Noesis

The Journal of the Mega Society
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EDITORIAL
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Evidently Chris Cole has been covering for me while I putz around. For those of you he's told about my dad, here's the scoop:
A. He belongs to Kaiser, which is scary all by itself, since they tend to be cost-conscious and complacent even about a F***ING HUGE LUMP in his chest, growing rapidly.
B. After several months of x-raying lump & saying we dunno what it is, somebody decides it's an aortic aneurysm, which can blow at any time.
C. It's a misdiagnosis, but it gets their asses moving, diagnostically. They find that it's a recurrence of thyroid cancer from 1984. This is not necessarily horrible news, since it tends to be curable.
D. However, months of jacking around has allowed lump to engulf some of the clavicles & sternum. Involved area must be excised in an eight-hour operation, which goes well, taking only six hours.
E. However, six weeks later, during the post-op iodine scan, it's found that the lump has regrown to it's pre-op size.
F. The following week, we're told the x-ray was misread. No lump at all. My dad is doing great. We're optimistic about a complete recovery.

In the middle of this, my best friend, a grad student in biochem who knew what he was doing, took cyanide.

Save your sympathy. If I had any class, I wouldn't have mentioned this stuff at all and would have gotten Noesis out on time. Thanks for letting me periodically try your patience.

Taking GRE's for credit is going well. Taken four so far, plan on taking seven or eight more. Any of you could accumulate years of college credit (one year per three-hour GRE!) doing the same thing. Lemme know if you want to be bored with the specifics.

Just read that Ron Hoeflin is also increasing his dues to $2.00 an issue. But here's my special deal to you, since it's taken so long to get these issues out. Subscription money received between January 5 and February 10 will be credited at a cost of $1.60 an issue. After that, it's two bucks per. Please make checks payable to me, rather than to Noesis. Thanks.

Daryl Inman recently had his analogy tests printed in two high-circulation magazines. His **Quest Test** appears in this month's **Omni** (It's the new "World's Hardest I.Q. Test."), and his **Crypto-Analogies Test** appears in some Canadian mag called **SBT**.

Robert Hannon and **Norman Hale**--I've got material of yours to be stuck in the February issue.

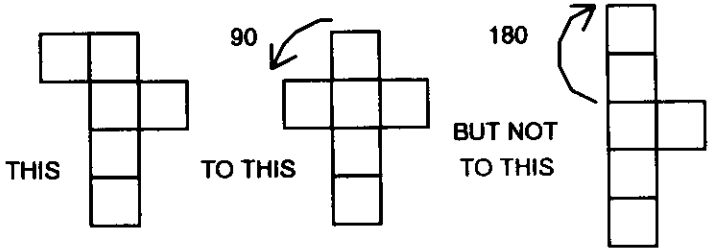
SHORT FORM TEST
QUESTIONS AND ANSWERS TO DATE
WITH TWO NEW PROBLEMS

1. Six squares can be joined edge-to-edge to form a two-dimensional shape. Some of these shapes can be folded and joined along the squares' edges to form complete cubes. How many different arrangements of six squares can be folded into cubes? (Count reflections as distinct, but not rotations.) (Rick Rosner)

Answer: 20.

2. Eight cubes can be joined face-to-face to form a three-dimensional shape. Some of these shapes can be folded and joined (fourth-dimensionally) along the cubes' faces to form hypercubes. How many different arrangements of eight cubes can be folded to form hypercubes? (Again, reflections, but not rotations, are distinct.) (Rick Rosner)

Hints: I know the answer to the first problem, but the second is brutal. You don't need to be able to think in 4D's to solve it, however. Each member of the set of six-square shapes that can be folded into cubes may be transformed into any other member through a series of 90-degree rotations of its constituent squares around the squares' corners. 180-degree rotations are not allowed.



Similarly, each member of the set of eight-cube shapes that can be folded into tesseracts may be transformed into any other member through a series of 90-degree rotations of its constituent cubes around the cubes' edges. Again, 180-degree rotations aren't kosher. Any legal rotation produces a member of the set. All you have to do is find one unfolded tesseract; the rest is just finding legal rotations in three dimensions.

There are as many ugly problems of this type as there are unfolded polyhedra and hyperpolyhedra. The set of unfolded tetrahedra is trivial, and the set of unfolded octahedra is easy, (Is it equivalent to the set of unfolded cubes? I forget.) as is the set of unfolded hypertetrahedra. The sets of unfolded icosohedra and dodecahedra are nasty (but equivalent?).

Answer: ?

3. 0, 1 ,7, 2, 5, 8, 16, 3, 19, 6, 14, 9, 9, 17, 17, 4, 12, 20, 20, 7, 7, 15, 15, 10, 23, 10, ? (Eric Erlandson)

Answer: 111 (the number of operations of the famous "3x+1" function to work from n to 1)

4. 10, 10, 171, 186, 2748, 3258, 43981, 56506, 703710, 974010, 11259375, ? (Eric Erlandson)

Answer: 16702650 (In hexadecimal, A, A, AB, BA, ABC, CBA, ABCD, DCBA, ABCDE, EDCBA, etc.)

5. BODY : HOLE :: MAX : ? (Mike Price)

Answer: STEPHEN (black body radiation: black hole radiation :: Planck: Hawking)

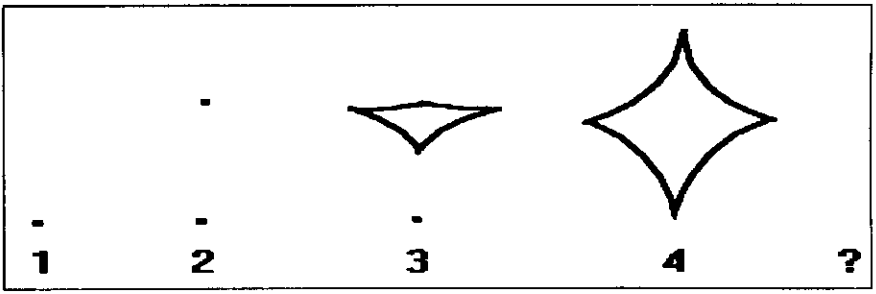
6. You are lost in a half-planar forest, bounded on one side by a linear road. The forest is too dense for you to be able to see the road until you walk right up to it. You know that you are within one mile of the road, but are unable to determine the direction to it. What is the length of the shortest path that will guarantee your reaching the road? (Dean Inada)

Answer: $\sqrt{3} + 7\pi/6 + 1 = 6.397242237$ miles

7. If $f(f(x)) = \sqrt{1-x^2}$ what does $f(x) = ?$ (Chris Cole)

Answer: $f(x) = \sqrt{\frac{1}{1+i} + ix^2}$

8. (Rick Rosner)



Answer: a heptagon with concave sides and minus its middle.

9. 0, 20, 6, 2, 5, 4, 2, 6, 0, ? (Jeffrey Wright)

Answer: one quadrillion (smallest nonnegative integer containing each letter of the reverse alphabet)

10. Consider the "volume" of an n-dimensional sphere of radius r. For n=1, 2, 3 the "spheres" are the line segment, the circle, and the sphere, and the volumes are $2r$, πr^2, and $4/3\pi r^3$. What is the volume of an infinite-dimensional sphere, radius r? (Marshall Fox)

Answer: 0 ($\lim_{n \to \infty} \frac{\pi^{\frac{n}{2}} r^n}{(\frac{n}{2})!}$)

11. 95 : 98 :: VENITE : ? (Pomfrit)

Answer: CANTATE

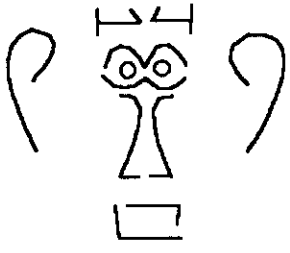
12. MINCES : EYES :: PORKIES : ? (Pomfrit)

Answer: LIES

13. 2823 : 5331 :: ELEPHANT : ? (Pomfrit)

Answer: ANTIQUARIAN

14. (Sharp)



W Sharp

Answer: ?

15. At each point in the Cartesian plane whose coordinates are both integers, an equilateral triangle is centered. Each triangle is free to pivot around its center, all triangles are the same size, and no triangles overlap. What is the maximum length of the triangles' sides (and what is the maximum percentage of the plane's area they can cover)? (Rosner)

Answer: ?

16. A goat is tied to a post on the circumference of a circular meadow with a diameter of 100 meters. Determine the goat's "radius of action" when the pasture ground within its reach is exactly one half of the circle's area.

Answer: 57.9365 square meters

17. In what order are these signs arranged?

E I S H 5

Answer: Number of dots in Morse code.

18. MORE : BOLSHEVIK :: LESS : ? (Eric Erlandson)

19. Given a solid sphere sliced by n planes,
a. Find a general expression for the maximum number of undivided volumes.
b. Calculate the number of these volumes which are tetrahedrons, pentahedrons, etc., and the number of volumes which have a section of the sphere surface as a "side." Do the proportions of numbers of these various polyhedrons approach limits as n goes to infinity? If so, calculate them. (Glenn Morrison, extracted from letter later in this issue).

PROBLEM ANSWER

Dear Rick:

Here is my answer to problem 16, page 12, in Noesis 74, about the goat. I get a radius of 57.936 meters.

Yours truly,
John W. Mathewson

[Right! 57.9365 gives you one more digit.]

ANALOGY PARIS

M.N. van der Riet
Republic of South Africa
October 1990

1. VICTORIANISM: HIPPOCRATISM :: VICTORIA:
2. VICTORIANISM: HIPPOCRATISM :: COINS:
3. NIGHT: DAY :: NOCTURNAL:
4. NIGHT: DAY :: NYCTALOPIA:
5. STABILISER: ELEVATOR :: FIN:
6. STABILISER: ELEVATOR :: WING:
7. GRAPE: PLUM :: VINEYARD:
8. GRAPE: PLUM :: BRANDY:
9. AMERICAN: RUSSIAN :: ASTRONAUT:
10. AMERICAN: RUSSIAN :: RUTHERFORDIUM:
11. MALE: FEMALE :: ARRHENOTOKY:
12. MALE: FEMALE :: DECATHLON:
13. TEA: COFFEE :: THEACEAE :
14. TEA: COFFEE :: INFUSION :
15. HUMAN: CATTLE :: CORPSE:
16. HUMAN : CATTLE :: EUNUCH:
17. FEMALE: MALE :: SIREN:
18. FEMALE: MALE :: CARYATID:
19. MOON : EARTH :: APOCYNTHION:
20. MOON: EARTH :: SELENIUM:
21. URSA MINOR: CANIS MAJOR :: BEAR:
22. URSA MINOR: CANIS MAJOR :: POLARIS:
23. GREENHEART: PROTOPLASM :: RENEGADE:
24. GREENHEART: PROTOPLASM :: GENERATE:
25. BILE: CHOLAGOGUE :: SMELL:
26. BILE: CHOLAGOGUE :: SALIVA:

27. JEW: CATHOLIC :: RABBINICAL:
28. JEW: CATHOLIC :: YARMULKE:
29. HYDROLYSIS: ESTERIFICATION :: EVAPORATION:
30. HYDROLYSIS: ESTERIFICATION :: K-CAPTURE:
31. ITALY : INDIA :: SICILY
32. ITALY: INDIA :: LATIN:
33. TRANSPARENT: DIAPHANOUS :: NEPTUNE:
34. TRANSPARENT: DIAPHANOUS :: ACUTIFOLIATE:
35. TOBACCO: NICOTINE :: CINCHONA:
36. TOBACCO: NICOTINE :: POMEGRANATE:
37. KIP: AT :: KYAT:
38. ICIP: AT :: LEU:
39. PIG: PORK :: GAME:
40. PIG: PORK :: SNAIL:
41. SECTIONAL: COASTLINE :: OOCYTE:
42. SECTIONAL: COASTLINE :: VACUOLATE
43. BOL: ERO :: FLAM:
44. BOL: ERO :: LAB:
45. TREE: SPOON :: ARBOR:
46. TREE: SPOON :: BONG
47. PARIS: COPENHAGEN :: FRANCE:
48. PARIS: COPENHAGEN :: LUTETIUM:
49. RED: BLUE :: GREEN:
50. RED: BLUE :: ERYTHEMA:
51. 5169: 120 :: 1010000110001:
52. S169: 120 :: 1010111:
53. HEAT: WIND :: THERMOMETER:
54. HEAT: WIND :: IGNEOUS:
55. 5: 2 :: HE:
56. 5: 2 :: LOAF:
57. 2: 5 :: He:
58. 2: 5 :: DOMINO:
59. DOWN: UP :: SNAKE:
60. DOWN: UP :: STRANGE:
61. 4N + 3: 4N + 2 :: 7:
62. 4N + 3: 4N + 2 :: ACTINIUM:
63. FROLICSOME : MOORS :: STAGE-COACH:
64. FROLICSOME : MOORS :: SHIGELLA
65. CHILD: ADULT :: IMP:
66. CHILD: ADULT :: RACHITIS:
67. LOOK: TOUCH :: VISUAL:
68. LOOK: TOUCH :: VOYEUR:
69. ANAPAEST: DACTYL :: IAMBUS :
70. ANAPAEST: DACTYL :: U:
71. CRICK: WATSON :: PENZIAS:
72. CRICK: WATSON :: HERTZSPRUNG:
73. X: X + 1 :: HARVEST MOON:
74. X: X + 1 :: O H M S:
75. HYDRA: HERCULES :: MEDUSA:
76. HYDRA: HERCULES :: CHIMAERA:
77. DISCRETE: CONTINUOUS :: CHILIAGON:
78. DISCRETE: CONTINUOUS :: BINOMIAL:
79. F#: G♭:: STOAT:
80. F#: G♭:: TERJUBILEE:

81. GENERAL: SPECIFIC :: GEOSYNCHRONOUS ORBIT:
82. GENERAL: SPECIFIC :: CRYPTARITHM:
83. 22: 9 :: LOLLO:
84. 22: 9 :: TITANIUM:
85. ARRIVAL: DEPARTURE :: LAND:
86. ARRIVAL: DEPARTURE :: RUDIMENT:
87. RUSSIA: SOMALIA :: MOSCOW:
88. RUSSIA: SOMALIA :: OBLAST:
89. IS: WAS :: ANTIMONY:
90. IS: WAS :: SCHIZOPHRENIA:
91. SiO2: TiO2 :: SILICON:
92. SiO2: TiO2 :: SILICA:
93. OHM : MHO :: SEMORDNILAP
94. OHM: MHO :: HALF:
95. AEEOUU: EUOUAE :: CHRTW:
96. AEEOUU: EUOUAE :: DKRTYZ:
97. MKS: MTS :: KILOGRAM:
98. MKS: MTS :: NEWTON:
99. APPLE: PEAR :: POMUM:
100. APPLE : PEAR :: CIDER:
101. RIDGE: FURROW :: GYRUS:
102. RIDGE: FURROW :: HORST:
103. 100: 9 :: MEDUSA: (INMAN)
104. 100: 9 :: PERCENTILE: (HOEFLIN)
105. CIS: TRANS :: MALEIC:
106. CIS: TRANS :: OLEIC:
107. 12: 21 :: 144:
108. 13: 31 :: 169:
109. 930: 969 :: CMXXX:
110. 930: 969 :: ADAM:
111. 2: 3 :: VENUS:
112. 2: 3 :: RELAPSE:
113. CONFESSION : OF SIN : CoNFeSSiON:
114. CONFESSION : OF SIN : GOBBLEDYGOOK:
115. SOLDIER : SAILOR :: MILES:
116. SOLDIER : SAILOR :: MILES PER HOUR:
117. VARICES : VISCERA :: VARIX:
118. VARICES : VISCERA :: ENTICER:
119. JOY: SORROW :: LAETITIA:
120. JOY: SORROW :: THALIA:

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October 2, 1992

Dear Mr. Rosner:

Thank you for your telephone call regarding my letter. I am still interested in your organization and I would like the Mega members to be involved in my software projects, hopefully to be awarded by the Federal government.

Please provide me with the following information;

1) membership list, including addresses and telephone numbers;

2) a sample newsletter;

3) I intend to write to all members requesting a copy of their resume to find out how each member can contribute to my software projects. If you are a member please send your resume.

I appreciate your prompt response.

Sincerely,

Mark Downey

[If anyone doesn't want their name & number supplied, let me know. Otherwise I'll send Mark Downey a list in February.--Ed.]

IN THE NEWS:
THE THREE CUBES

The Artist, the Physicist and the Waterfall

Roger Penrose, now a professor at the University of Oxford, was a 23-year-old graduate student when he encountered the geometric art of Maurits C. Escher at a mathematics conference in Amsterdam in 1954. Since then, the British mathematician and physicist seems to have shared a mysterious, space-and-time-transcending bond with the late Dutch artist.

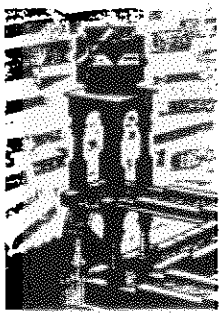
Like many mathematicians, Penrose was fascinated by Escher's playful exploration of such concepts as symmetry and infinite regress—and his manipulation of perspective and geometry to construct "impossible" objects, which violate the rules of three-dimensional reality. Escher's drawings inspired Penrose to doodle an impossible object of his own, a "tribar" made of three conjoined beams. The tribar appears straightforward at first, but as one traces its beams one realizes that they—or is it space itself?—must be twisted.

Penrose showed the tribar to his father, Lionel, a prominent geneticist from whom Roger inherited his love of puzzles. Lionel responded by sketching an impossible staircase, one that seems to ascend but somehow keeps circling back on itself. Together father and son wrote a paper describing the triangle and staircase and sent it to Escher. The paper, published in the *British Journal of Psychology* in 1958, spurred Escher in turn to create two of his most famous lithographs: *Ascending and Descending*, which depicts monks tramping up and down a Sisyphean staircase, and *Waterfall*, which transforms Roger's tribar into a perpetually flowing circuit of water.

The story resumes three decades later. In May 1991, when Penrose attended a meeting in Copenhagen on quantum physics. There he heard the physicist Asher Peres of Technion University in Israel lecture on hidden-variable theories. These theories attempt to explain quantum effects such as nonlocality—in which particles emitted by a common source influence one another across vast distances—in classical terms, by invoking undetectable forces or properties. Peres proposed that one can unambiguously rule out a broad class of hidden-variable theories by measuring the spin of a particle with respect to 33 directions, defined by coordinates in three dimensions.

Penrose, who often tries to envision concepts in geometric terms, asked Peres if his coordinates corresponded to any interesting polyhedrons. "He just looked at me blankly," Penrose recalls. "So I decided I'd draw some pictures and see if they made any sense." Sure enough, as Penrose plotted Peres's coordinates, a complex polyhedron emerged on the page. It consisted of three interpenetrating cubes, each rotated 90 degrees with respect to the others. "I looked at it," Penrose says, "and I thought, 'Gosh, I've seen that somewhere before.'" Suddenly he remembered: Escher had set just such a polyhedron atop the left-hand tower of his waterfall structure. Penrose has written up his "curious" finding for a volume of papers to be published in memory of the great quantum theorist John Bell. Unfortunately, Penrose cannot send the paper to Escher, because the artist died 21 years ago.

Penrose did meet Escher once, in 1962. "I happened to be driving in Holland," he recalls, "so I phoned him up, and he invited me over for tea." Penrose presented Escher with a puzzle: a set of identical polygons that, if fitted together properly, could generate an infinite plane. Escher later solved the puzzle—the key was flipping over some polygons to turn them into mirror-symmetric counterparts—and in 1971, just before he died, he drew a picture based on the puzzle.



QUANTUM POLYHEDRON adorns a tower in M. C. Escher's Waterfall.

In one respect, the encounter was a bit disappointing. "I thought his house might have a staircase going out the window or something," Penrose remarks. "But everything was very neat and organized." —*John Horgan*

PRECIS FROM RICHARD W. MAY

Richard W. May, M.A.

"I"

Born near the rarified regions of Laputa, then, and often, above suburban Boston, during the Year of the Monkey, I am a Piscean, cerebrotonic ectomorph, and an ailurophile. Kafka and Munch have been my therapists and allies. Ever striving to descend from the mists and to attain the mythic orientation that is known as having one's feet upon the earth, I have done occasional consulting and frequent Sisyphean schlepping.

A paper tiger with letters after my name, I have been awarded an MA degree, *mirabile dictu,* in the humanities by Cal. State, Diplomate status in ISPE, and a U.S. patent for a board game of possible interest to aliens. As the author of *Autoanthropophagy: the Eucharist of the Gods, a Seven-level Allegorical Encryption,* it is fitting that I am a member of Mensa, ISPE, Prometheus, Mega, and the Aleph Nine. As founder of the Aleph, itself, and the renowned Laputans Manqué, I am a biographee in Marquis *Who's Who in the World*.

A sleeping dragon, to sleep, per chance, to dream? Most significant to me is the *philosophia perennis* and the realization of the idea of man as an incomplete being who can and should complete his own evolution by effecting a change in his being and consciousness.

Glenn Arthur Morrison
706 Brown Av
Evanston, IL 60202

Dear Rick:

Thanks for the back issues- great reading. Boredom coefficient is under control again for now. Enclosed is $10 for renewal.

I've come up with what is probably an unoriginal method on scoring IQ tests, but I'll take up some space with it anyway:

Suppose that the problems are arranged on the test in increasing order of difficulty. Then weight the scores for the correct answers exponentially in that order, and weight them also for the proximity of other correct answers.

This method essentially determines the maximum difficulty level at which the subject gets a considerable fraction of the problems correct. This would encourage the test-taker to do only those problems which are around the proper level for that individual. If a weak subject gets lucky with a harder problem, the proximity factor will reduce its effect on the total score. Similarly, careless mistakes on easier problems will have little effect. The score that one ends up with can be used in place of the simple raw score as a possibly more accurate indicator.

I played around with various formulas for the total processed score until the following one suggested itself:

$$S = \ln\left[1 + \sum_{n=1}^{48} \sum_{\substack{m=1 \\ (m \neq n)}}^{n} k^n \, c(n)\, c(m)\, e^{-p(n-m)^2} + \sum_{n=1}^{48} w^n \, c(n)\right]$$

where k around 1.3 is best, and $w = 1.08$

c(n) = 1 if nth answer correct, 0 if wrong

p = about 0.2

I have programmed this on the PC, (listing available) and have tried it, with interesting results, on some of the data Ron provided in a past issue for the 100 top scorers on the Mega. One testee with a raw score of 44 had the highest rating, having missed some of the easier problems.

Here are some skull busters to fool around with:

Given a solid sphere sliced by n planes,

1a. Find a general expression for the maximum number of undivided volumes.

b. Calculate the number of these volumes which are tetrahedrons, pentahedrons, etc, and the number of volumes which have a section of the sphere surface as a "side". Do the proportions of numbers of these various polyhedrons approach limits as n goes to infinity? If so, calculate them.

2. What word can be humorously defined by deleting a single letter, creating two words? (More than one answer may exist).

I think that Noesis can serve a very important function: that of airing informed speculation, including those ideas that may not be quite ripe, in that grey area between the orthodox and the unsound, that more staid journals would be reluctant to touch.

Mr. Jefferson had an astonishing insight into matters political. He said that when the day arrives that the people discover they can elect politicians who will plunder the national treasury on their behalf, that will be the death knell of the republic. I have been pondering why it is that while everyone seems to be working harder, the general standard of living is going down. The only answers that make the least bit of sense to me are: 1. that resources are finally beginning to run out, relative to the population, and 2. that an ever larger proportion of the people are engaging in non-productive parasitic occupations like law, advertising, middleman stuff, useless services, trash entertainment, etc.

I am pro-choice on abortion, and I think the drug war will have no more success than alcohol prohibition. To paraphrase H. L. Mencken, any idiot can find something to ban.

We are being blindsided by a form of totalitarianism that we are unprepared for because it has no name. We are the French generals in 1939 who were preparing for the last war instead of the next. It is not a specific Right or Left that we can point to and say Aha, there he is, another Hitler sneaking up on us. If we look at the situation before the revolution in Russia, and in Germany accompanying the rise of the Nazis, what do we see? An outbreak of nihilism, occultism, superstition, a general breakdown in reason. The signs today are book censorship, seizure of property without due process, lawsuits used for intimidation, computerized surveillance of workers in the private sector, "politically correct" university managements glorifying ignorance, trashing the First Amendment along with the ideal of rationality itself, and so on down the list, all of it feeding on a popular culture in a state of terminal vapidity, and a matching level of public education...whew...Exit soapbox.

In reply to the "if you're so smart..." category of question, an apt quotation from chairman H. Ross Perot: "Money makes you stupid"

Answer to Peter Schmies' problem #17: In order of the number of Morse code dits. (too easy for a radio ham)

- Glenn Arthur Morrison

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'Mega Test weighting and analysis.  (Microsoft QuickBasic)

CLS
DEFDBL A-Z
DIM c(48)
DIM f(48)
'order of difficulty:
DATA 1,2,3,42,6,18,29,11,12,5,43,14,10,25,31,39,17,27,28,9,46,40,13,15
DATA 38,4,26,32,37,8,44,19,16,45,35,34,24,23,41,47,7,30,33,48,22,21,20,36

DO
 FOR n = 1 TO 48

  PRINT n;
  DO
    a$ = INKEY$
  LOOP UNTIL a$ <> ""

  IF a$ = "1" THEN
    c(n) = 1
  ELSE
    c(n) = 0
  END IF
  PRINT c(n),

 NEXT n

FOR m = 1 TO 48
  READ d
  f(m) = c(d)
NEXT m

s = 0
FOR n = 1 TO 48
 FOR m = 1 TO n

  IF n <> m THEN
    s = s + (1.3 ^ n) * f(n) * f(m) * EXP(-.2 * (n - m) ^ 2)
  ELSE
    s = s + f(n) * 1.08 ^ n
  END IF

 NEXT m
NEXT n

 PRINT LOG(s + 1)
 RESTORE

 DO
  b$ = INKEY$
  IF b$ = "q" THEN END
 LOOP UNTIL b$ = "m"       'type "m" for another series.

LOOP
```

ARTICLE FROM LEROY KOTTKE

The FTUP Hypothesis

The extraction of meaning from any given context is never easy, except in a trivial sense. I have found that, as a check on relevance, if I can find ideas that exist in different contexts, but illustrate the same general idea, I can regard each such contextual transcendence as a metaphor. Furthermore, I regard the multiplicity of references as a metaphorical set. The import of the meaning is proportional to the number of contextually transcendent references.

I'm thinking specifically about the set which includes the Heisenberg Uncertainty Principle, the Fourier Transform of a time-space limited energy pulse, Bohr's "Complementarity" which I believe referred to the same characteristic of nature, and, I believe, Godel's theorem, which is nothing more than the logico-mathematical equivalent of H.U.P. There may be others.

My point of reference is the Fourier Transform. Fundamental to the determination of the precision of a certain frequency, is the inevitable time window which surrounds the observation. I simply don't have the infinity of time available which is required for absolute accuracy in this case, and what, after all, in our observations is NOT enveloped by a finite time window? The universe at large is only about 18*10^9 years in time extent. This enforces an upper limit on our observational precision; certainly in terms of the complement of time known as frequency. If no single part of the universe is older than 18*10^9 years, then that imposes the restriction that I cannot expect to resolve single frequencies (events) with accuracies greater than roughly 1/18*10^9*86400*365.25 Hz. That's about 1.76*10^-18 Hz. That's a pretty low frequency error. But it's inescapable and fundamental and it has nothing to do with instrumentation errors. If the BIG CRUNCH started right now, then the event known as the life cycle of this universe would be characterized by a frequency of one cycle in 2*18*10^9 years, and it could be said that an equivalent precision of one event per 2*18*10^9 years, which is about 8.8*10^-19 Hz, could be associated with it. The life time of the universe would have to extend to eternity so that it could be said that arbitrary precision could be associated with it's life cycle.

The infinite set of related multiple events (harmonic frequencies) associated with an energy pulse do exist simultaneously as a complement to the time of the pulse. The shorter the time, the more uncertain is the frequency. Until, in the limit, I can't be sure that ALL frequencies (events) aren't present! The more (longer in terms of time) I examine something in terms of a given characteristic, the less certain I am of that characteristic which is complementary to it (its frequency) and vice-versa. High

frequencies are associated with shorter times, as I mentioned above, and in the limit, all events (frequencies) have about the same probability of occurence as any other within a single frequency (event) uncertainty envelope. In one sense this state of affairs says to me that if I limit my observation time to a very short time, then the probability of similar events (frequencies) coexisting, is enhanced, and in the same manner, the probability of a single frequency (unique event) existing alone, is reduced. I suspect that this may provide a mathematical structure for SYCHRONICITY.

The above observations are equally true if the word "space" is substituted for "time", in this case, the window is quite literally a window, an aperture through which I am forced to view the outside world; the smaller the window, the less certain I am of the spatial extent that might unambiguously characterize my unknown object. The smaller my window, the more likely the object I am viewing is NO specific or definite object. The wider my window, the more certain I am that it is a specific object. So the complement of time, it seems is an analog for the NUMBER of events. The complement of space, in the same way can be viewed as an analog for the NATURE of events.

I have so far dealt with the limits of space and time separately, and now let's consider other, derived, limits. One would be velocity. What limits are imposed by a finite velocity (say C, the velocity of light.)? First, to come to grips with units, we consider the space time aspects of light velocity C. C = approximately one foot per nano-second. From the previous discussion of universal dimensions as to age, we can now determine size. 18*10^9 years = 5.68*10^17 seconds since the BIG BANG. This, assuming isotropic expansion at the speed of light, gives us 10^9 feet/sec * 5.68*10^17 sec = 5.68*10^26 feet as the radius of the universe. Twice this radius would yield the apparent window width required to encompass all objects within the universe. Thus 11.36*10^26 feet should suffice for an outside observer to get a good (unambiguous) look at our universe. Calculating the MAXIMUM AMBIGUOUS space-time interval for an observer involves using these same numbers over again. Recalling that the BIG CRUNCH, if it happened today, would find the universe in approximately this state, would have to collapse through 5.68*19^26 feet, and could be said to have to traverse this distance in about the same time it took to expand to this point. This gives a complete cycle space of 11.36*10^26 feet. The complementary Fourier Transform space is about 1/11.36*10^26 = 8.8*10^-28 and the units are 1/distance in feet; we don't have a word for inverse distance, so how about perfeet. This, then, would be the window size that it is not necessary to reduce so that maximum ambiguity would be preserved; 8.8*10^-28 perfeet.

The time aperture limit determines 8.8*10^-19 Hz as a frequency resolution limitation on universal observations at this stage in the life cycle of the universe, and of course this quantity decreases with time. The space aperture limitation is 8.8*10^-28 perfeet, or 2.68*10^-26 percm. If I take the ratio of these two quantities, (8.8*10^-19/8.8*10^-28), I arrive at 10^9 Hz-feet, which is the complement of 1 foot per nano-second; the speed of light.

The maximum frequency of EMR predicted by this hypothesis is 1.1194*10^36 Hz (3*10^10 / 2.68*10^-26), with a corresponding time (time quantum) of 8.933*10^-37 secs. (1/1.1194*10^36 Hz).

If I multiply the 8.8*10^-19 Hz with the time quantum, I arrive at the counterpart of the HUP which results from the FTUP. The product is: 7.861*10^-55; let's call this constant Kf; the units are Hz-secs, and this quantity might be called the observational uncertainty of any time and space limited observation.

This seems more fundamental than the HUP and suggests an experiment to determine the age of the universe. By independently determining the maximum frequency of EMR, and correcting the age of the universe to correspond to that frequency. For example, the whole wavelength of this maximum frequency, would correspond to 8.8*10^-28 perfeet, at light velocity. This translates to 2.68*10^-26 percm or 2.68*10^-18 PerAngstroms.

The use of this observational constant is illustrated by a few examples. Kf is a dimensionless constant, since Hz-sec = (1/sec)*sec = 1, this means that I get out what I put in. Let's plug in the minimum universal freqency (Fumin), if I divide Fumin by Kf I get Fumax - 1.1194*10^36 Hz. If I plug in Tmin and divide by Kf I get 1.1364*10^18, the projected one cycle age of the universe. And so it can be seen how these quantities are mutual inverses.

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ON FREE WILL

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I see something of a debate is raging in Noesis on the subject of free will. I am something of an agnostic on the subject, but would like to contribute a few ideas.

First of all, we read that man has no free will, he is (just) a machine. According to this reasoning there is no such thing as a mind, there are only brains. This reasoning agrees with Mary Baker Eddy that "there is no life, truth, intelligence... in matter," and it says matter is all there is. All is mechanism. Backing this up is Kevin Langdon writing about mental "forces," as though minds are mechanisms. I.e. he begs the question.

The notion that all men are "only" machines is just as much a leap of faith as to say that the streets of heaven are paved with gold. It is totally unprovable by any conceivable experiment, the actions of split-brain persons notwithstanding. I have written it before: There is no free will visible in any person as seen from the outside. Any action can be explained by non-psychic factors.

From the inside free will means that even if my body is enslaved, I can will just as well as any free person. I can make choices. I am made in the image and likeness of God, and breathe with His breath. Making good choices is, if I read the Bible aright, the highest and most valuable achievement. Making choices is a fundamental experience which almost anyone can have. How can it be argued away?

Speaking for myself, I usually do not want free will. I want fidelity to the good, as best I can understand the good. A radical free-willer might say that I choose to reaffirm previous choices. I often find myself unable to do right, and unable to will to do right. Then I usually pray for the ability to will to do right. Often I don't get it, but then I reflect that hungering and thirsting after the will to do right is in fact hungering and thirsting after righteousness, and Jesus said that is blessed.

How can a machine be joyful? How can it live? How can it feel sorry? How can it honor its Creator? Human life and its blessings are simply unintelligible for machines. People who think that they themselves are only machines must, I say, lead profoundly deficient lives. I wish I could give them the experience of joy, as, I say, no machine has ever been joyful, nor will one ever be so. "What is joy?" these people may say, "I can explain away the feeling of joy so that it is only apparent, not real." So much the worse for them.

Joy can, of course, come to an end. The proper response to this event is mourning, which is a process of opening oneself up to new joy. Do I choose to mourn, or am I "forced" to mourn? I don't care. Either way I am blessed, as no machine ever has or ever will be blessed.

In sum, doing joy is something no machine can do. I hold this truth to be self-evident. I am NOT "only" a machine, and you, dear reader aren't either. You and I are made of the dust of the ground, true, but also of the breath of God. "And man became a living soul."

Robert Dick

WHY AUSTIN AND SEARLE FOUND FIVED TYPES OF ILLOCUTIONARY ACTS

In Recent Philosophers (1985) John Passmore remarks:

> As matters stand, [Searle] is content to suggest, as against Austin's view that there are a thousand or so different kinds of illocutionary acts, that there are but five general categories of such acts, without trying to deduce—as is, he thinks, ultimately demanded of him as a philosopher—from the philosophy of mind that there must be just five, no more and no less.[1]

The present paper will argue that there is indeed a clear-cut justification for maintaining that there are exactly five general categories of illocutionary acts.

It should first be noted, however, by way of correcting an error in Passmore's statement, that Austin had in fact come up with five types of illocutionary acts, to which Searle's list was simply an emendation. In How to Do Things with Words (1962) Austin remarks that in a concise dictionary one will find on "the order of" 1,000 verbs (by which he says in a footnote he means between 1,000 and 9,999). But on the very next page he goes on to classify these verbs into just five types, which he calls verdictives, exercitives, commissives, behabitives, and expositives.[2]

In "A Taxonomy of Illocutionary Acts" in Expression and Meaning (1979), Searle reviews Austin's five types, finds them unsatisfactory in various respects, and proposes his own list, which he calls assertives, directives, commissives, expressives, and declarations. Searle presents a rather technical analysis of these five types, but his analysis plays no role in the present analysis, so it will be ignored here.[3]

The gist of the present analysis is to correlate Austin's and Searle's lists to five of the traditional branches of philosophy—ethics, inductive logic, epistemology, deductive logic, and aesthetics. These in turn will be correlated with the phases of a purposive act, thereby establishing the completeness of the list.

The relevance of purposive acts is that they pervade virtually our every waking moment, and even our dreams. We constantly pursue food, shelter, clothing, and myriads of other things. It should not be surprising, then, that these purposes, if they have a common structure, would leave the imprint of that structure on our language, where perceptive researchers would be able to discern them like paleontologists unearthing the fossils of dinosaurs. Let us first examine Austin's and Searle's results, which will then be connected to the structure of purposes.

Let us first tackle Austin's list. Austin says that exercitives "are the exercising of powers, rights, or influence. Examples are appointing, voting, ordering, urging, advising, warning, &c." He adds that "It is a decision that something is to be so, as distinct from a judgment that it is so. . . ."[4] Hence, it seems appropriate to classify this type as predominantly ethical in character. The precise meaning of "ethics" and the other branches of philosophy will be considered in the latter half of this paper, but for now I ask the reader to simply trust his own general feeling for these words.

Austin says that by behabitives he has in mind verbs that "have to do with attitudes and social behavior [Austin's emphasis]. Examples are apologizing, congratulating, commending, condoling, cursing, and challenging."[5] I associate behabitives with aesthetics, which may be construed broadly as being concerned with our satisfactions and dissatisfactions. To commend, for example, is to express satisfaction, while to curse is to express dissatisfaction. "Social behavior" is thus not the key issue here, according to my interpretation, since one can feel and express satisfaction or dissatisfaction with nature or with oneself, not just with other members of one's society.

Austin says that expositives "are difficult to define. They make plain how our utterances fit into the course of an argument or conversation, how we are using words, or in general, are expository. Examples are 'I reply', 'I agree', 'I concede', 'I illustrate', 'I assume', 'I postulate'."[6] I classify expositives as epistemological in character because they appear to concern what we construe the existing situation to be. To agree is to agree that something is true, for example, and to concede is to concede that something is true. Epistemology is concerned, roughly speaking, with what we can know, i.e., know to be true.

Austin says that verdictives "are typified by the giving of a verdict, as the name implies, by a jury, arbitrator, or umpire. But they need not be final; they may be, for example, an estimate, reckoning, or appraisal. It is essentially giving a finding as to something—fact, or value—which is for different reasons hard to be certain about." Austin adds that "Verdictives consist in the delivering of a finding, official or unofficial, upon evidence or reasons. . . ."[7] I construe verdictives as deductive in character, therefore. A "finding' is tantamount to a deductive conclusion, for example, while the "evidence or reasons" for that finding are tantamount to the premises that lead to that conclusion.

Last, Austin says that commissives "are typified by promising or otherwise undertaking; they commit you to doing something, but include also declarations or announcements of intention, which are not promises, and also rather vague things which we may call espousals, as for example, siding with."[8] I initially thought of commissives as ethical in nature, since they include promises, but since they also include non-ethical commitments such as "espousals," I decided instead to classify com-

missives as inductive because espousing or commiting oneself to an idea is tantamount to forming a hypothesis, which is generally an inductive process or inductive flash of insight.

Let us turn now to Searle's list of illocutionary acts. He says that directives "are attempts . . . by the speaker to get the hearer to do something." Examples given by Searle include "command" and "beg".[9] It seems plausible to classify directives, then, as ethical.

Regarding expressives, Searle says that they "express the psychological state specified in the sincerity condition about a state of affairs specified in the propositional content." Examples Searle gives are the verbs "congratulate" and "condole".[10] Searle's expressives thus seem to correspond to Austin's behabitives and to belong in my aesthetic category. For to congratulate is to express satisfaction with someone, and satisfaction versus dissatisfaction, as mentioned before, constitute the general focus of aesthetics.

Concerning assertives, Searle says that their role is "to commit the speaker . . . to something's being the case, to the truth of the expressed proposition." Examples given include "boast" and "complain".[11] In view of their stated connection with the concept of truth, I classify assertives as epistemological.

As for declarations, Searle says that "the successful performance [of a declaration] brings about the correspondence between the propositional content and reality, [and] guarantees that the propositional content corresponds to the world: if I successfully perform the act of appointing you chairman, then you are chairman; if I successfully perform the act of nominating you as candidate, then you are a candidate; if I successfully perform the act of declaring a state of war, then war is on; if I successfully perform the act of marrying you, then you are married."[12]

The "if . . . then" form of these examples suggests that declarations might be classified as deductive in character.

Finally, Searle says that his conception of commissives is essentially the same as Austin's, although he questions Austin's inclusion of verbs like "shall", "intend", and "favor" in this category. He says the purpose of commissives is "to commit the speaker . . . to some future course of action."[13] I classified Austin's commissive category as inductive and do likewise with Searle's. If one sees, for example, that a certain sort of chess opening or a certain sort of military strategy generally leads to disaster, one will, if one is prudent, resolve to adopt some other course of action. This is both an inductive conclusion or generalization and also, in Searle's words, "to commit the speaker . . . to some future course of action."

Here is a summary of the foregoing classifications:

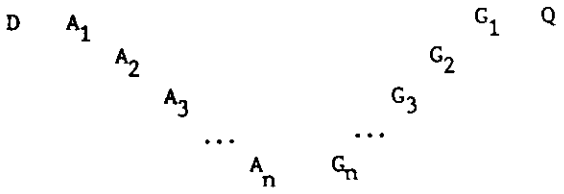
Branches of philosophy	Austin's Illocutionary Acts	Searle's
Ethics	Exercitives	Directives
Induction	Commissives	Commissives
Epistemology	Expositives	Assertives
Deduction	Verdictives	Declarations
Aesthetics	Behabitives	Expressives

In order to establish that these five categories are essentially complete, let us next see how they can be correlated with the structure of a purposive act.

In Concept and Quality (1967) Stephen C. Pepper devised a metaphysical theory or "world hypothesis" he called "selectivism," based on the central guiding model or "root metaphor" of a purposive act. Pepper gave as one of his primary reasons for choosing this root metaphor

the fact that "It is the act associated with intelligence," which makes it probably the most complex structure in the universe, from which we can learn about simpler structures "by a kind of subtraction."[14] The reason a purposive act is associated with intelligence is presumably that intelligence refers to problem-solving ability, and to solve a problem is to achieve a purpose.

Pepper had analyzed numerous types of purposive act in his previous book, The Sources of Value (1958), which was influenced by two earlier works, R. B. Perry's General Theory of Value (1926) and E. C. Tolman's Purposive Behavior in Animals and Men (1949). Those who seek a more detailed analysis of purpose should consult these books. But for present purposes we may limit our attention to the following slightly modified version of Pepper's schematization of a typical purposive act from Chapter 2 of Concept and Quality:[15]



This schema has four components: (1) the drive, D, such as thirst or hunger; (2) anticipatory sets, A_1 through A_n, such as the anticipation that eating a hamburger will satisfy one's hunger: A_1, that hamburgers can be obtained at a fast-food restaurant: A_2, that fast-food restaurants require money in exchange for hamburgers: A_3, and that money can be obtained in a variety of ways such as by getting a job: A_n; (3) goal objects, G_n through G_1, corresponding to each of the anticipatory sets, such as a job: G_n, money: G_3, a fast-food restaurant: G_2, and a hamburger: G_1; and (4) the quiescence of the drive, Q, such as satisfying hunger by eating a hamburger or quenching thirst by drinking water.

Pepper lists some thirty categories for selectivism, based loosely on this schematization, but his categories have a byzantine complexity nearly rivaling that of Whitehead's forty-seven categories in Process and Reality, a work to which Pepper explicitly compares Concept and Quality.[16] I felt that a simpler, more straightforward analysis might be fruitful.

I decided to connect Pepper's schema into five segments or phases and to associate with each phase a common-sense question that expresses the problem specific to that phase. My results were as follows:

(1) From D to A_1 the problem seems to be What should I do?, e.g., given the feeling of hunger, D, what proposed action, A_1, might assuage it?

(2) From A_1 to A_n the problem seems to be How (by what agency or method) should I do it (e.g., assuage my hunger)?, i.e., what series of proposed actions would lead up to the primary action, such as eating, if that primary action cannot be put into effect immediately?

(3) From A_n to G_n the problem seems to be Will my anticipations bear fruit?, i.e., will a proposed action, A_n, yield its corresponding goal object, G_n?

(4) From G_n to G_1 the problem seems to be What will be the consequences?, i.e., having attained one goal object, such as a job, will the next goal object, such as money, materialize?

(5) And from G_1 to Q the problem seems to be Will I be satisfied?, e.g., will eating this hamburger satisfy my hunger (or drinking this water quench my thirst)? If the meat is spoiled (or the water salty), it might not lead to the satisfaction of one's hunger (or thirst) drive.

These common-sense questions, rather unexpectedly, turned out to express the central problems for ethics, induction, epistemology, deduction, and aesthetics, respectively. Specifically:

What should I do? seems to express the core problem of ethics. For example, in The Language of Morals R. M. Hare makes the relevant observation that

> It would be when, knowing all the relevant facts of a situation, . . . faced with choices or decisions between alternative courses of action, between alternative answers to the question 'What shall I do?', that [one] would reveal in what principles of conduct he really believed.[17] [Emphases added.]

This statement links my common-sense question for the first phase to conduct, and Pepper defines "ethics" as "the study of the criteria of good and bad conduct," where "conduct" means "voluntary activity."[18]

How (by what agency or method) should I do it? can be associated with induction by noting that induction is commonly linked to probability and by noticing that this common-sense question can be reworded What method or agency has the greatest probability of success? One also finds that Pepper associates the anticipatory sets with induction in Chapter 5 of The Sources of Value, where the following three sentences appear:

> A docile organism with a strong drive . . . , like hunger or thirst, when faced with a novel environment would be at a loss what to do, if it were not for the instinctive technique of trial-and-error activity that automatically goes into gear at such a time . . . .
> . . . My view is that the peculiarity of docile behavior is precisely the lack of a cognitive element in the crucial gap between a drive and its goal, and what is learned is the cognitive anticipatory reference that was previously lacking. . . .
> The inductive methods of experimental science are essentially systematized trial-and-error.[19] [Emphases added.]

Here we find anticipatory behavior associated with docile behavior in the second sentence, docile behavior linked to trial-and-error behavior in the first sentence, and trial-and-error behavior connected with induction in the last sentence, which thus completes the association between the anticipatory sets and induction, albeit in a somewhat roundabout way. In effect, How should I do it? can be construed as a call for anticipatory, docile, trial-and-error, and hence inductive behavior.

Will my anticipations bear fruit? can be regarded as the central problem for epistemology by noticing that this question can be reworded Will my knowledge claims (= anticipatory sets) be true (= bear fruit)?, bearing in mind that "epistemology" is just another word for "theory of knowledge."

What will be the consequences?, my common-sense question for the fourth phase, seems clearly to represent the key issue for deduction. In The Ground of Induction, for example, Donald Williams associates the major premise of a syllogism with induction and the minor premise with something that is "directly verifiable by perception."[20] Thus, for instance, we might have the following line of argument:

Part of syllogism	Letter code	Verbalization	Primary means of knowing this
Major premise	A_n	Jobs yield money.	Induction
Minor premise	G_n	This is a job.	Perception
Conclusion	G_3	This job yields money.	Deduction

So our initial method of getting from G_n to G_3 along the fourth-phase dimension is by deduction, using the second-phase result, A_n, as our major premise and the third-phase result, G_n, as our minor premise. We can, of course, subsequently verify G_3 by direct inspection by noticing whether the boss actually pays us on payday, but that would be a third-phase activity again, not a fourth-phase activity, which is purely deductive.

Finally, Will I be satisfied? expresses the basic issue for aesthetics, as we can see, for example, by noticing that Pepper defined "positive aesthetic value," commonly known as beauty, as "satisfaction in felt quality."[21] (Andrew Reck mentions in his book, The New American Philosophers, that "It was Pepper who, more than any thinker of his generation, made aesthetics and the philosophy of art the technical fields of study they are today.")[22]

So, to sum up, Austin and Searle appear to have been justified in classifying verbs or "illocutionary acts" into just five types.

References

[1] John Passmore, Recent Philosophers (La Salle, Ill.: Open Court, 1985), p. 21.

[2] J. L. Austin, How to Do Things with Words, 2d ed., ed. J. O. Urmson and Marina Sbisa (Cambridge: Harvard University Press, 1975), pp. 150-151.

[3] John R. Searle, Expression and Meaning: Studies in the Theory of Speech Acts (Cambridge: Cambridge University Press, 1979), pp. 12-20.

[4] Austin, How to Do Things with Words, pp. 151 and 155.

[5] Ibid., p. 152. [6] Ibid. [7] Ibid., pp. 151 and 153.

[8] Ibid., pp. 151-152.

[9] Searle, Expression and Meaning, pp. 13-14.

[10] Ibid., p. 15. [11] Ibid., pp. 12-13. [12] Ibid., pp. 16-17.

[13] Ibid., p. 14.

[14] Stephen C. Pepper, Concept and Quality: A World Hypothesis, Paul Carus Lectures, Series 13, 1961 (La Salle, Ill.: Open Court, 1967), p. 17.

[15] Ibid., p. 22. [16] Ibid., pp. 6-14 and 28-30.

[17] R. M. Hare, The Language of Morals (Oxford: Oxford University Press, 1952), p. 1.

[18] Stephen C. Pepper, Ethics, Century Philosophy Series (New York: Appleton-Century-Crofts, 1960), pp. 2-3.

[19] Stephen C. Pepper, The Sources of Value (Berkeley: University of California Press, 1970), pp. 103, 105, and 106.

[20] Donald Williams, The Ground of Induction (New York: Russell & Russell, 1963), p. 9.

[21] Pepper, Concept and Quality, p. 566.

[22] Andrew J. Reck, The New American Philosophers: An Exploration in Thought Since World War II (Baton Rouge: Louisiana University Press, 1968), p. 46.