers)*: As long as the roots are not severed, all is well, and all *will* be well, in the garden.

U.S. President (Jack Warden) (after several moments of struggling to grasp the concept): In the garden...

Chance: Yes. (Long pause.) In a garden, growth has its season. First comes spring and summer but then we have fall and winter, and *then* we get spring and summer again.

President (after several moments' further struggle): Spring and summer...

Chance: Yes.

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1. After years of searching, the only one I have been able to find is *Synopsis of the Four Gospels*, ed. Kurt Aland, American Bible Society, N.Y., 1985.

President: (after several more moments): Then fall and winter...

Chance: Yes.

Elderly millionaire (Melvyn Douglas): I think what our insightful young friend is saying is that we welcome the inevitable seasons of nature but are upset by the seasons of our economy.

Chance: Yes. There will be growth in the spring.

President (thoughtfully): Hmm...Hmm...Hm: well, Mr. Gardner, I must admit that's one of the most refreshing and optimistic statements I've heard in a long time."

One of the many reasons why we should be contemptuous of the education of the modern scholar (including the modern historian) is that this education never includes the experience of being an object of scholarly study. This could easily be accomplished by the scholar writing a paper on a subject of his choosing, then giving it, along with his name and university affiliation, and no other information, to a randomly selected scholar in his country (or, better still, another country), the task of the second scholar being, from this information alone, to come up with an analysis of the first scholar's personality and the "meaning" of his paper. The second scholar can use any legal means at his disposal to accomplish his task except communicating in any way with the first scholar. The judgement as to the accuracy of the second scholar's analysis would be entirely left to the first.

This experience, we may hope, would do wonders for encouraging in the first scholar an awareness of the fundamental weakness — or inapporpriateness — of scholarly "method" to at least some tasks of scholarship.

Whenever someone extols the virtues of a previous age, you should always ask what it was like to go to the dentist then.

"People often ask me, as a specialist in this field, would I like to have lived in the eighteenth century? First, I say, I would insist on being born well above the peasantry. Second, no toothache, please. While reading thousands of letters from people in all walks of eighteenth-century life, I have often encountered toothaches. The pain cuts through the archaic language, and the writer looms up in your imagination, waiting in dread for an itinerant tooth-puller to arrive in town and, by a brief bout of torture, to put an end to the long weeks of agony." — Darnton, Robert, "George Washington's False Teeth", *The New York Review of Books*, Mar. 27, 1997, p. 38.

How fast does time pass? How fast does history proceed? At a rate of about one second per second?

Is it possible to record "all" of history? The question can be expressed more precisely as follows: is it possible to arrange a finite set of TV cameras, each having a given range, on the surface

of a sphere, such that every point on the sphere — including the points occupied by other cameras — is within the range of at least one camera? (For a discussion of a similar problem, see Stewart, Ian, "Mathematical Recreations" in *Scientific American*, Feb., 1992, pp. 112-115.) Of course, even if it were possible, that does not prove we could record "all" of history, since most history takes place inside of buildings. The next question, therefore, is: would it be possible to place TV cameras in every building in the world such that the activities of every human being could be recorded twenty-four hours a day — including the loading and unloading and storing of the video tape for each camera?

The idea of recording every activity of every human being immediately makes us think of totalitarian societies. But put these associations aside for a moment and ask yourself if we shouldn't have, e.g., a recording of the sound of breathing of people sleeping. Who is recording the sounds of everyday life, in particular, that of children playing? Is there a single video, or at least audio record of, say, 24 hours in a small park in an affluent suburban town? Imagine that there existed, on video tape, a visual and auditory record of every act of love-making among humans back to, say, three million years ago, and (more important), that there was a way of rapidly searching these tapes on the basis of certain characteristics of the love-making, e.g., 5100 b.c. Egyptian peasant couple", "19th century upper middle class English, lasting longer than fifteen minutes", etc. Certainly it would be of great interest to have 24-hour-a-day recordings of the conversations of the rich. What is said in the million-dollar homes of, say, Piedmont, Calif.? I am sure that the subjects must be opera, the symphony, classical literature, politics, and money, but what exactly is said about these things?

We criticize TV because it discourages conversation, but even the most mediocre situation comedy is better than the typical conversation in the typical household. Who are we kidding? The matter would be settled if we had recordings of all conversations in all homes throughout the history of the country. "Did you put the car in the garage?" "I'll do it later." (Silences in between each speech, as husband is reading the sports pages, wife is sorting coupons.) "You said you'd do it before you came in." " I'll do it later." (She sighs.) "You always put things off." " I'll do it later." "Why don't you do it now and get it off your mind?" "Because I'm doing something else right now." "What?" "Reading the paper." "You can do that after." "But I'm doing it now." (She sighs.) "I just don't see why you say you'll do things and then you don't do them." "I said I'll do it later."... Watching *Taxi* or *M*A*S*H* or *Cheers* or *Seinfeld* or *Frasier* is a much, *much* better way to spend your time.

Intellectuals, in their loneliness, are ashamed of their need for movies for companionship. But why be ashamed? A video tape or DVD can be rented for $4.50 or less — less than the price of capuccinos for two. If it is a film you have seen many times since your youth, because you love it, then it has become a friend. Why not enjoy these friendships? (Some of my best friends are movies.)

The future will know a great deal about us, but one thing it will never know is what it was like to experience the events, discoveries, inventions, that were new to us. How many historians are recording the day-to-day experiences of themselves, their friends and neighbors in learning to access the Internet, use email? I am not referring to the bland abstractions that appear in papers in learned journals, but to the personal experience of the historian himself: his feelings regarding new hardware and software, what he didn't understand, what he went through in order to understand it, or at least get the technology to work, the amount of time spent.

And we in turn must ask about the past questions such as: what was it like to see perspective drawings and paintings for the first time? Do we have any records of first impressions by people living in Renaissance Italy? Was it as strange as, say, cubism was in the early years of the twentieth century? How did the past, e.g., the nineteenth century, regard the typography of the time? Did it seem "modern"? Or distinguishedly old? Or neutral? How do we feel about the various typefaces we see? (Helvetica, as used in signs, suggests modern, up-to-date.)

When beards and long hair suddenly became fashionable again in the sixties, the old photos of the nineteenth century suddenly became contemporary, real. Those people were just like us! Whereas previously they seemed very different from us.

"...the frivolous life of an epoch after ten centuries have passed over it is worthy of the most scholarly research..." — Proust, Marcel, *The Past Recaptured*, tr. Frederick A. Blossom, vol 7. of *Remembrance of Things Past*, The Modern Library, N.Y., 1932, p. 121.

The PBS programs *1900 House* and *1940 House*, in which people attempted to live with precisely the furnishings and technology of the indicated year, suggest the idea of the *technology-conservative*. Each of us can probably make a list of items of technology we would not want to do without: electric light, gas or oil heating, washing machine and dryer, etc. But we can probably also make a list of things we *can* do without, or wish we didn't have to own (e.g., a desktop computer, with its enormous cost in worry about disk crashes, and in money for consultants, since we have no interest in trying to learn all that we need to know to operate and repair the computer). A person who tries to live with the minimum technology that he can, without subjecting him- or herself to unacceptable hardship or frustration, is a technology conservative. (But he or she must keep in mind that one of the main appeals of new technology — the hidden appeal — is the *companionship* it brings to all those who buy it and use it. "I am part of this new community!")

Why do historians have so little interest in describing *in detail*, for the educated layman, the everyday life of past ages? Is it that such descriptions carry such little weight in the PhD culture? What did a Roman aristocrat of, say, the first century BCE, have for breakfast, lunch, dinner? What was the equivalent for him of a modern bathroom? Did he wash with soap, and if so, what kind of soap? How exactly did he send a message to another Roman living within, say, a two-mile radius? If he was a writer, say, like Cicero, exactly how did he go about writing a book? What kind of a pen did he use, what kind of paper, how expensive were these? Exactly how were copies of his book made, and what measures were taken to ensure that the copies were accurate? What did his house look like, inside and out? What did the streets of his town or city look like on a typical weekday? What did the people typically wear?

Why are artist's renditions of city and country scenes so rare? What did the Parthenon look like on a typical day in ancient Athens? What did the statues in a city look like when, as is currently believed, they were all painted?

Why is it considered unimportant, or at least in bad taste, to write letters to the future? Because we can never receive a reply? But every day, thousands of authors around the world write words to which they will never receive a reply. Few things would do the nation more good, in the long run, than beginning, and maintaining, an ongoing dialogue with those who will live here 100, 200, 300 years from now.

The Lessons of History — surely the latest version of such a book should be as common, as readily available, as any reference work. Yet the nearest I can think of to such a book is Machiavelli's *The Prince*, which is now almost 500 years old! Surely it is possible to come up with a plausible set of do's and dont's, based on the historical record, for achieving certain goals, or perhaps I should say, for avoiding certain calamities. (One goal may be peace and stability, but another is conquering the world, or at least, expanding a nation's territory.) World War I taught us that it is unwise to break the financial back of a defeated nation, but instead to enable it to rebuild (provided it installs a form of government we approve of). The Crash of 1929 taught us that it is unwise to allow stock purchasing on large margins. Vietnam taught us (although we failed to learn the lesson) not to attack a country in which a significant proportion of the population is willing to fight to the death in a guerrilla war against you. The first Gulf War taught us that, when victorious over a tyrant's forces, it is foolish not to get rid of the tyrant while you have the opportunity. The war in Afghanistan, taught us that it is futile to expect to win a war when you know next to nothing about the culture of those you are fighting, and both the second Iraq war and the war in Afghanistan, taught us it is futile to attempt to get savage tribes of religious fanatics to adopt democracy.

But the *Lessons of History* can be far more formal than this — the recommendations can be as precise as the data specifying the circumstances permits. "In a country in which...and in which... and in which ... then, in order to avoid..., the following measures are probably best..." with justification based on a pre-defined logic, or, at the very least, on a polling of the world's historians, and of politicians and statesmen known to have wide learning in history, e.g., Churchhill.

And why isn't it a good idea to teach history from the point of view that each student will one day be President, and therefore should have, in his notes as he takes office, a list of the bad times and good times of the past, and plausible reasons for each? History becomes far more interesting from such a point of view. It seems to me that the question, "What can we learn from this period?" is far more likely to promote student interest than questions like "On what date did ... occur?" "Who was king of ... during ... ?"

"For historical reasons" (for hysterical reasons)

Additional Thoughts

A: "The male seahorse gives birth to the young."
B: "How do they know it's not the female seahorse?"
A: "Because the female doesn't give birth to the young."

"What side of the street is the house on?
"It depends on which way you're coming down the street."

Is it possible that Western scholars and poets who study Japan and China for many years begin to develop epicanthic eyes? Look at some before and after photographs of these people and you will understand the source of this question.

Does a person's face change when he wears a mask? Do his features start to resemble the mask, however slightly?

When people walk naked, do they walk differently than when they wear clothes?

Things normally viewed from one viewpoint, viewed from another: (1) think of all the cars on the road as being driven by people trying to win a contest in which $1 million will be awarded to the first driver who duplicates a pre-established (but unknown to the public) sequence of steering-wheel turnings and presses of the brake, clutch and accelerator pedals; (2) think of a driver's various turnings of a steering wheel as being his crumpling and uncrumpling of a piece of paper; or think of a car that was steered by the driver's discarding cards from a hand he is holding and drawing more from a deck on his seat; (3) think of a piano composition as the record of someone's attempt to kill flies that were crawling around on the piano strings;(4) think of a new type of car which the driver can only enter by diving through a small opening in the side, then twisting in mid-air so as to land on his back in a certain contorted position, this being the only position from which it is possible to drive, and then only with the aid of various mirrors and specially designed controls; (5) think of the various styles in which sex manuals might be written, e.g., that of a mathematics text, a manual for a piece of electronic equipment, a political indoctrination text, Milton's *Paradise Lost*, the Bible; (6) think of a mathematical proof being presented, in a classroom, in the style of a sermon in a Southern Baptist church; (7) think of a mathematical proof being presented like a recipe on a TV cooking show; (8) collect several of each type of insect which you find repulsive and place each type into a separate container; now sprinkle a different perfume in each container and observe how the nature of the insects therein changes before your very eyes; (9) recall the scene in *The Battle of Algiers*, the docudrama on the French-Algerian civil war of the 1950s, in which a prisoner was tied and suspended from the ceiling, then tortured with a blowtorch to the music of Bach.

Suppose that, at the end of a phone conversation, instead of hanging up the phone to terminate the connection, you had to tie a shoelace attached to the phone cradle.

The three maxims of womanhood: (1) You can never have too much money; (2) You can never be too thin; (3) There is no such thing as too much cleaning.

Maxim for weight watchers: if you lose you gain, if you gain you lose.

Experiences with light: (1) driving a car into a tunnel; (2) emerging from a lighted bathroom at night, turning off the light, returning to bed. Is it possible that the strange feeling that we sometimes have at these moments, namely, the feeling that something important is about to happen, is a residue of our childhood experiences of entering and leaving movie theaters?

When you turn off the light, you turn on the dark.

"'Professionalism' is the means by which professionals achieve maximum income with minimum accountability." — Pasley, Jeffrey L., "The School for Scandal", *The New Republic*, July 4, 1988, p. 20.

Ballet Flossing: the body bending and swaying as the string saws into obscure gum pockets, then the withdrawing of it with a toreador's fluorish, then the positioning it between the next pair of teeth; the grimaces made, the tuneless song hummed as this important work proceeds.

A different kind of claustrophobia: flying a single-engined plane down a long, gently curving, brightly lit tunnel which is just a few yards wider than the plane's wing span.

How fast have we learned to go in these modern times? Imagine driving your car at freeway speeds through a woods or forest. That is how fast we have learned to go.

"A common housefly is faster than a jet airplane — in one manner of speaking. The fly moves 300 times its body length in one second. The jet at the speed of sound travels 100 times its body length in one second." — Boyd, L. M., "The Grab Bag", *San Francisco Chronicle*, Oct. 5, 1980. And why *don't* we measure the speed of animals in animal-lengths-per-unit-time? And the speed of vehicles as well? What are the advantages and disadvantages of such units?

"In 1927, Vogel recalls, [J. B. S. Haldane] wrote 'On Being the Right Size', a playful essay on the ratio between an animal's height and its weight. Gulliver's giants of Brobdignag, who were a hundred feet tall, would have weighed 280 tons, or 4,600 times more than Gulliver, but since their

bones would have been only three hundred times thicker they would have crumbled under their own weight. Gulliver's Lilliputians, on the other hand, were only six inches tall. They would have profited from being able to fall a long way without hurting themselves, because the air's drag would have slowed their fall more than that of a full-sized man. The drag that slows a falling object is proportional to its surface area. The ratio of a Lilliputian's surface area to his weight would have been sixteen times greater than that of a full-sized man, and this would have slowed his fall. An even greater ratio of surface area to weight lets mice fall down mine shafts and run away unharmed.

"Vogel points also to a handicap that would have afflicted Lilliputians, but had escaped Haldane's notice: the heat lost by animals is also proportional to the ratio of their suface area to their weight, so that they would have lost heat sixteen times faster than Gulliver and might have frozen to death in cold weather. This is why babies have to be kept warm. The smallest warm-blooded animals, shrews and hummingbirds, have to eat almost continuously just to keep warm. To reduce their loss of heat during the night, they lower their body temperature as if they were hibernating." — Perutz, M. F., "The Top Designer", review of Vogel, Steven, *Cat's Paws and Catapults: Mechanical Worlds of Nature and People*, *The New York Review of Books*, Apr. 22, 1999, p. 52.

Suppose that, when you pressed the elevator button, stairs arrived instead of the elevator car.

All pets are professional pets.

He who swears naturally, swears well.

"You've got to kiss a lot of frogs before you get lip cancer." — observation by a friend.

Anyone contemplating starting a drug habit should keep in mind that for the amount the habit will cost them, they can have, *every evening*, a good French dinner for two, with wine and several hours' conversation. The only disadvantage is that it is not illegal.

At the time of this writing (1990), a drug habit costs at least $200-$300 a day. Taking the lower figure, that amounts to $1400 a week, or $72,800 a year, or $101,111 a year before taxes, and that figure excludes all other living expenses, e.g., rent, food, clothing, other entertainment. My argument to anyone contemplating a drug habit is simply: if, unlike most of the rest of us, you are able to earn that kind of money, why waste it on drugs? Or, perhaps even better, if you can earn that much while taking drugs, surely you ought to at least find out how much you could earn if you didn't!

Is there a kind of sightedness that is almost as bad as being blind? A color TV camera can be said, metaphorically, to be able to "see", but not in the sense we normally use the term, because it

has no depth perception and cannot recognize objects (in the sense of understanding their "meaning"). A human being who suddenly found himself with such a disability would be groping with his hands before him just as surely as if he had suddenly become blind. He would suddenly be living in a world of flat shapes, a mad world of endless visual puns: the sky seen through a doorway would be no different than a section of blue plaster on the wall; the open manhole merely a peculiar design on the street; approaching objects, e.g., trucks, simply shapes that seemed to grow rapidly larger.

"I chanced on a wonderful book by Marius von Senden, called *Space and Sight*. When Western surgeons discovered how to perform safe cataract operations, they ranged across Europe and America operating on dozens of men and women of all ages who had been blinded by cataracts from birth. Von Senden collected accounts of such cases... Many doctors had tested their patients' sense perceptions and ideas of space both before and after the operations. The vast majority of patients, of both sexes and all ages, had, in von Senden's opinion, no idea of space whatsoever. Form, distance, and size were so many meaningless syllables. A patient 'had no idea of depth, confusing it with roundness'. Before the operation a doctor would give a blind patient a cube and a sphere; the patient would tongue it or feel it with his hands, and name it correctly. After the operation the doctor would show the same objects to the patient without letting him touch them; now he had no clue whatsoever what he was seeing. One patient called lemonade 'square' because it pricked on his tongue as a square shape pricked on the touch of his hands. Of another postoperative patient, the doctor writes, 'I have found in her no notion of size, for example, not even within the narrow limits which she might have encompassed with the aid of touch. Thus when I asked her to show me how big her mother was, she did not stretch out her hands, but set her two index-fingers a few inches apart.' Other doctors reported their patients' own statements to similar effect. 'The room he was in...he knew to be but part of the house, yet he could not conceive that the whole house could look bigger'; 'Those who are blind from birth...have no real conception of height or distance. A house that is a mile away is thought of as nearby, but requiring the taking of a lot of steps [italics mine; see also the chapter of this book, "Thoughts on Traffic"]...The elevator that whizzes him up and down gives no more sense of vertical distance than does the train of horizontal'.

"For the newly sighted, vision is pure sensation unencumbered by meaning: 'The girl went through the experience we all go through and forget, the moment we are born. *She saw, but it did not mean anything but a lot of different kinds of brightness*. [Italics mine; see also remarks elsewhere in this book regarding exercises for artists in which the artist attempts not to see "what" something is, e.g., a house, an orange, but merely to see it as an arrangement of colors, and similarly in music, when one attempts not to "hear the melody" but merely to hear a succession of sounds.] Again, 'I asked the patient what he could see; he answered that he saw an extensive field of light, in which everything appeared dull, confused, and in motion. He could not distinguish objects.' Another patient saw 'nothing but a confusion of forms and colors.' When a newly sighted girl saw photographs and paintings, she asked, 'Why do they put those dark marks all over them?"' '"Those aren't dark marks"', her mother explained, '"those are shadows. That is one of the ways the eye knows that things have shape. If it were not for shadows many things would look flat."' '"Well, that's how things should look,"' Joan answered. '"Everything looks flat with dark patches."'

"But it is the patients' concepts of space that are most revealing. One patient, according to his doctor, 'practiced his vision in a strange fashion; thus he takes off one of his boots, throws it some ways off in front of him, and then attempts to gauge the distance at which it lies; he takes a few

steps towards the boot and tries to grasp it; on failing to reach it, he moves on a step or two and gropes for the boot until he finally gets hold of it.' 'But even at this stage, after three weeks' experience of seeing,' von Senden goes on, '"space", as he conceives it, ends with visual space, i.e., with colour-patches that happen to bound his view. He does not yet have the notion that a larger object (a chair) can mask a smaller one (a dog), or that the latter can still be present even though it is not directly seen.

"In general the newly sighted see the world as a dazzle of color patches. They are pleased by the sensation of color, and learn quickly to name the colors, but the rest of seeing is tormentingly difficult. Soon after his operation a patient 'generally bumps into one of these colour-patches and observes them to be substantial, since they resist him as tactual objects do. In walking about it also strikes him — or can if he pays attention — that he is continually passing in between the colours he sees, that he can go past a visual object, that a part of it then steadily disappears from view; and that in spite of this, however he twists and turns — whether entering the room from the door, for example, or returning back to it — he always has a visual space in front of him. Thus he gradually comes to realize that there is also a space behind him, which he does not see.'

"...The mental effort involved in these reasonings proves overwhelming for many patients...A disheartening number of them refuse to use their new vision, continuing to go over objects with their tongues, and lapsing into apathy and despair. 'The child can see, but will not make use of his sight. Only when pressed can he with difficulty be brought to look at objects in his neighborhood; but more than a foot away it is impossible to bestir him with the necessary effort.' Of a twenty-one year old girl, the doctor relates, 'Her unfortunate father, who had hoped for so much from this operation, wrote that his daughter carefully shuts her eyes whenever she wishes to go about the house, especially when she comes to a staircase, and that she is never happier or more at ease when, by closing her eyelids, she relapses into her former state of total blindness.' A fifteen-year-old boy, who was also in love with a girl at the asylum for the blind, finally blurted out, 'No, really, I can't stand it any more; I want to be sent back to the asylum again. If things aren't altered, I'll tear my eyes out.'" — Dillard, Annie, *Pilgrim at Tinker Creek*, Harper & Row, N.Y., 1974, pp. 25-28.

An elderly Chinese woman was pushing an elderly Chinese man in a wheelchair. She was thinking: "I am stronger, because I can still walk." He was thinking: "I am stronger, because she must obey when I say, 'Push me'."

Subject, as artist begins to paint the subject's portrait: "I knew you were going to begin that way!"

Artist: "What way?"

Subject: "With a stroke of the brush like that."

Artist: "How else did you imagine I could begin?"

Subject: "Oh, I don't know — by knocking over the easel, or... ."

A good cigar is a smoke of leisure and confidence — of a man enjoying himself. A cigarette is a 20th and 21st century smoke, one for anxiety-ridden social climbers, a smoke for the perennially dissatisfied.

The five types of burglary: (1) the familiar kind, i.e., when someone breaks into your house and takes things you want; and the lesser known kinds, i.e., (2) when someone breaks into your house and takes things you *don't* want (so-called "forced entry refuse removal"); (3) when someone breaks into your house and *leaves* things you don't want (so-called "anti-burglarly" or "forced-entry littering") (4) when someone breaks into your house and leaves things you want (Santa Claus is the best-known example); and (5) when someone breaks into your house and neither takes nor leaves anything (the so-called "null burglarly").

Suppose falling down suddenly became a fad. At first, when it was not yet a fad, people would come to the aid of those who had fallen, thinking they had suffered a heart attack or stroke, then gradually would not take them seriously. Falling down dances would become popular. People would find it amusing to fall down in groups. Those with heart problems would now have to receive special training in ways of indicating that they were not merely falling down for fun.

Or consider a ballet or short silent film titled, perhaps, "The Dance of Things Falling Down", in which soon after an Everyman begins his day, he drops something, picks it up, only to have something else fall down, etc., throughout his day. What things drop, or fall down, during a typical person's lifetime?

Good intellectual conversation, like good improvisation in jazz, is unpredictable and depends not only on the participants' learning and experience, but also on their ability to be inspired by wild and often fragmentary ideas. Among the most boring intellectuals I have known have been several who could only think systematically on a subject.

Most of the men I have known who have made it clear they did not mind being regarded as geniuses, were usually intolerably dull in conversation because they made clear that either a conversation was about them or it was about nothing.

There is a thin line between genius and inanity.

"Talking to oneself" means, to most of us, carrying on a conversation with oneself in one's own mind. But if we could clone ourselves, then the phrase would also mean, e.g., carrying on a conversation with one's clone in a coffee shop. What would such an experience be like? Would each know what the other was going to say before he said it? If not, what would seem different about such a conversation as compared to a conversation with a mere friend?

In "Healing Heat: Harnessing Infection to Fight Cancer"[1], the author reports on cases that suggest that bodily heat produced by infection can increase the effectiveness of the immune sys-

1. Hobohm, Uwe, "Healing Heat: Harnessing Infection to Fight Cancer", *American Scientist*, Jan. - Feb. 2009, pp. 34-41.

tem in fighting cancer. Which raises the following questions: How do cancer rates in tropical climates compare with those in cold and temperate climates? How do cancer rates among athletes and persons doing strenuous physical labor compare to those of workers in sedentary jobs? Do cancer victims benefit from spending, say, an hour or so each day in a jacuzzi, sauna, or other elevated-temperature environment?

How should cancer research funds be apportioned? Well, the first thing to realize is that that is not the right question. The right question is, "How should we apportion the total amount of money that we have for fighting cancer so as to produce the greatest reduction in cancer deaths?"

It might be that, since lung cancer kills more people than any other type, the greatest reduction might result from anti-smoking ads on TV. (Past statistical studies of the effects of these ads will be our main guide.) The secord-greatest reduction might result from reducing exposure to sunlight, or from avoiding certain carcinogen-containing foods, or from eating more of foods that, statistically, seem to lower cancer rates, or from feasible improvements in one or more drugs, etc.

Certainly cancer research will have a place in our hierarchy of choices, but we will want to make every effort to be wary of expensive fads in the research culture. This means, among other things, that we will not turn a blind eye on folk remedies, provided that we subject them to the same rigorous statistical tests as other remedies.

Cruel though it may sound, we will not spend huge amounts on research into cures for rarely-occurring cancers.

Such a program for apportioning funds does not apply for all major diseases. It would not have applied, for example, in the case of polio, which was caused by a virus and which was cured (prevented) by the discovery of the right vaccine.

A cure for insomnia: have an intellectual tell you about his day, or have him read aloud to you out of one of the books he finds interesting.

How to decide which movie to see: suppose you and a friend want to go to a movie together. There are, say, five movies which you both are willing to see, but your degree of preference for each differs. How should you proceed? The answer is simple: (1) Each of you separately rank each movie on a scale from 1 to 5, with, say, 5 representing most preferred; (2) For each movie, compare the differences in ranking, and rank the movies by these differences; (3) Among those with the smallest difference, choose the pair at least one of which has a higher rank than any of the others of that difference.

Another method, of course, is to simply let one of you make the decision.

Backing into good taste: many men are utterly baffled by the question of how to furnish the apartment or house they live in. Perhaps they have been recently divorced, and for the first time confront decisions that up till then have always been made by the women in their lives. Or perhaps they have lived alone for years, and are tired of always having to find an excuse for not having people visit them at home. They believe that their problem is that they lack good taste in these matters. But what they really lack is a means for *getting at* the good taste they already have. (If

they didn't have it, they wouldn't be worrying about the problem in the first place.) The trick is to avoid all questions of the *right* way to furnish a home, and even more to avoid all female, zero-information advice about "expressing one's personality" and "making it look the way *you* want it to look". Instead, begin simply by comparing the interiors you come across in everyday life — those of friends, acquaintances, co-workers, those seen on TV or in movies or magazines — and ask of each, "Of all the ones I can right now recall having seen, including this one, which would I choose to live in if I were forced, on pain of death, to choose one?" The answer will usually come rapidly. That is all there is to it. When (if) it comes time to actually buy furniture, you simply decorate according to the style that was on the top of the list the last time you checked.

"You can't please everyone" is a statement accepted by everyone except politicians. But is it really true? Suppose you were given the task of sending, to everyone in the country who could read, a statement that would please them. How about "2 + 2 = 4"? Although no one, we assume, would disagree with it, not everyone would be pleased to receive such dull news in the mail. But what about a statement asserting the recipient's good looks and wonderful personality? Or a convincing announcement that they had just won a large sum of money?

Why do we always want to wash our clothes when we see a few spots on them, instead of merely removing the spots as they occur, reserving washing for those occasions when hand-removal of dirt would take more time than washing the entire garment?

Is it possible to wash your clothes and dry them at the same time? Yes, if you have several sets of identical clothes. (1) Wash first set. (2) Transfer first set to dryer and load washer with second set. (3) Turn on washer and turn on dryer. Now you are washing and drying your clothes at the same time (remember that the sets are identical). The process can be repeated, so that you can, in effect, repeatedly wash your clothes and dry them at the same time, without ever washing and drying the same set.

"Denied the opportunity to use their talents in the service of their country, [the Piranha brothers] began to operate what they called 'The Operation'. In this racket they select a victim and then threaten to beat him up if he paid them the so-called protection money. Four months later they started another operation which they called 'The Other Operation'. In this racket they selected another victim and threatened *not* to beat him up if he *didn't* pay them. One month later they hit upon 'The Other Other Operation'. In this the victim was threatened that if he didn't pay them they would beat him up. This for the Piranha brothers was the turning point." — *The Complete Monty Python's Flying Circus: All the Words*, Vol. 1, Pantheon Books, N.Y., 1989, Episode 14, p. 186.

As far as I know, it hasn't been necessary to pass a law prohibiting either The Operation or The Other Operation. Which suggests an interesting project, namely, that of making a List of Unnecessary Laws. A few that come to mind are: a law requiring every human being to sleep at least, say, eight hours a week; a law requiring winners of lotteries and other games of chance to collect their winnings; a law requiring people to be interested in sex; a law requiring heterosexual

women to wear perfume. (But in the latter two cases, we know there would be law-breakers, which introduces the whole thorny problem of finding just and fitting punishments.)

Does the law take into account the possiblity that a power failure might stop all the electric clocks and interrupt all phone communications in a region where an execution is to take place, so that there would be no way to determine that the condemned man's hour had in fact arrived?

Three ways of sending an object through space and time: (1) send the object; (2) send a description of how to make the object; (3) send the coordinates of the object if the recipient already has the object somewhere.

"This is my grandfather's axe. My father replaced the handle and I replaced the head, but it's still my grandfather's axe." — illustration, by a former co-worker, of an object-oriented programming concept

Argument against the existence of UFOs: most reports describe ships with lights; but if an alien culture wanted to study us, it would certainly not want to call attention to itself by illuminating its research vehicles. Counterargument made by a friend: the culture wants to accustom us to its presence, and assumes the best way to do this is to make its research vehicles correspond to our fantasies of how such vehicles should look.

Second argument against the existence of UFOs: that the aliens, no matter how humanoid they are reported to be, are almost invariably described as being *naked*, this despite the fact that we never imagine ourselves visiting other planets unless we are wearing so much equipment we can hardly walk.

What possible advantage is there in having disk-shaped space ships that rotate as they move ("flying saucers")? We know that rotating a space craft is a way of generating artificial gravity. Is this the reason why flying saucers spin? But then why are they never reported to be spinning with the disk in a vertical or near-vertical orientation? Is it because aerodynamically, the horizontal orientation is more efficient? How do the aliens maneuver their spinning ships in the relatively close quarters of flight near the surface of the earth? Where does the pilot sit? Does he go around and around?

Aliens in the late 20th century were almost always shown to have big eyes. In animals on earth, this feature is present in animals that hunt at night. So we may assume that most aliens come from planets with a low level of ambient light. Then why don't they wear the equivalent of sun glasses when they visit a planet that, for them, must be extremely bright?

Why not a check list for observing UFOs? In fact, why not a UFO observation kit? (A marvelous business opportunity!) It would consist of, say, a wallet-size notebook and pencil with instructions, e.g., "(1) Write down time of day when UFO is first observed, along with your location; (2) If you have a camera, take as many pictures of UFO as possible; if not, write down as exact a description as you can; (3) Use lazer distance-measuring device [which is part of kit] to determine distance and speed of UFO; write down these values; (4) At some time during this process, turn around at least once, see if UFO is still there."

Is it possible that the reason that UFOs never seem to show up on radar even though they are seen and sometimes photographed, is that the aliens are able to selectively bend electromagnetic waves *around* their spacecraft? If the spacecraft had completely non-reflecting exteriors, this would mean that spacecraft could also be rendered invisible. (What would it be like to be standing in an open field somewhere on a sunny day, looking at the clouds, the blue sky, the waving grass, the trees in the distance, and suddenly have your elbow hit something, and suddenly realize that something huge was parked in the air right next to you?)

Why it is impossible to simultaneously save water and take a shower with the water at the right temperature: Assume that, after you turn the water on, it is too hot. You now have two choices: either turn on more cold water, or turn down the hot water. The first way uses more water, so you choose the second. There is now less water flowing than when you began. But it is very unlikely, indeed impossible, that you will have arrived at *precisely* the temperature you want. Assume that the water is now too cold. Again you have two choices: either turn on more hot water, or turn down the cold. As before, the first way uses more water, so we choose the second. There is now even less water flowing than after the first adjustment. Again it is very unlikely that you will have arrived at precisely the temperature you want, so you must repeat the adjustment process. Proceeding in this manner, you will eventually have turned the shower off.

In order to get water to soak down into the soil and water the roots of plants, we keep adding more and more of it at the surface. But this is rather silly: the only purpose of the water at the surface is to push down the water immediately below it, and the only purpose of that water is to push down the water immediately below it, etc. A tremendous waste! Surely there is a better way.

A much easier way to make things smooth than sanding or polishing is by making them smaller! You can make the glossiest surface as rough and uneven as you like by magnifying it, so why not simply reverse the process whenever necessary? The procedure works in mathematics, too, as long as we realize that the term "rough", as in "rough answer" is a misnomer, and instead should be replaced by "smooth". Something is smooth when one part is identical to another. Therefore two answers which are "the same" are "smooth". So if your answer disagrees with the correct answer in, say, the third decimal place, just shrink your answer to two decimal places — or one, or none, or simply to the sign of the number, or to the type of number, or to ... Sooner or later, your answer will agree with the correct one.

A nervous person is giving a speech. He recalls reading somewhere that one way to overcome nervousness is frankly to admit it to the audience, so he pauses in his given topic. Sweat is breaking out on his forehead.

"I know that you are being made uncomfortable by how nervous I appear to be.You are beginning to wish you could leave. But you're not sure if you should, especially given how nervous and unsure of myself I already am. You wish I would return to my scheduled topic at least. I wish I would, too, but I am trying to overcome my nervousness by this method which I am using now, which someone told me would work. But it doesn't seem to be working. In fact, you are more uncomfortable than you were a few minutes after I began, and it was clear how uncomfortable I was then. I'm sure we both wish we were somewhere else. I know I do. But we're just not sure who should make the first move. We are wondering if perhaps the program chairman might not interrupt at any moment and announce that maybe it would be better if we resumed at another time. But perhaps he too is worried about becoming afflicted with the same problem I am, namely, that of telling the truth about the present. A laudable practice, some will say. Though not for those of us trapped in this present situation..."

"[TV announcer] Good evening. Well tonight, we are going to talk about...well that is...*I* am going to talk about...well actually I *am* talking about it now...well I'm not talking about it *now*, but I am *talking*...I know I'm pausing occasionally, and not talking during the pauses, but the pauses are part of the whole process of talking....when one *talks* one has to *pause*...er...like then! I paused...but I was still talking...and again there! No the real point of what I'm saying is that when I appear *not* to be talking don't go nipping out to the kitchen, putting the kettle on....buttering scones...or getting crumbs and bits of food out of those round brown straw mats that the teapot goes on...because in all probability I'm *still* talking and what *you* heard was a pause...er...like there again. Look! To make it absolutely easier, so there's no problem at all, what I'll do, I'll give you some kind of sign, like this *(makes a gesture)* while I'm *still* talking, and only pausing between words...and when I've finished altogether I'll do this. *(he sits upright and folds his arms)* All right?

"(Superimposed caption: 'The End')

"[Announcer] No, no! No sorry — just demonstrating...haven't finished. Haven't started yet. *(the caption is removed; he sits and tries to gather his thoughts then suddenly remembers)* Oh dear. *(does the gesture hastily)* Nearly forgot the gesture..." — *The Complete Monty Python's Flying Circus: All the Words*, Vol. 2, Pantheon Books, N.Y., 1989, p. 100.

Just as there are towns which consistently seem to vote the way the nation as a whole votes, and thus can be used to predict the outcome of elections, so there are individuals whom we might call "influential particles" (Marshall McLuhan claimed they are usually artists) because they always seem to become interested in things which the entire culture soon becomes interested in also. In passing, it should be mentioned that the so-called "Pigeonhole Principle" in mathematics assures us that, if the number of things it is possible to be interested in is small enough, and the number of individuals is large enough, then there must be at least two individuals who are interested in the same thing. (This Principle can be used, incidentally, to prove that there are at least two people in the New York Metropolitan Area who have the same number of hairs on their

head.) Which calls to mind the gambling fraud originally perpetrated in Italy, in which prior to each of a series of horse races, letters predicting the winner were sent to names on a number of mailing lists. Then an offer was made to sell the miraculous scheme by which the correct winners were predicted. Many of the persons on one of these mailing lists responded, being convinced that the scheme was valid, when, in fact, the perpetrators had simply made sure that the number of mailing lists was large enough so that, if they named a different horse to each list, one list would, in fact, receive the names of all the winners.

Consider the dilemma of a person who knows that he is an influential particle. He knows that whatever his thoughts, say, on how to vote on a certain proposition, are the thoughts of someone else as well. He cannot outwit the other person, cannot one-up him, cannot go his separate way, because in so doing he would be outwitting, one-upping, himself.

If you live in an age in which anything is tolerated, you should make a special effort to discover what is *not* tolerated — "probe the edges of the culture" —, e.g., find out what causes embarrassment. In this age, consider: any of the numerous social blunders in the academic world; driving too slowly in traffic (i.e., at the speed limit); accidentally sending the wrong greeting card, e.g., congratulations when the occasion is a death in the family; entering, and being seen in, a restroom for the opposite sex; farting in a small room containing an important gathering of people you know; leaving the toilet unflushed after a bowel-movement in a place where others will know you did so.

The most peculiar thing of all is that there is such a thing as *familiarity.* How is such a thing possible in this appalling absurdity, this dreadful mistake, which is our universe? How can anything anywhere ever become *familiar*?

"If I had to produce a slogan for the search I see ahead of us, it would read like this: That we shall first understand how simple the universe is when we realize how strange it is." — physicist John Archibald Wheeler, quoted in Ferris, Timothy, *Coming of Age in the Milky Way*, Doubleday, N.Y., 1988, p. 187.

The greatest crime that extraterrestrial beings will commit against us, once they make their existence publicly known, will be the theft of familiarity from every aspect of our lives.

Our first and foremost duty is to learn to regard ourselves as the extraterrestrials we are. There are many ways to begin: one is by realizing how utterly strange the act of walking is.

You can pipe in sound, but you can't pipe in silence.

"The flies crawl on our faces trying to drink from our eyes." — Bowles, Paul, quoted in Craft, Robert, "Pipe Dreams", *The New York Review of Books*, Nov. 23, 1989, p. 8.

"As I was speaking, my right shoe had caught fire again, and it took me quite some time to scrape off all the phosphorous." — Heisenberg, Werner, *Physics and Beyond*, Harper Torchbooks, N.Y., 1972, p. 187.

"No room has ever been as silent as the room
Where hundreds of violins are hung in unison."
— Longley, Michael, "Terezin", in *Gorse Fires*, Wake Forest University Press, 1992, reviewed in *The New York Review of Books*, June 25, 1992, p. 16.

The longer the ship, the shorter the trip

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