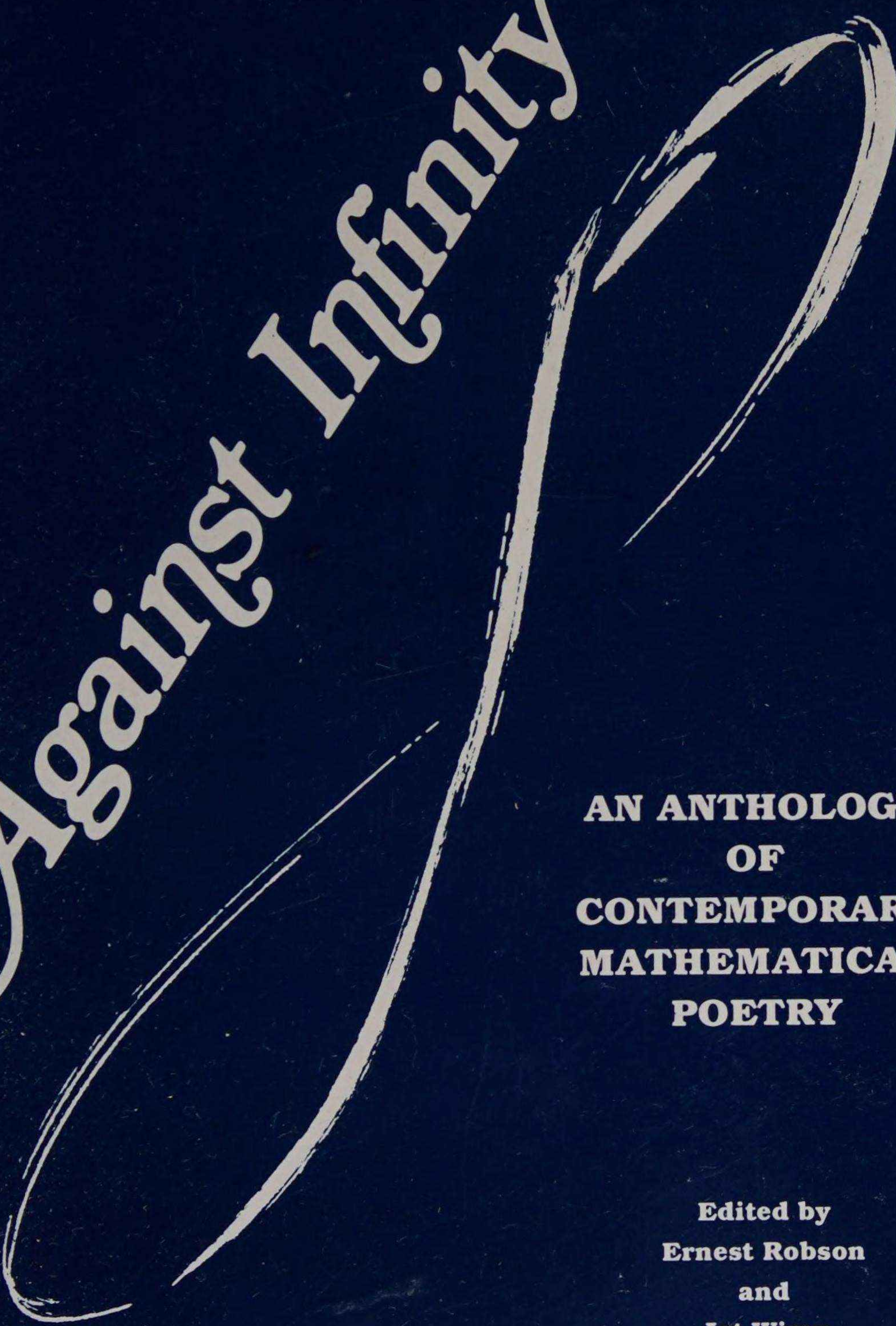


# Against Infinity



**AN ANTHOLOGY  
OF  
CONTEMPORARY  
MATHEMATICAL  
POETRY**

**Edited by  
Ernest Robson  
and  
Jet Wimp**







*Against Infinity*

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# Against Infinity

An Anthology of Contemporary  
Mathematical Poetry

Initiated, Collected and Edited  
by Ernest Robson & Jet Wimp



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## *In Appreciation*

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Book design, cover drawings and many other contributions by Marion Robson.



## *In Consideration of Mathematical Poetry*

*Ernest Robson & Jet Wimp*

That there is an irreconcilable disparity between the backgrounds and interests of poets and mathematicians or, more significantly, poets and scientists, is usually taken for granted. C. P. Snow recalls his presence at a literary gathering where the illiteracy of scientists was being made the subject of humour. He asked the company how many could describe the Second Law of Thermodynamics. "The response was cold," he writes. "It was also negative."

At one time the assumption prevailed that the person of culture should be familiar with *all* systems of thought. The metaphysical poets drew their images from science, mathematics, logic:

*As lines so loves oblique may well  
Themselves in every angle greet;  
But ours so truly parallel  
Though infinite can never meet.*

Newton and Harvey, the discoverer of the circulation of blood, were celebrated in verse. Classical poetry often served as a vehicle for the current "scientific" knowledge (Lucretius, *De Rerum Natura*.)

In the 19th century, perhaps earlier, a systematic and still continuing divergence began between science and the arts. It has been attributed to several factors: the accumulation of bodies of knowledge so large no person could be expected to master them all, a disillusionment with the industrial revolution which was seen as responsible for decreasing the quality of life and increasing the anomy of society. However a very early observer, Plato (in *The Republic*) had conjectured that the aims of geometric reasoning and poetry were *inherently* antithetical.

Perhaps science and art could find a meeting only in the early and heady days when scientific method was announcing its first victories. The knowledge gained was new and invigorating and even more exciting was the fact that knowledge *could* be obtained by a system of thought, induction, that was so radically different from the deductive systems known to ancient writers such as Euclid.

As the co-editors of an anthology which attempts once again to reconcile these willful disciplines, we feel we should declare ourselves. Plato, we suspect, approached the truth. We also believe that the reasons for this innate disaffinity between mathematics and poetry go much deeper than anyone has previously imagined: deeper than whatever pedagogy or aesthetic preference can account for, deeper than the social goals or consequences of either. The problem, we think, has to do with real differences: the difference between mathematical and natural language, on the one hand, and the difference between poetry and natural language on the other. Out of an appreciation for the nature of these differences, some kind of reconciliation, we hope, can be constructed.

After all, poetry and mathematics do share important features: concision; consequentiality (the syntagmic function of the poem's or proof's logic); abstraction; symbol-making (metaphor); a tendency to elaborate analogically, proceeding from the specific to the general; stressing mental experience; and a concern with connections in structures.

Rilke saw in the poetic process the attempt to substitute for a chaotic outer world an internal world ordered by symbols. It is probably clear, as Northrop Frye claimed, that one of the chief aims of poetry is to examine the role the physical object plays in the human experience. But neither mathematicians nor poets have an absolute interest in objects. Poets have traditionally seen *things* as points of departure for symbolic and philosophical reflection and mathematicians have seen them and their interactions only for those qualities which can be idealized and modeled.

Before we go further, let us define mathematical poetry, at least provisionally. Mathematical poetry is an association of mathematical concepts, relationships, symbols or forms with interesting verbalizations and/or graphic components. The values the mathematics and poetry each can contribute to the final form, as well as the nature of their essential differences, can be clarified by considering the concept of *information*. *Information* means the number of choices available at the source of a message system. It is a statistical measure of unpredictability and of *potential* meaning. A Shakespearean vocabulary of 50,000 words is richer in *potential* meaning than the average writer's 10,000 to 20,000 words. *Redundancy*, the complement of *information*, is a statistical measure of predictability or certainty. An obvious example is repetition when no information occurs.



The information of natural languages is remarkably small. Conversational English or prose is 90% redundant. The word "take", according to Lorge and Thorndike, 1937-1944, has 171 different definitions in a sample of 3504 usages. The ambiguity of words makes all poetry context-dependent. Yet its context is culture-bound by rules relating symbols to things, symbols to symbols (grammars and syntax) and by rules relating symbolizers to other symbolizers (singular or plural pronouns, goals, appetites, emotions and social customs of speakers.) That English uses 41 phonemes out of a possible 150 phonemes spoken by all people on Earth puts a severe phonetic constraint on context. In contrast, mathematics as a language of possible patterns with enumerative measures derived according to logical rules from explicit assumptions can acquire redundancy only through the verbalization of its results; and its symbology is (at least theoretically) completely available. Also, mathematics is *context independent*. Contemporary mathematicians understand Pythagoras or Euclid more readily than contemporary readers of poetry would comprehend metaphorical allusions to Greek mythology, the Upanishads, or Biblical parables. Much poetry seeks to enhance (through devices such as repetition and meter) the redundancy of natural language; mathematical systems, on the other hand, are considered to be *elegant* by mathematicians only when redundancy is completely eliminated.

What does the mathematical component of mathematical poetry contribute in the way of information to the three contemporary forms of poetry: sound poetry, visual (concrete) poetry and conventional poetry (rhymed or free verse)? To sound poetry (which is redundant due to the sloppiness of our auditory perceptions of speech,) mathematics can contribute exactness due to its numerical content (see *LOG  $\pi$  SUTRA*, p.74) and to a redundant poem such as  $[A:B : B (B+A) :: B: (B+A)]$ , p.59, mathematical notation can substitute temporal for spatial symbols and introduce pattern diversity. Here sound poetry means any acoustic pattern of speech independent of grammar or meaning. Concrete poetry is any poetry which increases information by visually reordering language. To visual poetry, mathematics can contribute concision (the poems *Compromise*, p. 9, *Infinity*, p.25 and *Eye of History*, p.67, are good examples of this); exactitude (see *In the Asymptotic Silence*, p.70); and pattern diversity (see, for instance, *The Derivative*, p. 7, *Fibonacci*, p.30, *Formula*, p.56.)

What mathematics contributes to conventionally written poetry is often a ready-made symbol system which can be interpreted poetically or explored as a metaphor for the human experience. *Algebra*, p.50, is an excellent example of the latter. An interesting poem in this collection, *The Square Root of Two is Irrational*, p.79, presents, dramatically, a mathematical proof due to Pythagoras.

The earliest mathematical symbol system is, of course, that of *number*, or, more accurately, the system of the positive integers, (0, 1, 2, 3. . . ). Many of the poems in this anthology *Prime Numbers*, p.43, 1, p.77, *Zero*, p.81, *God is Zero*, p.61, *Triangular Numbers*, p.40, attest to the fascination writers have always felt for numbers. One reason is that the concept of counting is intrinsic to form, hence order, of any kind. Writers throughout history – the Biblical authors with their uses of chiasmus, the Greeks with their metrical patterns based on the counting of syllables – testify to the liberation rather than the restriction that writers have always found in the use of form. Modern literary forms are freer and more diversified. Nevertheless, they are essential.

Poets of the renaissance (for instance Maurice Scève, *Microcosme*) believed that by employing numbers in poetry one could emulate the celestial numbers which ruled the universe. Poetry could then provide a metaphorical interpretation of physical or mathematical law. That to each Hebrew letter corresponds a number and hence to each word a number, the sum of its composite letters, is the basis of the kabalistic tradition of *gematriya*. By the manipulation of these word-numbers, important and previously hidden ideas can be discovered.

A generalized concept of integer, that of *real number*, is the foundation of the calculus, and thus virtually all of our mathematical descriptions of physical reality. It is easy to believe, as the Pythagoreans did, that number is the basis of all knowledge, perhaps, of everything. Prometheus, in Aeschylus' play, calls the discovery of number the masterpiece of the wisdom which civilizes.

Finally, credibility is one of the more valuable services of mathematics to mathematical poetry. Credibility occurs because mathematics is the language of the exact sciences, the notation of truth in our technological culture.

What are the contributions the poetical component makes to mathematical poetry? Poetry as a form of natural language (although differing from it in certain aspects) gives information about real life which mathematics lacks: references to things, emotions, states, intentions, goals, the struggles of existence and the complexities of interacting human and physical environments. Poetry carries on its verbal ambiguities within a cultural framework. And the ambiguities themselves are productive of meaning, for instance, the swamps of ambiguity in *A Visit to Mathland*, p.58, the imaginative disorder of *City Street Scenes*, p.32, and *Wisdom Buried the Immortal Objective*, p.72, or the permuted imagery of *Do You Remember*, p.75.

Real life events, which must remain unspecified by the aloof and deductive autonomy of mathematical knowledge, can yet be events in which the discipline of mathematics plays a role, a role as dramatic as those in *Variance*, p.68, or *Accomplice*, p.73, or *Number Theory*, p.69, or



*Well-Charted Waters*, p.78. The many faceted expressions of our complex existence is the information contribution of poetry to mathematical poetry – an enormous one.

One of the more frequently rejected submissions to this anthology was computer verse, but more the verbal versions than the graphic compositions. The visual offerings appealed with more structural definitiveness and more eye charm. (This could be due to the lack of randomness in the original programming of the graphic art, hence to more direct human involvement.) Most readers, we have discovered, dislike computer verse with intensity that borders on moral censure. What is the source of this aversion? Is it rational? After all, the lines:

*the philosophical butterfly  
alights on the rosy star  
and that makes a window in hell*

were *not* written by a computer (see *Hôtel des Éticinelles* by André Breton) but their ambience isn't dissimilar to those samples of computer poetry we received. Yet, had we quoted more, the intelligence of Breton would have begun ineluctably to surface (*the pendulum of absence swings between the four walls.*) The reader could then have relaxed, secure in the knowledge that he wasn't somehow being cheated.

Do people want the human element so badly that Dadaist randomness is preferable to machine wisdom? Probably. And above all people *sense* machine-made randomness. Programmed unpredictability does not *sound* quite the same as *human* unpredictability: the *oral performance value* latent in most poetry is missing from computer compositions. And, humanly, we appreciate perfection more when there is the risk of imperfection. Although this would not include a highly sophisticated computerized poetry generated through a computerized internalization of formalized poetic canons and programs based on these canons, such an effort would entail more labor than most people would willingly expend. Such aesthetic judgments must, of necessity, be extraordinarily complex.

The structured and relatively non-random, hence highly informational programs for computer graphics, are simpler. A computer can generate many more graphic forms per unit time than any artist can hand-draw but a similar efficiency does not hold for randomized units of natural language, at least, judged by the intrinsic aesthetic quality. A verbally sensitive and linguistically imaginative human poet can compete with any automatic device in creating interesting nonsense... and, frequently, in less time.

Finally, a word about the organization of this volume. The collection could have been organized under categories. However, after evaluating several systems of classification, we became convinced that any system

involved much overlapping. Nevertheless, some readers feel more comfortable with classifications. Accordingly, approximate as it is, we present this system of categorizations:

1. *Poems about mathematics or mathematicians*
2. *Mathematical love poems*
3. *Poetic forms determined by mathematical relations*
4. *Visuals with and without verbalizations*
5. *Math/verbal simulations of each other*
6. *Computer generated compositions*

Our conclusion was that any system for classifying the poetry would reduce the charms of variety, discovery and surprise for the reader and vitiate the aesthetic quality of the book as a whole.

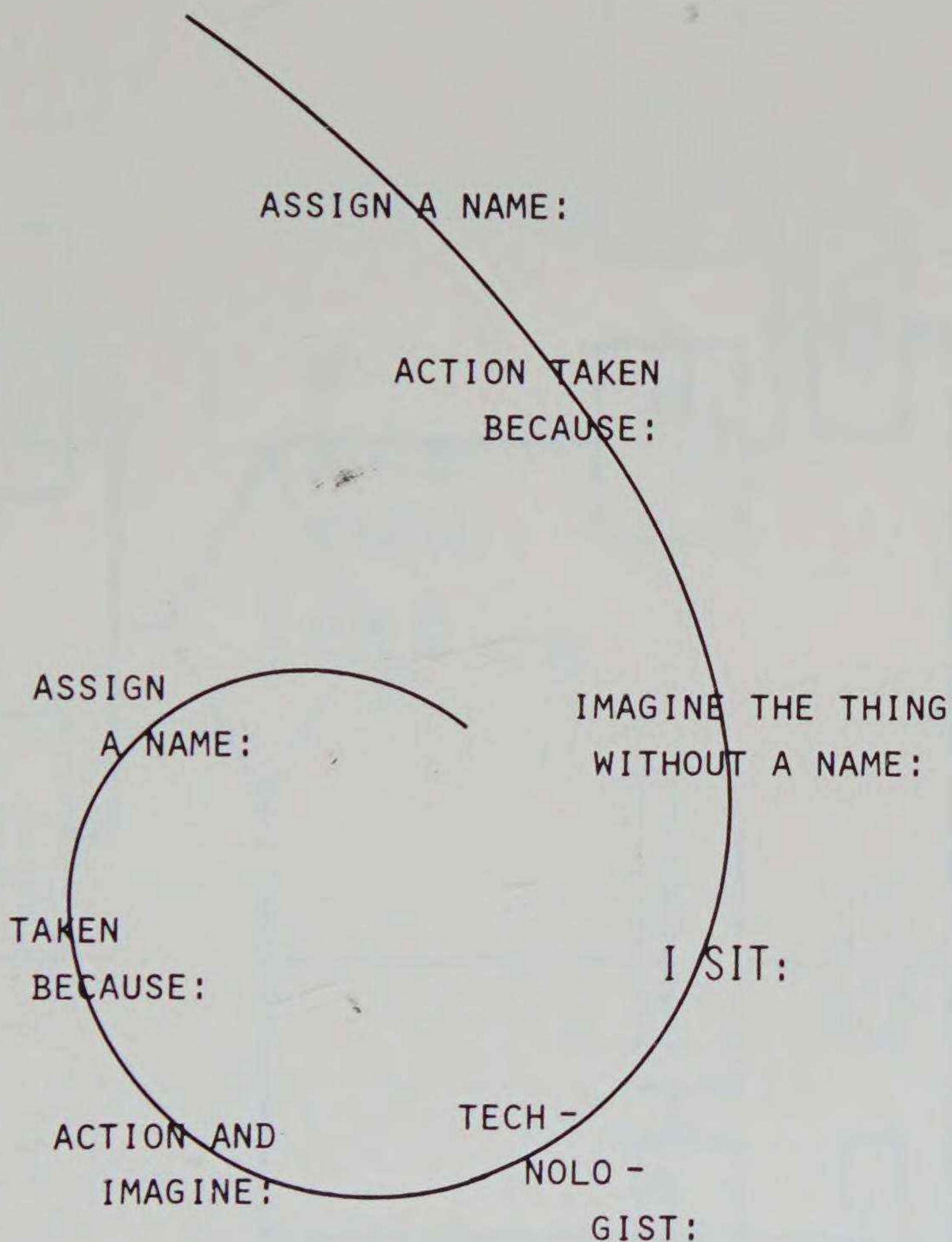
Here then, alphabetically by author, is our collection. Although our culture communicates and expresses itself by means of many symbol systems, its two most dominant and powerful are those of verbal and mathematical language. The former conveys, generally, the human experience and its concomitants, the latter the language of hard science and technology. This union of the two, if only associative, can define for poetry new ways of writing more exactly, more concisely and with more credibility; to mathematics and its awesome deductive power, this association makes available yet another domain of knowledge and promises, perhaps, to enrich the unique human excitement which is its only source of growth.



*Against Infinity*

*Poems...*

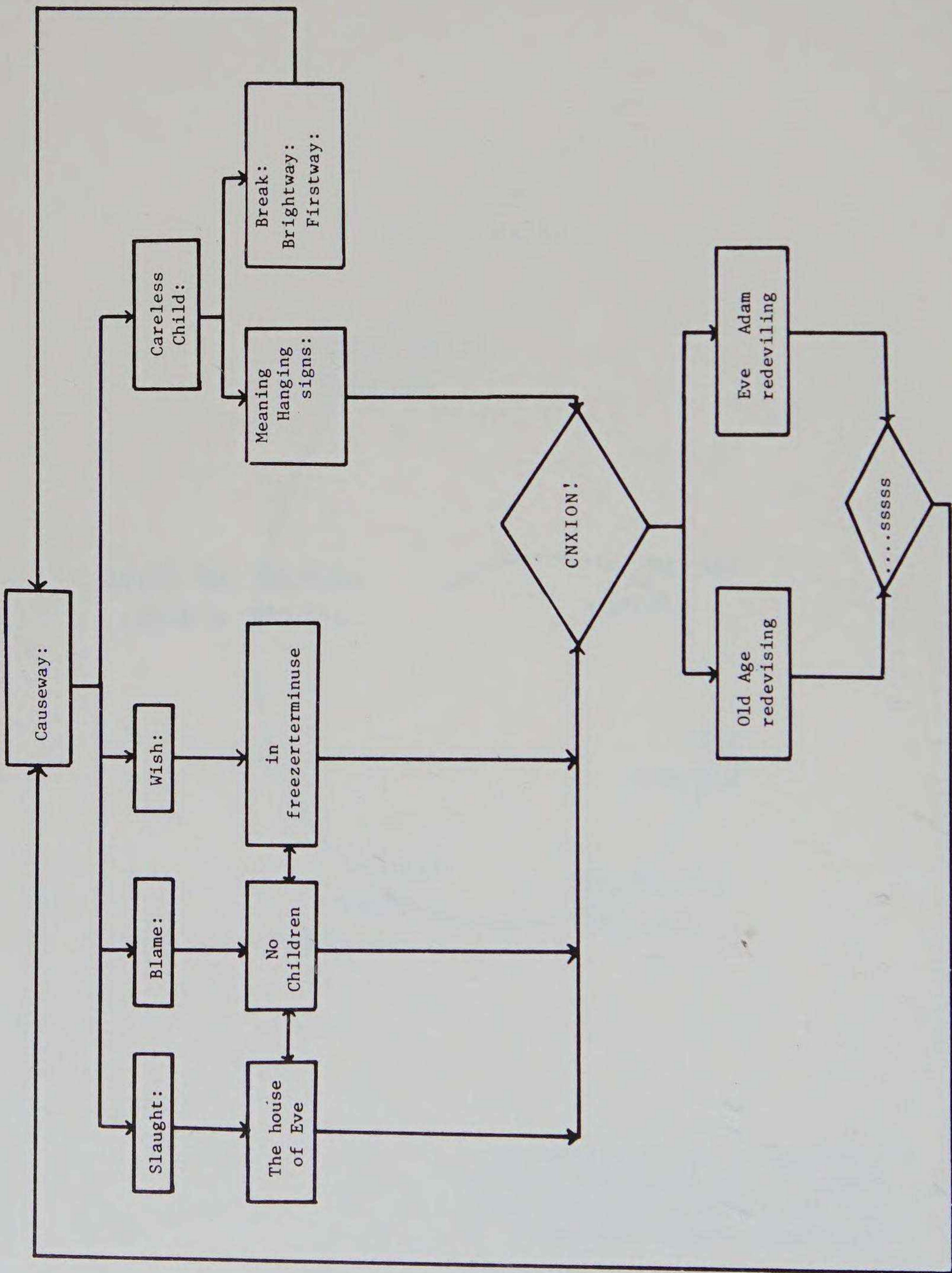




/ a derivative can be defined as  
change in the function's behavior  
when the function's independent  
variable(s) change minutely.

this minute change is represented  
by  $dy$ , and is called a differential.





## COMPROMISE

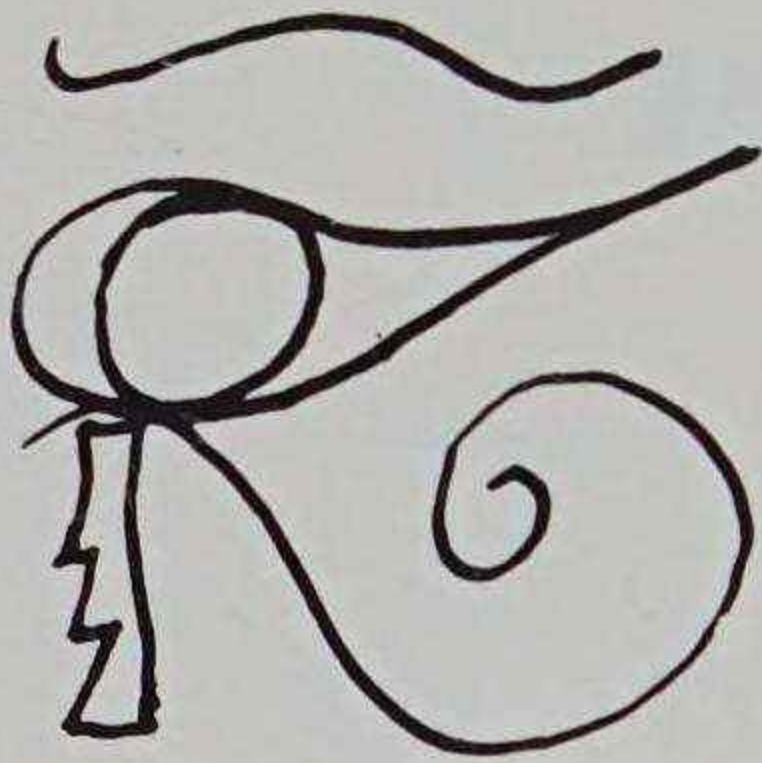
IF

$A < B$

THEN

$$\frac{A+B}{2} < B$$

Margin for Error



$\int = \frac{1}{64}$

$\mathcal{O} = \frac{1}{32}$

$\mathcal{D} = \frac{1}{16}$

$\sim = \frac{1}{8}$

$\mathcal{O} = \frac{1}{4}$

$\mathcal{C} = \frac{1}{2}$

Egyptians viewed the eye

As mystic-mathematical;

$\mathcal{O} + \mathcal{O} + \int + \sim + \mathcal{D} + \mathcal{D} = \frac{63}{64}$



*Because I Longed*

Because I longed  
to comprehend the infinite

I drew a line  
between the known and unknown

From zero base  
to its apex point opposite

Thus dividing  
all past time from all future time

And all of space,  
the positive from negative.

Where both sides met,  
they formed the infinite present.

## *Infinitesimal*

infinitesimal is the nearest to zero

infinitesimal is so small

that it is no longer something

but it is not yet nothing

if jumping into the water

you detect the instant

when you are no more in the air

and not yet in the water

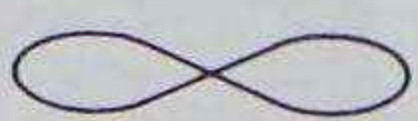
you grasp the infinitesimal

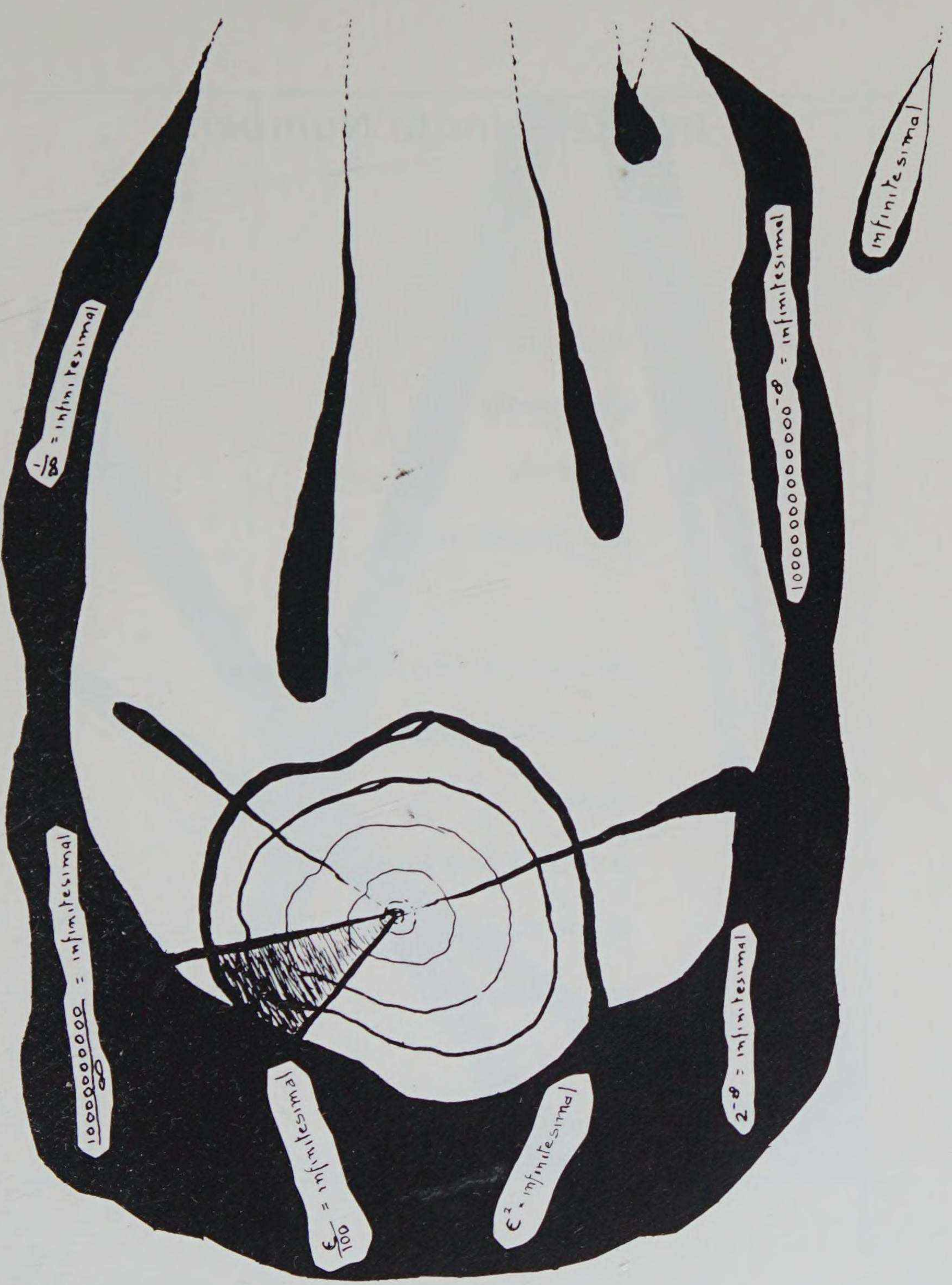
this infinitesimal instant

lies at the point

where the possible and the impossible

touch each other





## *Indeterminate Numbers*

numbers

supposedly

direct us

in a precise way

yet in certain combinations

numbers become

elusive

and their only answer

in the many answers

to our search

is

a question





## *Where the Kissing Never Stops*

Before curves kiss  
they have to get acquainted  
discuss their known  
and unknown functions  
settle a discrete problem or two  
decide on a common border

They strive to make each other  
equal zero  
to reach that point  
at which they will reduce to lines  
and kiss

They linger  
at the intersection of multiplicity  
although the relationship has been clarified  
the performance rated  
the equation ended



# *Ad Infinitum*

o how I would go on and on like a tickertape of infinite numbers who have so far to fly they will not die

**MELISSA CANNON** /*ad infinitum*



## *Algebraic Love*

A function is a relation,

Each number pairing with its double.

To designate that unique number,

Look for favorable conditions.

The domain of each variable is limited

By constraints.

Follow the power of patterns

To form relations,

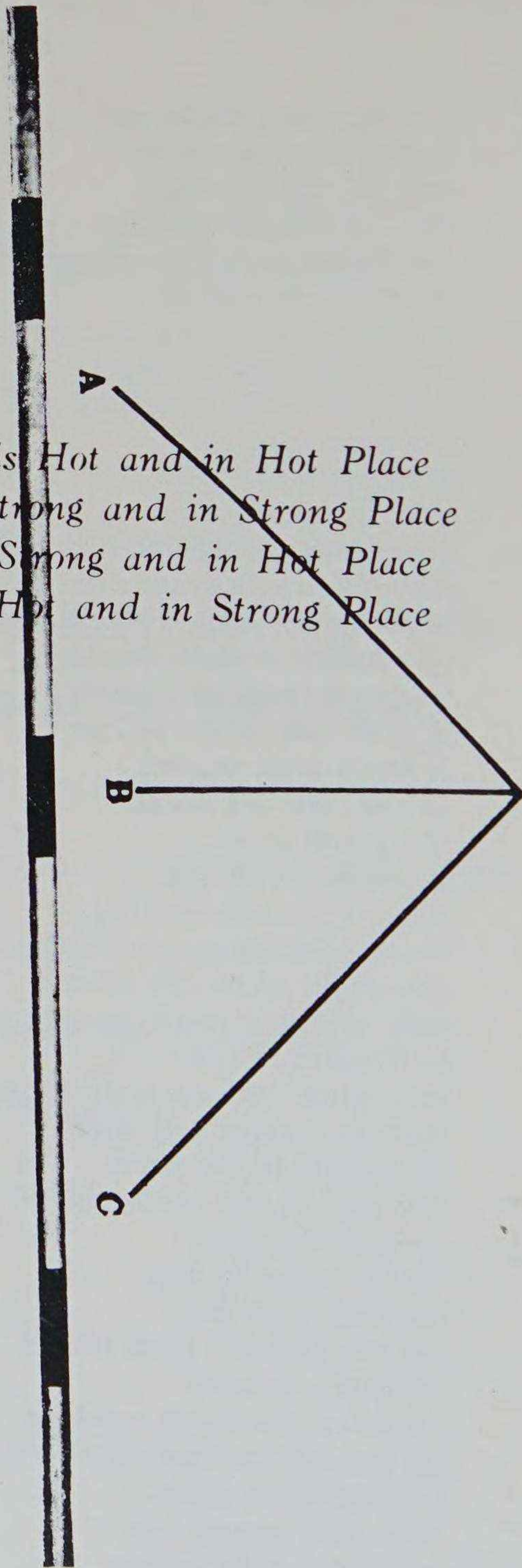
To form pairs.

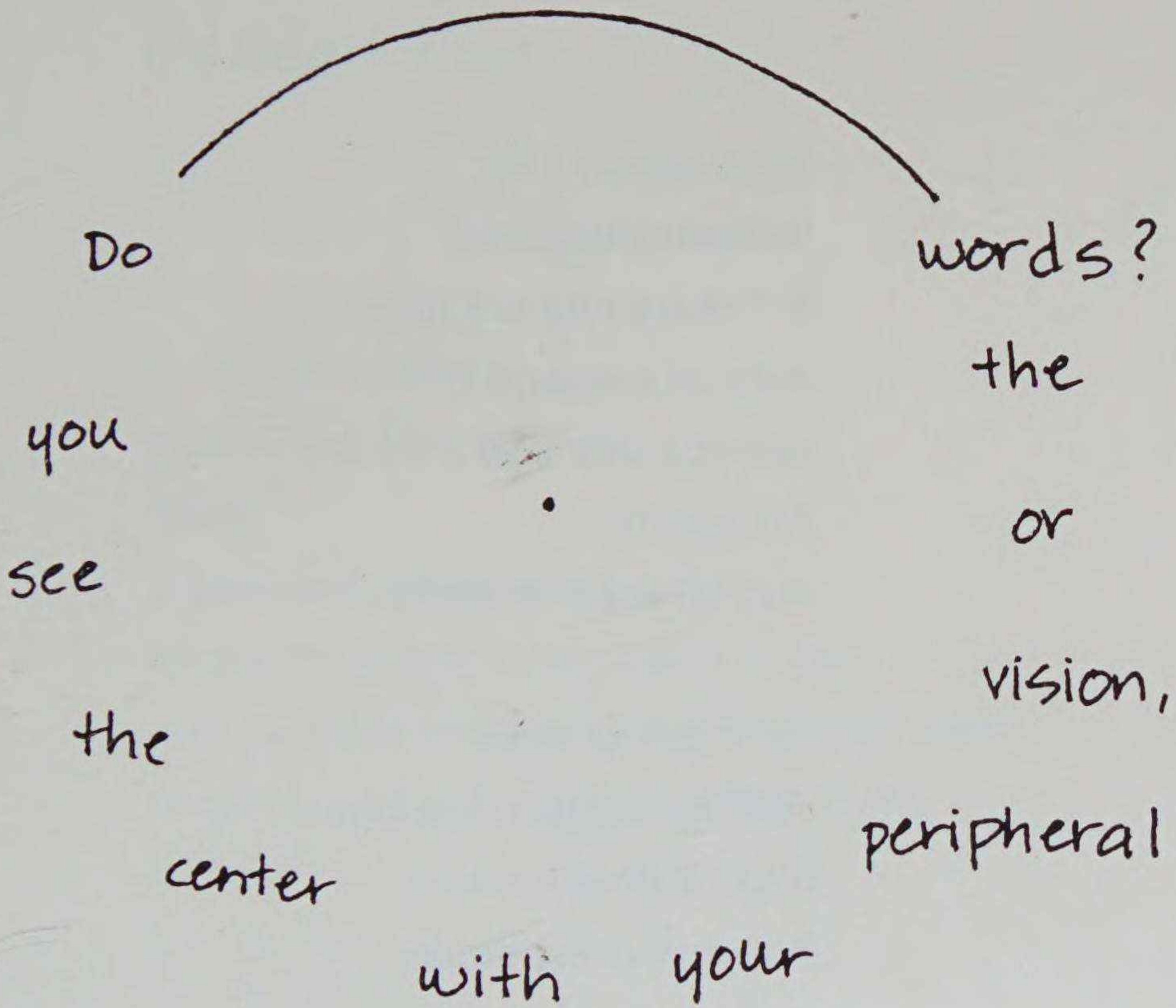


## House, Tree, Sky

If, when the pond is still  
and nothing is moved  
and the light is right,  
you consider the angles  
and make the proper approach,  
you come to a bend  
where a small white house  
against a deep sky meets  
the same white house against  
the blue water:  
stair rests on stair,  
door opens on door,  
tree grows out of tree.  
And if you steady your pace  
and fix your eye on bough  
or window or door, you find  
you're moving on a plane,  
and the depth you've lost  
is the merest matter,  
in the clear air ahead,  
of up and down.  
Walking a fine line  
toward the intersecting  
two-roofed house, you figure  
you could be on the other  
side, and that could mean  
both sides at once;  
you think, without beginnings,  
ends or means, you might  
be getting to the point.  
But just as you reach out  
to open the door,  
things begin to slip  
beneath your feet:  
the sky gets out from under,  
the tree retrieves  
its roots, the house recovers  
its ground and you get down  
to solid facts again.  
Still, your recent loss  
has made a difference:  
looking around,  
you keep in mind the profound  
surface of things.

*Bar is Hot and in Hot Place  
Line is Strong and in Strong Place  
Bar is Strong and in Hot Place  
Line is Hot and in Strong Place*





## *Numbers*

What would I do  
without numbers?  
A 7 there and a 3 here,  
days in a month  
months in a year  
AD and BC  
and all such symbols

the track of time  
and the magical fractions  
5 to 12 (that's noon)  
5 to 5 (bus for home)  
segments  
fragments  
mysterious freedoms

will it be like that  
5 minutes to death?



## *College Trig*

A college townee  
gets to his desk at home  
alone  
trigonometry in a quiet room  
with a #2 pencil in an empty house  
and all those lonely squares on graph paper  
tangent, sine and cosine at their worst.

## To Turn Around

To turn around  
a center –

knowing  
Exactly  
how many  
Feet of Hope one had

to hang oneself with –

and  
certain  
that  
One  
could  
ALWAYS

come back to the same spot

either by going

around –

or right across –

& not ever

having to worry

about

strange entanglements

with some-

body-

else's

center –

dumbly

placed

within One's

r

b

i

t

What was it Pascal said  
about the silences  
of those infinite spaces?



infinity

C C  
H S H  
A N A  
I I



## Non-additive postulations

random order + perposterous outcry = negative time  
 negative time<sup>2</sup> = relationships + 3

$$\text{relationships} = \frac{\text{rudders}}{\text{udders}} + \sqrt{\frac{\text{alphswakes}}{\text{oscillations}}}$$

$\phi + \pi =$  blueberryohio to the tenth power

$$\text{Ohio} = \sum_0^{\infty} \frac{+\text{antioch}}{\text{trying} \sqrt{\text{power} + \phi}}$$

equality + three equality + 5 = race<sup>2</sup>

without (recognition) + negative se x = tomorrow

$$\text{Jefferson} + \frac{\text{airplane}}{6+3\text{pee}} = \frac{\text{pee} + \infty}{\text{green ddt}}$$

negative

$$\text{sex} + \text{i.u.d.} = \sqrt{\frac{\text{time}}{\text{communicate}}} + 1^2 + c$$

$$\text{time} = 2' + c = \frac{\text{noosphere}}{\text{RBF}} =$$

telepathy

terminate



# computing

$$\text{construction} = \frac{\text{preferable}}{\text{machines}} \text{highly} + \frac{1}{2} \frac{\text{snowstorm} + \text{input}}{\sqrt{\text{choices}}}$$

$$\frac{\text{snowstorm}}{\text{types}} = \text{binary} + 2 \frac{\text{significant} + \text{other}}{\text{lowest} \text{remember}}$$

$$\text{computing} - (\text{paradoxes}^4 \times 3 \frac{\text{content-9}}{\text{dynamic}}) = \frac{\text{flow}}{\text{saliva}}$$

where by

$$3 \text{nevertheless} + \frac{\sqrt{\text{visual}}}{\text{fact}} - \text{salivation} = x - \text{three/clear}$$

$$\text{associate } x (\text{reflex} + 1) - \text{equilibrium} = \frac{\text{precisely}}{\text{observed}}$$

$$1 \left( \frac{\text{at points}}{2 \text{ pie } x \text{ no}} \right) dt = \frac{\text{brain wave}}{x} + \frac{\text{displaced}}{\text{spectrum}} - \text{nearly}$$

$$\frac{\text{real} - \text{expression}}{\sqrt{\text{personality} - 3}} = \text{compute}$$

## *The Corporal Who Killed Archimedes*

in one bold stroke  
he massacred the circle, the  
tangent, the point of  
intersection at infinity

on pain of  
quartering he banned  
numbers  
from three on up

in Syracuse he now  
heads a college of  
philosophers squats

on his halberd  
and for another thousand  
years writes

one two  
one two  
one two  
one two

*translated by Jet Wimp*



## *Zito the Magician*

to amuse the king Zito changes water into  
wine frogs into footmen beetles  
into bailiffs he makes a Prime Minister  
out of a rat he bows: daisies  
grow from his fingertips  
a talking bird perches on his shoulder

so there

think up something else demands the king  
think up a black star Zito thinks up a black star  
think up dry water Zito thinks up dry water  
think up a lake in a wicker basket Zito does

so there

up comes a student: think up an angle alpha  
whose sine is bigger than one

Zito pales: I'm sorry  
the sine of any angle is between minus one  
and plus one he stutters  
nothing can be done  
about it

he leaves the royal chambers shuffling  
through the throng of  
courtiers back to his home  
in a nutshell

*translated by Jet Wimp*



# from FIBONACCI

0 3 3 6 9 15 21 28 35 42 49 57 64 71 78 85 92 99 106 113 120 127 134 141 148 155 162 169 176 183 190 197 204 211 218 225 232 239 246 253 260 267 274 281 288 295 302 309 316 323 330 337 344 351 358 365 372 379 386 393 400 407 414 421 428 435 442 449 456 463 470 477 484 491 498 505 512 519 526 533 540 547 554 561 568 575 582 589 596 603 610 617 624 631 638 645 652 659 666 673 680 687 694 701 708 715 722 729 736 743 750 757 764 771 778 785 792 800 807 814 821 828 835 842 849 856 863 870 877 884 891 898 905 912 919 926 933 940 947 954 961 968 975 982 989 996 1003 1010 1017 1024 1031 1038 1045 1052 1059 1066 1073 1080 1087 1094 1101 1108 1115 1122 1129 1136 1143 1150 1157 1164 1171 1178 1185 1192 1199 1206 1213 1220 1227 1234 1241 1248 1255 1262 1269 1276 1283 1290 1297 1304 1311 1318 1325 1332 1339 1346 1353 1360 1367 1374 1381 1388 1395 1402 1409 1416 1423 1430 1437 1444 1451 1458 1465 1472 1479 1486 1493 1500 1507 1514 1521 1528 1535 1542 1549 1556 1563 1570 1577 1584 1591 1598 1605 1612 1619 1626 1633 1640 1647 1654 1661 1668 1675 1682 1689 1696 1703 1710 1717 1724 1731 1738 1745 1752 1759 1766 1773 1780 1787 1794 1801 1808 1815 1822 1829 1836 1843 1850 1857 1864 1871 1878 1885 1892 1899 1906 1913 1920 1927 1934 1941 1948 1955 1962 1969 1976 1983 1990 1997 2004 2011 2018 2025 2032 2039 2046 2053 2060 2067 2074 2081 2088 2095 2102 2109 2116 2123 2130 2137 2144 2151 2158 2165 2172 2179 2186 2193 2200 2207 2214 2221 2228 2235 2242 2249 2256 2263 2270 2277 2284 2291 2298 2305 2312 2319 2326 2333 2340 2347 2354 2361 2368 2375 2382 2389 2396 2403 2410 2417 2424 2431 2438 2445 2452 2459 2466 2473 2480 2487 2494 2501 2508 2515 2522 2529 2536 2543 2550 2557 2564 2571 2578 2585 2592 2599 2606 2613 2620 2627 2634 2641 2648 2655 2662 2669 2676 2683 2690 2697 2704 2711 2718 2725 2732 2739 2746 2753 2760 2767 2774 2781 2788 2795 2802 2809 2816 2823 2830 2837 2844 2851 2858 2865 2872 2879 2886 2893 2900 2907 2914 2921 2928 2935 2942 2949 2956 2963 2970 2977 2984 2991 2998 3005 3012 3019 3026 3033 3040 3047 3054 3061 3068 3075 3082 3089 3096 3103 3110 3117 3124 3131 3138 3145 3152 3159 3166 3173 3180 3187 3194 3201 3208 3215 3222 3229 3236 3243 3250 3257 3264 3271 3278 3285 3292 3299 3306 3313 3320 3327 3334 3341 3348 3355 3362 3369 3376 3383 3390 3397 3404 3411 3418 3425 3432 3439 3446 3453 3460 3467 3474 3481 3488 3495 3502 3509 3516 3523 3530 3537 3544 3551 3558 3565 3572 3579 3586 3593 3600 3607 3614 3621 3628 3635 3642 3649 3656 3663 3670 3677 3684 3691 3698 3705 3712 3719 3726 3733 3740 3747 3754 3761 3768 3775 3782 3789 3796 3803 3810 3817 3824 3831 3838 3845 3852 3859 3866 3873 3880 3887 3894 3901 3908 3915 3922 3929 3936 3943 3950 3957 3964 3971 3978 3985 3992 4000 4007 4014 4021 4028 4035 4042 4049 4056 4063 4070 4077 4084 4091 4098 4105 4112 4119 4126 4133 4140 4147 4154 4161 4168 4175 4182 4189 4196 4203 4210 4217 4224 4231 4238 4245 4252 4259 4266 4273 4280 4287 4294 4301 4308 4315 4322 4329 4336 4343 4350 4357 4364 4371 4378 4385 4392 4399 4406 4413 4420 4427 4434 4441 4448 4455 4462 4469 4476 4483 4490 4497 4504 4511 4518 4525 4532 4539 4546 4553 4560 4567 4574 4581 4588 4595 4602 4609 4616 4623 4630 4637 4644 4651 4658 4665 4672 4679 4686 4693 4700 4707 4714 4721 4728 4735 4742 4749 4756 4763 4770 4777 4784 4791 4798 4805 4812 4819 4826 4833 4840 4847 4854 4861 4868 4875 4882 4889 4896 4903 4910 4917 4924 4931 4938 4945 4952 4959 4966 4973 4980 4987 4994 5001 5008 5015 5022 5029 5036 5043 5050 5057 5064 5071 5078 5085 5092 5099 5106 5113 5120 5127 5134 5141 5148 5155 5162 5169 5176 5183 5190 5197 5204 5211 5218 5225 5232 5239 5246 5253 5260 5267 5274 5281 5288 5295 5302 5309 5316 5323 5330 5337 5344 5351 5358 5365 5372 5379 5386 5393 5400 5407 5414 5421 5428 5435 5442 5449 5456 5463 5470 5477 5484 5491 5498 5505 5512 5519 5526 5533 5540 5547 5554 5561 5568 5575 5582 5589 5596 5603 5610 5617 5624 5631 5638 5645 5652 5659 5666 5673 5680 5687 5694 5701 5708 5715 5722 5729 5736 5743 5750 5757 5764 5771 5778 5785 5792 5799 5806 5813 5820 5827 5834 5841 5848 5855 5862 5869 5876 5883 5890 5897 5904 5911 5918 5925 5932 5939 5946 5953 5960 5967 5974 5981 5988 5995 6002 6009 6016 6023 6030 6037 6044 6051 6058 6065 6072 6079 6086 6093 6100 6107 6114 6121 6128 6135 6142 6149 6156 6163 6170 6177 6184 6191 6198 6205 6212 6219 6226 6233 6240 6247 6254 6261 6268 6275 6282 6289 6296 6303 6310 6317 6324 6331 6338 6345 6352 6359 6366 6373 6380 6387 6394 6401 6408 6415 6422 6429 6436 6443 6450 6457 6464 6471 6478 6485 6492 6499 6506 6513 6520 6527 6534 6541 6548 6555 6562 6569 6576 6583 6590 6597 6604 6611 6618 6625 6632 6639 6646 6653 6660 6667 6674 6681 6688 6695 6702 6709 6716 6723 6730 6737 6744 6751 6758 6765 6772 6779 6786 6793 6800 6807 6814 6821 6828 6835 6842 6849 6856 6863 6870 6877 6884 6891 6898 6905 6912 6919 6926 6933 6940 6947 6954 6961 6968 6975 6982 6989 6996 7003 7010 7017 7024 7031 7038 7045 7052 7059 7066 7073 7080 7087 7094 7101 7108 7115 7122 7129 7136 7143 7150 7157 7164 7171 7178 7185 7192 7199 7206 7213 7220 7227 7234 7241 7248 7255 7262 7269 7276 7283 7290 7297 7304 7311 7318 7325 7332 7339 7346 7353 7360 7367 7374 7381 7388 7395 7402 7409 7416 7423 7430 7437 7444 7451 7458 7465 7472 7479 7486 7493 7500 7507 7514 7521 7528 7535 7542 7549 7556 7563 7570 7577 7584 7591 7598 7605 7612 7619 7626 7633 7640 7647 7654 7661 7668 7675 7682 7689 7696 7703 7710 7717 7724 7731 7738 7745 7752 7759 7766 7773 7780 7787 7794 7801 7808 7815 7822 7829 7836 7843 7850 7857 7864 7871 7878 7885 7892 7899 7906 7913 7920 7927 7934 7941 7948 7955 7962 7969 7976 7983 7990 7997 8004 8011 8018 8025 8032 8039 8046 8053 8060 8067 8074 8081 8088 8095 8102 8109 8116 8123 8130 8137 8144 8151 8158 8165 8172 8179 8186 8193 8200 8207 8214 8221 8228 8235 8242 8249 8256 8263 8270 8277 8284 8291 8298 8305 8312 8319 8326 8333 8340 8347 8354 8361 8368 8375 8382 8389 8396 8403 8410 8417 8424 8431 8438 8445 8452 8459 8466 8473 8480 8487 8494 8501 8508 8515 8522 8529 8536 8543 8550 8557 8564 8571 8578 8585 8592 8599 8606 8613 8620 8627 8634 8641 8648 8655 8662 8669 8676 8683 8690 8697 8704 8711 8718 8725 8732 8739 8746 8753 8760 8767 8774 8781 8788 8795 8802 8809 8816 8823 8830 8837 8844 8851 8858 8865 8872 8879 8886 8893 8900 8907 8914 8921 8928 8935 8942 8949 8956 8963 8970 8977 8984 8991 8998 9005 9012 9019 9026 9033 9040 9047 9054 9061 9068 9075 9082 9089 9096 9103 9110 9117 9124 9131 9138 9145 9152 9159 9166 9173 9180 9187 9194 9201 9208 9215 9222 9229 9236 9243 9250 9257 9264 9271 9278 9285 9292 9299 9306 9313 9320 9327 9334 9341 9348 9355 9362 9369 9376 9383 9390 9397 9404 9411 9418 9425 9432 9439 9446 9453 9460 9467 9474 9481 9488 9495 9502 9509 9516 9523 9530 9537 9544 9551 9558 9565 9572 9579 9586 9593 9600 9607 9614 9621 9628 9635 9642 9649 9656 9663 9670 9677 9684 9691 9698 9705 9712 9719 9726 9733 9740 9747 9754 9761 9768 9775 9782 9789 9796 9803 9810 9817 9824 9831 9838 9845 9852 9859 9866 9873 9880 9887 9894 9901 9908 9915 9922 9929 9936 9943 9950 9957 9964 9971 9978 9985 9992 10000



111111111111111111  
122222222222222221  
123333333333333321  
1234444444444444321  
1234555555555554321  
12345666666666654321  
123456777777777654321  
123456788888887654321  
12345678999987654321  
1234567890987654321  
1234567899987654321  
1234567888887654321  
1234567777777654321  
1234566666666654321  
123455555555554321  
1234444444444444321  
123333333333333321  
122222222222222221  
111111111111111111

# MIRROR

000000000000000000  
099999999999999999  
098888888888888890  
0987777777777777890  
0987666666666667890  
0987655555555567890  
09876544444444567890  
09876543333334567890  
0987654322234567890  
0987654321234567890  
0987654322234567890  
098765433334567890  
098765444444567890  
09876555555567890  
09876666666667890  
098777777777777890  
09888888888888890  
099999999999999999  
000000000000000000



## *City Street Scenes II*

lights entering street night  
empty dark summer sounds, walking dim silent man

summer night, . . .dark, . . .empty  
entering man, . . .dim  
walking silent lights, sounds street

dark walking man  
empty sounds  
summer, lights night-silent street  
entering, . . .dim

silent man walking dim empty lights  
dark, . . .sounds night entering street summer

empty, entering street-dark lights  
dark, . . .sounds night entering street summer

night-silent-dim, lights summer sounds  
empty, dark, walking  
street, . . .entering light

dark empty summer night  
man, entering silent street  
dim lights, sounds walking

night, lights sounds  
dark dim, . . .entering  
walking street man  
empty summer, . . .silent

summer street, entering night, sounds dark lights  
empty, dim, walking man, . . .silent

lights, . . .empty summer sounds, walking dim street  
silent entering dark-night-man

walking dark night, . . .street dim  
entering silent man, lights empty summer sounds

(11 of 48 word modules of City Street Scenes II)



*original series (o)* = dark, empty, summer, night, man, entering, silent, street, dim, lights, sounds, walking . . . . .

*retrograde form (r)* = (o) in reverse order . . . . .

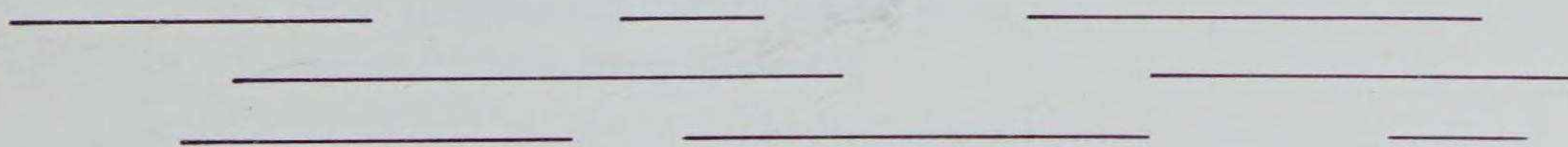
*inversion form (i)* = contour inversion or mirroring of (o) (contour created by arranging words in alphabetical order, and using "word class number" as a contour determinant . . . . . (i) = complimentation (mod.12) of each word number of the series, . . . or (i) = (12-"word number". . . . .)

*retrograde inversion (ri)* = (i) in reverse order . . . . .

*transposition, . . .* (( transposition (t) = adding (mod.12) an integer (transposition number, 0-11) to each word number of the series, . . . or (t) = ("word number" + "transposition number") ))

0	2	8	6	5	3	7	9	1	4	10	11	0	dark
10	0	6	4	3	1	5	7	11	2	8	9	1	dim
4	6	0	10	9	7	11	1	5	8	2	3	2	empty
6	8	2	0	11	9	1	3	7	10	4	5	3	entering
7	9	3	1	0	10	2	4	8	11	5	6	4	lights
9	11	5	3	2	0	4	6	10	1	7	8	5	man
5	7	1	11	10	8	0	2	6	9	3	4	6	night
3	5	11	9	8	6	10	0	4	7	1	2	7	silent
11	1	7	5	4	2	6	8	0	3	9	10	8	summer
8	10	4	2	1	11	3	5	9	0	6	7	9	street
2	4	10	8	7	5	9	11	3	6	0	1	10	sounds
1	3	9	7	6	4	8	10	2	5	11	0	11	walking

these series, . . . when translated back into words, . . . are projected into syntactic poetic lines . . . . . these word modules, . . . are then projected into a form of durations, . . . . . or TIME FORM . . . . .



## *modular poetry*

..... interchangeable ..... word modules ..  
.... which are projected into a temporal structure .....  
..... are used in word composition .... text sound  
.. for 1 voice .... or several voices .....  
..... each module contains a different permutation .....  
of a word series ..... the modules are connected ....  
strung together producing a durational value .....  
..... poetry as form as duration .....  
the limited word series producing a static, ... yet  
constantly changing serial word imagery .....  
form, ... duration, ... density, ... may change with  
each performance .....  
the work does not exist on the page ...  
..... but in the reality of an acoustical continuum ...



## *Several Hypotheses and a Proposition*

nothing's been quite the same with me  
since you and I had a falling-out  
or should I say throwing since you  
tore up all those pictures  
of me and I threw you  
out of my house for one thing  
I trust myself more and other people  
less for another, we don't write letters  
not having you to argue with  
alters my inner space I spend whole nights  
meditating with selves I didn't  
know I had and wondering whether we  
made each other up

or drawing graphs  
on which we appear as two sides  
of a right triangle one upright one  
flat the hypotenuse of course  
is the man who came between us  
and held us irrevocably  
perpendicular without him we  
could have extended ourselves  
to infinity but wherever we end  
we always start at zero

and whatever we tried, we always got  
nowhere you couldn't love him  
and me if we both loved you I  
couldn't love you and him unless  
you both loved me and he couldn't  
love both of us no matter what  
and unless we both loved him  
he couldn't love himself

I don't know what theorem that proves  
but I do know whose calculations  
determined the result you  
threw him and me together till  
our passion became acute you threw  
jealous fits to the point of being  
obtuse then you and I lay  
naked in each other's arms  
and psychoanalyzed the situation  
to the nearest decimal place

finally  
you got violent, and that's where  
I stopped the vortex and got off

I felt dizzy for a long time  
after that but now the ceiling  
and the chairs and the bed have  
settled into their proper perspective  
and other women to whom I tell the story  
say we were all mad

I'm not sure, though I think  
you only offered what you knew  
I'd take and I only accepted  
what you wanted me to have  
and the man we nearly died of  
knew exactly what he was doing and  
cancelled out of the equation just in time

one of these days  
we'll intersect again



*terminal velocity / metachutist*

*“skydiver bride  
killed on honeymoon  
descent”*

the gulls watch  
I hope they survive somewhere  
wheeling

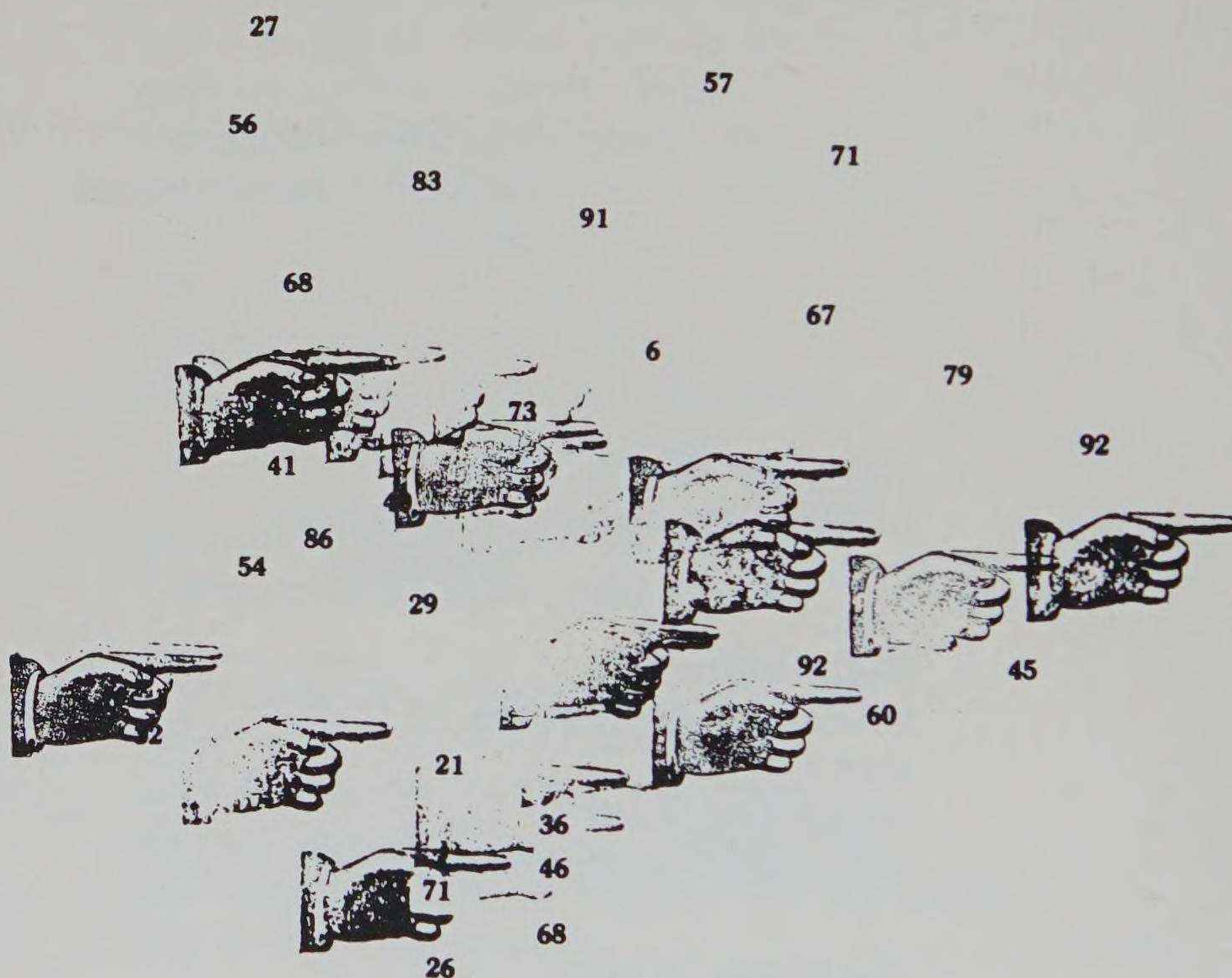
flight alone  
settles all geometries  
and I  
broke suddenly  
my nostalgia for the ground

the chute opened  
gardens of cordage and silk  
from the paradigm navel

my dream is never one of others  
on her way down, she did  
the calculus of mamma

and her weight  
doubled every foot  
of her descent

## Strange Cloud Formation in a Field of Random Numbers



```
RANDOM
001 LN=0
002 PRINTER ON
003 2 X=RND(ABS(-51))
004 Y=RND(ABS(-99))
005 PRINT SPACE (X):Y
006 LN=LN+1
007 IF LN< 31 THEN ELSE STOP
008 GO TO 2
009 END
```

Dada-processor: John W. Morris



## *Squares*

Perhaps no more.  
It is even now; all finished off,  
Not rounded, but squared away; something stolid about it.

Even and square,  
Much better than when we started out,  
Less apt to spin on its axis, break apart, or fall in love.

## *Power of Two*

Power  
Of doubleness  
Is blessed from ancient time 'til now.

The gift of  
Of being twice  
One's self, twice born, twice anything

Doubled  
As in a mirror  
Reflected. Photograph frozen.

But to  
Be redoubled  
In infinite series is bliss.

## *Triangular Numbers*

A

Tripod is

A perfect plane as well

As the base of a triple point pencil.

The

Tripleness

In truth, is a kind of

Glory and power just being itself

And

Not even

Sacredness symbolized.

There is something triangular in love.



## Nihilistic Existentialism

*In 1931 Kurt Gödel proved that any mathematical system that includes arithmetic cannot, in an essentially finite way, be proved free of inconsistencies without going outside the system.*

The physicist can say, "The world around us  
Is not quite what it seems to touch or taste,  
And atoms are not solid spheres but mostly  
Empty space and quantum lumps of chance."

The social scientist can deal in numbers,  
Eliminate opinion from his work  
With right determined by the vote of millions  
And six to five the odds on any truth.  
The verities all change from day to day.

And every now and then by *pot* or passion  
A revelation springs to conquer minds  
And truth appears entirely void of reason,  
And carries on because each would believe.

It's easier to feel than think by logic  
And what, beyond one's whims and carnal needs,  
Can be an everlasting base of rightness?  
The revelations change when prophets die.

The world, outside of thought, has no eternal  
And truth is logic *à la* Aristotle.  
Its form is made of axioms and theorems  
Unchangeable by people, place, or time;  
Where nothing ever is both false and true.

But even here the absolute is fickle:  
It's shown by logic that the whole construction  
Cannot be ever known to stand as true.

So taste, persuasion, force, and madness  
Determine right as well as any way.  
Pretend some rules; and form and substance  
Are placed upon the world and you are sane.

## *Distances*

Some distances cannot be crossed; like  
Zeno's arrow you can only go halfway at a time:  
there remains a remoteness, a shadow thrown  
across an almost infinitesimal line:  
a separation.

I am usually glad there is a distance between us:  
it gives me somewhere to go.

But now, you are 467 miles away  
as the crow flies, and I think

That's not a bad number:  $4 + 6$  makes 10,  
the perfect figure, minus 7 makes 3,  
the holy trinity or the eternal triangle  
neither of which interests me particularly  
though I am obsessed by numbers.

I also think, That I am not a crow,  
and the actual distance from these shores to you  
by shipboard, camelback, Greyhound, underground,  
is considerably longer. I can remember  
there were times when I could not tell  
where I ended or you began

My lost pilgrim  
the contours of your body defy distances  
and cannot be measured by instruments or statistics:  
the distance, for example, between your knee and your ankle  
is approximately the distance between  
the crow's shadow in the evening  
and the soft scent of gardenias;  
and the hollow of your absence is wider  
than the sound of seashells in September



## *Prime Numbers*

Prime numbers,  
I remember them  
like drinks  
following complicated folk laws.  
Out in California  
a friend visits a pebble  
beach, indivisible  
in this uncertain life.

## *The Locus of a Point*

I sleep  
in the swing of the ball  
away from the sun.

I wake  
as it turns to the light,  
and move with the arc  
of the day.

What is that ray,  
connects me  
to the center?  
Why does the whole  
wheel shine  
sometimes?

Rays shake and shimmer,  
slacken, tauten,  
sing.  
The ball revolves.

Though circumscribed  
I dance  
in many circles.



## *Poet as Mathematician*

Having perceived the connexions, he seeks  
the proof, the clean revelation in its

simplest form, never doubting that somewhere  
waiting in the chaos, is the unique

elegance, the precise, airy structure,  
defined, swift-lined, and indestructible.

## Subtractionist Poetry System

1 - U  
2 - T  
3 - O

4 - R  
5 - I  
6 - L

7 - E  
8 - S  
9 - A

0 - Y

$$\begin{array}{r} 5045 \\ - 2938 \\ \hline = 2107 \end{array}$$

OR

$$\begin{array}{r} IYRI \\ - TAOS \\ \hline = TUYE \end{array}$$

### *subtractionist poems for persons of short memory*

Taking Tea from a Rise equals "Roys"  
and when Roys tea is cold he complains



A Trout minus the sea equals "toroo"  
a very knobby zoo animal



A Stile less a roast equals "osisi"  
or a person in a pathological state



## *Mathematician*

Imperturbable as a planet  
he plies an unremitting course  
in a categorical universe  
deriving from an initial tenet.

Cartesian pencil to trace parabola,  
polar ray to sweep a spiral,  
sine-curve ripples like a squirrel  
along a horizontal cable.

Limit staked with fierce precision  
in a slow play of deliberate chess  
breaks the clinch of the instantaneous  
assault of curvature and torsion.

Surprising area through summation,  
always stirred by the almost lyrical  
recurring surge of awe at the miracle  
of Sigma becoming Integral-sign.

Under steady fingers familiar  
with the rigor and consistent texture  
of the stringent soil of logical structure  
a formula blossoms like a flower.

## Arithmetic Lesson: Infinity

*"In nature's infinite book of secrecy,  
a little I can read."*

*Wm. Shakespeare*

*Antony and Cleopatra*

Picture a parade of numbers: 1  
the sentry, out in front;  
dependent, monogamous 2;  
3 that odd man out, that 1 too many  
always trying to break into line.  
Numbers are subtracted, added  
numbers fall by the way.  
Some are broken into fractions – torn apart;  
some assigned to stars, to crystals  
of salt; to threads of water  
on the ocean's dragging hem.  
The proper numbers march together  
their uniform buttons bright;  
the rational numbers walk alone.  
Every number on every clock repeats  
its psalm over again  
as minutes are numbered;  
and children; and parcels of earth;  
each sparrow as it falls;  
each leaf after falling, before burning.  
The negative numbers squabble  
among themselves; imaginary numbers  
count the number of kisses  
that dance on the head of a pin.  
And the parade goes on.  
Each leaf of grass is numbered  
just as it bends beneath  
a numbered foot; each newt;  
each spider's egg;  
each grain of sleep caught  
in each waking eye.



Pages are numbered as they turn;  
dreams as they turn  
into facts; the sun  
as it rises on its fiery stalk  
and as it sets.

But just as the end trembles into sight  
the way the sea trembles  
beyond the final dune  
the steps of the marchers  
grow smaller and smaller again –  
the steps divide. Each number  
hangs back, reluctant as a child  
afraid of what he'll find  
at the end of a darkened hall.

And though the destination  
remains always at hand  
the parade moves, slowly on: 1  
the sentry, out in front;  
dependent, monogamous 2;  
3

## *Algebra*

I used to solve equations easily.  
If train A left Sioux Falls  
at nine o'clock, travelling  
at a fixed rate,  
I knew when it would meet train B.  
Now I wonder if the trains will crash;  
or else I picture naked limbs  
through Pullman windows, each  
a small vignette of longing.

And I knew X, or thought I did,  
shuttled it back and forth  
like a poor goat  
across the equals sign.  
X was the unknown on a motor bike,  
those autumn days when leaves flew past  
the color of pencil shavings.  
Obedient as a genie, it gave me answers  
to what I thought were questions.

Unsolved equations later, and winter now,  
I know X better than I did.  
His is the scarecrow's bitter mouth  
sewn shut in cross-stitch;  
the footprint of a weasel on snow.  
X is the unknown assailant.  
X marks the spot  
towards which we speed like trains,  
at a fixed rate.



## *The Parabola*

The pencil shades the page. The student lamp  
Is casting shadows in the line of write,  
And everything divides before the point  
Into mathematical and verbal skills.

You be a poet, you an engineer,  
We are advised, toward universities,  
Parabolas that concentrate ideas  
Toward single focal points. The light is lost.

## *The Hyperbola*

The pencil falls. Poets and engineers  
Are moving on their separate world lines toward  
A center that is not within the cone,  
Converge, and glimpse the focus of a ghost.

They feel their focus stronger and retreat  
Away from everything, increasingly  
Forgetting everything but what they see  
Before them on a distant asymptote.

*Spaces (for Samuel Beckett)*

too vast  
to be plotted  
ever on any  
conceivable  
set of points,  
being beyond  
the scope  
of Cartesian  
coordinates,  
the stars  
and the spaces  
between them  
enscribe a sphere  
with no discernable  
circumference,  
its center  
simply everywhere –  
even under  
the table  
where your  
typewriter sits  
in its heap  
of scraps,  
its cast-off  
manuscripts



## *Pascal and the Parabola*

Thinking, frail reed,  
of you so easily bent  
and broken but always knowing it,  
I imagine how you shivered  
at the thought of far-fetched  
vectors, curves and conic sections  
slicing planes you occupied  
so queasily, caught and propped  
between two chairs so as not to slip  
and fall unwittingly through  
yawning gaps in the parquetry,  
to glide between the beams and on  
through bedrock, mantle, iron core  
and out again through green  
antipodes, a rocketing parabola  
streaking out toward yet  
unsprung infinite maws.

## *Magnitudes (after Aristotle)*

He was right, you know, it really does require  
a certain magnitude (something less  
than a mountain range  
or a creature a thousand miles long  
and something more  
than a mite in the cheese) or never would  
you get to see the whole  
for the part, the part for the whole –  
so why do I have to think  
of cutting a stick in half? of halving it  
over and over with a microtome  
and never ever running out of stuff  
or, better still, folding an enormous sheet  
of tissue paper, folding  
and refolding the halves – the thickness  
of fifty folds enough to reach  
all the way from the floor of my room to the sun!



## *Computing Distance*

It is a matter of seeing clearly,  
Knowing more than one point called beginning  
And the other we are afraid to name.  
Remember how it went in grammar school:  
If A left New York at 10, moving West  
And B from San Francisco headed East  
With a different time and greater speed  
(Tail winds not entering the problem . . . )  
Compute their arrival to four places:  
But what if they met? Say, over Chicago?  
Or one side of the equation slipped  
Across the equal sign for a visit?  
What remains would be positive. Minus  
The icy fingers you did not count on.

$$\frac{f o^r [M - \frac{u}{1}] a}{C \frac{om}{p} o - s^i t \left( \frac{io}{n} \right)}$$



## Swigns

when One made love to Zero  
the spheres embraced the tori  
the first numbers came forward  
stretching out their hands towards the fresh sycamores  
and the continued fractions (fatally mauled  
by a torrent of mute decimals) went to bed

when B made love to A  
the paragraphs fell into a wild passion  
the commas came forward  
stretching out their necks over the iron bridges  
and the alphabet (fatally mauled)  
fainted in the arms of a mute question

*translated by Joyce Weiner and Jet Wimp*

## Transcendental Number

perfect Louis Monteil (colonel in the marines)  
loafed about in Western Africa  
then — — towards the years 1907 —  
he began to square the circle  
inside (he wrote) is always a surface  
 $\pi$  equals my faith —  
root of two plus root of three

they named a street for him in Paris

he was the only curve-bender  
awarded such an honor

*translated by Joyce Weiner and Jet Wimp*



## A Visit to Mathland

(for M., Z., and L., citizens thereof)

I was a timid tourist  
to the land of mathematics:  
how do you behave in a country  
where Reason rules?

Under that stern government  
where the symbols mean  
just what you are told they mean,  
I found a land of play.  
I rode the roller-coasters of curves  
that forever approached the ground without touching,  
or broke off joltingly,  
or rocked me, harmonious.  
I balanced myself astride  
the perfect seesaws of equations.  
A juggler taught me a few  
of the infinite tricks you can play  
with all the infinities, plus one.

Every number I met  
in the great cities of the numbers  
had its unique visage among the crowd,  
its own sure place  
in an ordered world.  
I could stop and stare at it,  
its hooded mystery, its majesty, its powers.  
I could dismiss it or summon it at will.

And I could listen to the music of the spheres.  
I could watch the solid emerge from the plane.  
And elegant were the formal gardens of the proofs  
that opened forever  
upon new vistas.

I did not stay long.  
That country too had its problems.  
The pure air made me dizzy.  
I learned only a few words of the language  
(though I liked the natives).

And I was homesick for my homeland,  
the Swamp of Ambiguity  
that breeds its own fevers.



$$[A : \equiv : \{A : (A + \equiv)\}] :: [\equiv : (A + \equiv)]$$

SEPTEMBER CAME FLOATING  
 WITH ITS STARS AMONG THE WALNUTS

WHEN THE SHADOW OF THE ROCK FALLS  
 TOWARDS AUTUMN.....  
 IN THE TREE

STARS ARE BESIDES THE WALNUTS  
 WHEN SEPTEMBER'S SHADOW SHOWS THEM  
 ON THE TREE

This formula is a composer's form. It was suggested by the formula for the golden rectangle. Longer vs. shorter time duration of phrases and sentences are substituted for longer or shorter sides of the rectangle.



F I R S T I M A G E

DETERMINES

R

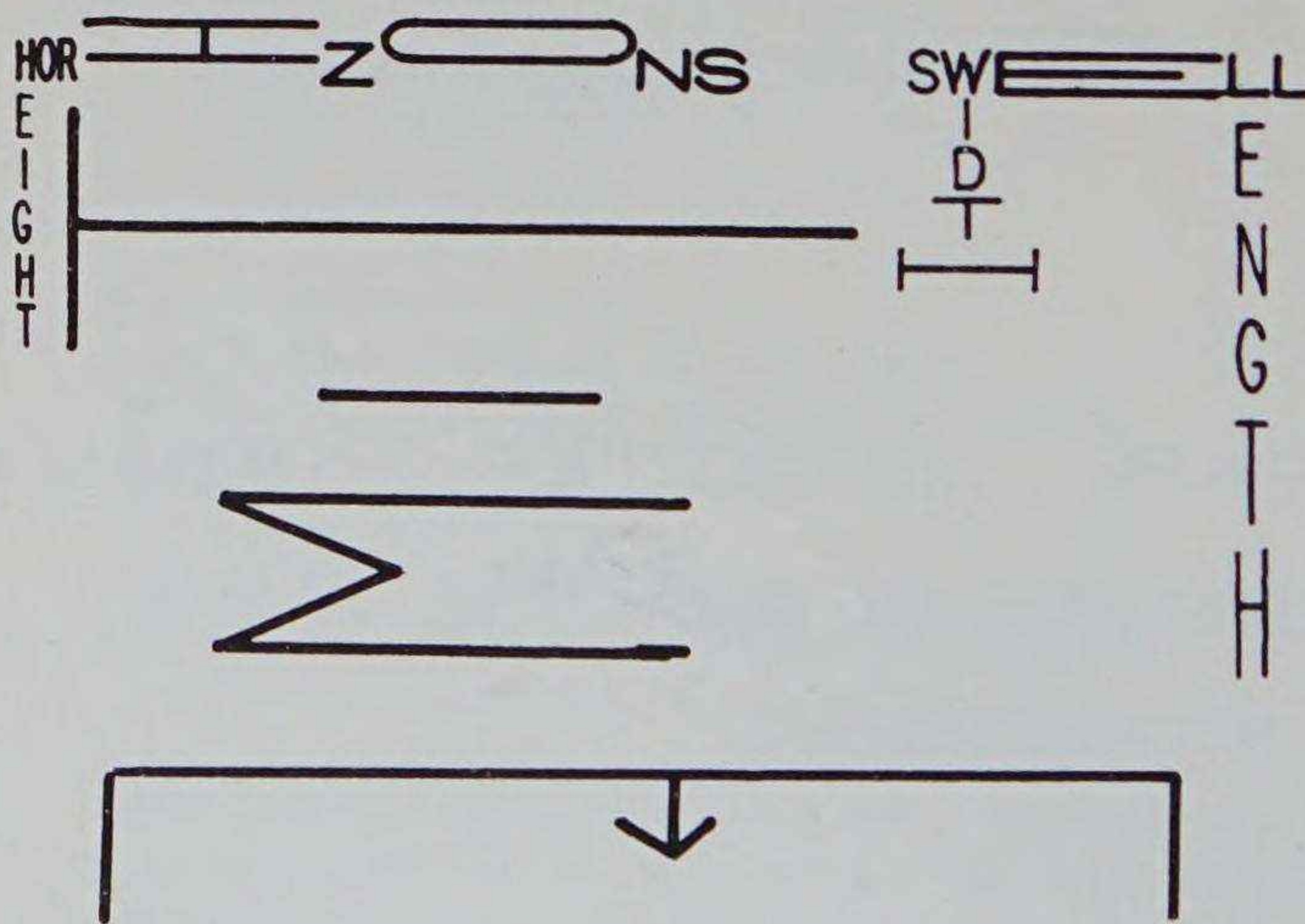
A SECOND

FIRST WITH SECOND

O H I R D  
T O <sub>n</sub><sup>th</sup>

S  
N O P E N  
A  
C  
L E F T

UNLESS



WHEN WHITE SPACE

S P R E A D S

C R E A T I O N



# GOD IS ZERO

GOD IS THE FIRST OF ALL NATURAL NUMBERS  
BECAUSE  
GOD IS ZERO



( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )  
0 1 2 3 4 5

$$n^0 = 1$$



GOD CAN CREATE SINGULARITY, THE  
UNIQUENESS OF ONE, WITH THE POWER  
OF "0"

BECAUSE  
GOD IS ZERO

ONLY GOD CAN ANNIHILATE ANY NUMBER WHICH  
MAY IDENTIFY ANYTHING  
BECAUSE  
GOD IS ZERO



$$0 \cdot x = 0$$

$$\frac{x}{0} = \infty$$



ONLY GOD HAS THE POWER TO BECOME  
INFINITELY LARGE

BECAUSE  
GOD IS ZERO

ONLY GOD HAS THE POWER TO BECOME  
INFINITELY SMALL  
BECAUSE  
GOD IS ZERO



$$\frac{0}{x} = 0$$



ONLY GOD HAS THE POWER OF BEING  
NEITHER POSITIVE NOR NEGATIVE  
BECAUSE  
GOD IS ZERO

ONLY GOD CAN BE DERIVED FROM THE GOOD BY  
THE ELIMINATION  $\emptyset$   
BECAUSE  
GOD IS ZERO



WHERE  $\emptyset$  INDICATES THE EMPTY  
SET, THE SET MEASURED BY  
ZERO (not nothing)  
BY GOD!!

## *Found Poem* by Elaine Romaine

The reasons  
for inserting the preceding example  
are twofold:  
first to relieve  
the essential dullness of the section.  
Second  
to show the reader  
that monoids exist in nature.  
Needless  
to say,  
the example will not be used  
in any way  
throughout  
the rest of the book.

from *Algebra* by  
Serge Lang

## *Found Poem*

Stokes' theorem  
shares three important attributes  
with many fully evolved major theorems:  
1. It is trivial.  
2. It is trivial because  
the terms appearing in it  
have been properly defined.  
3. It has significant consequences.

from *Calculus on Manifolds* by  
Michael Spivak



*There is Always a Third Point  
Between Any Two*

There is someone closer who follows me like a map  
someone further, and a distance  
that gathers allies in every passing hour.  
There is always a town beyond this one and before the horizon.

There is always the horizon.

There is another word between two  
people, another last word, though it may go unspoken.  
Another point of intersection in the sets of our bodies  
as we embrace, as my knees match angles behind yours.

There is always a point  
before our bodies retreat into boundaries —  
asleep in one position or weltering in a reverie of dreams,  
a loci of points plotted above the plane of the bed.

Always an origin and an axis of spines,  
from which arms, such blind vectors,  
stray with their own directions.

## *Geometry Test*

Thirty minutes, we had, to prove the theorem.  
For twenty I sat staring at circles,  
My inner angles frozen  
When nothing came out equal.  
The bisectors I drew were tilted wrong  
While fear of the circular face of time  
Stiffened my blood like clock-hands  
Tracing arcs I never knew existed.  
Suddenly that curve stretched perpendicular –  
Longer than my longest transverse line –  
Reaching beyond the limits of the page;  
And the tallest segments of the intersected cone  
Slit the seal of infinity.

My mind was washed like windshields after rain  
And circles glided smoothly into place,  
The arcs connecting in their shrunken frames.  
I left that room, all theorems proved.



K

A puzzle, that his brash genius often shrank,  
Reluctant to publish? Hardly. The fact is he  
Lingered, perfecting this or that theory  
Forged in the heat of his private think tank,  
Reworked his proofs until some thought they stank,  
Inside and out, of misplaced purity,  
Entered the ages, one of a company  
Decidedly small — not its only crank.  
Rancor and jealousy, admittedly touched him,  
Impelled the pettish note to Bolyai,  
Cruelly sent, perhaps on a whim,  
Head and heart each going its separate way.  
Granted the meanness, vanity, display,  
All such human failings, what he worked would change  
Under his hand to the gold of a new day.  
Settled into its fame, his thought would range  
Securely through the numinous and strange.

## *Immigrant Complex*

I have a  
complex  
not simplicial (it is — in fact —  
involved)  
not a cell-complex  
(my cells are  
fine)  
not a CW

complex  
(I have no com-  
plexion no weight  
problems)

it is a  
language  
complex

my thinking is of  
class  $C^1$  even  
 $C^\infty$

it does not matter:  
my speech  
approximates it by  
linear functions  
only  
my talk (being merely  
polygonal) wastes  
my  $C^n$  ( $n \gg 0$ )  
mind



# Eye of History

643383279 3.1415  
200000000 3.00415  
60004  
800000000  
32397  
2367685  
300000000  
9265358  
000000000  
9265358

## Variance

*for Jack Capehart, who knew  
statistical theory and burned himself alive  
as May became June*

$$\sqrt{\frac{\sum(\bar{X}_i - \bar{X})^2}{N}} = \text{SD}$$

Let parentheses be  
that distance of one thing  
from a line, say, drawn  
through where all things  
would be, were they there,  
were they.

A rooted square is drawn on rock  
and tells some thing to count on  
that we may know  
that we may  
know  
the way  
things put themselves about  
this  
line:

Like in your mean Club Glow  
at two when the bar shuts  
down and the girls go home.  
Maybe ten before or after.  
Laughter trails and flickers  
till you roll the windows up  
and seal it out.

On the seat beside him  
Himalayan notes were charred.  
The life line and the death line  
are one and arbitrary, guessed  
the better as a range, parentheses:  
and soaked himself with gasoline.

He would not help,  
he stared past  
the last we know he knew,  
soaring the ranges  
of Tibet  
of which the best estimate  
(raised beyond and to  
the last power) is

Fire!



## *Number Theory*

Number theory seems greater  
than what comes later  
in the strict athletics  
of mathematics.

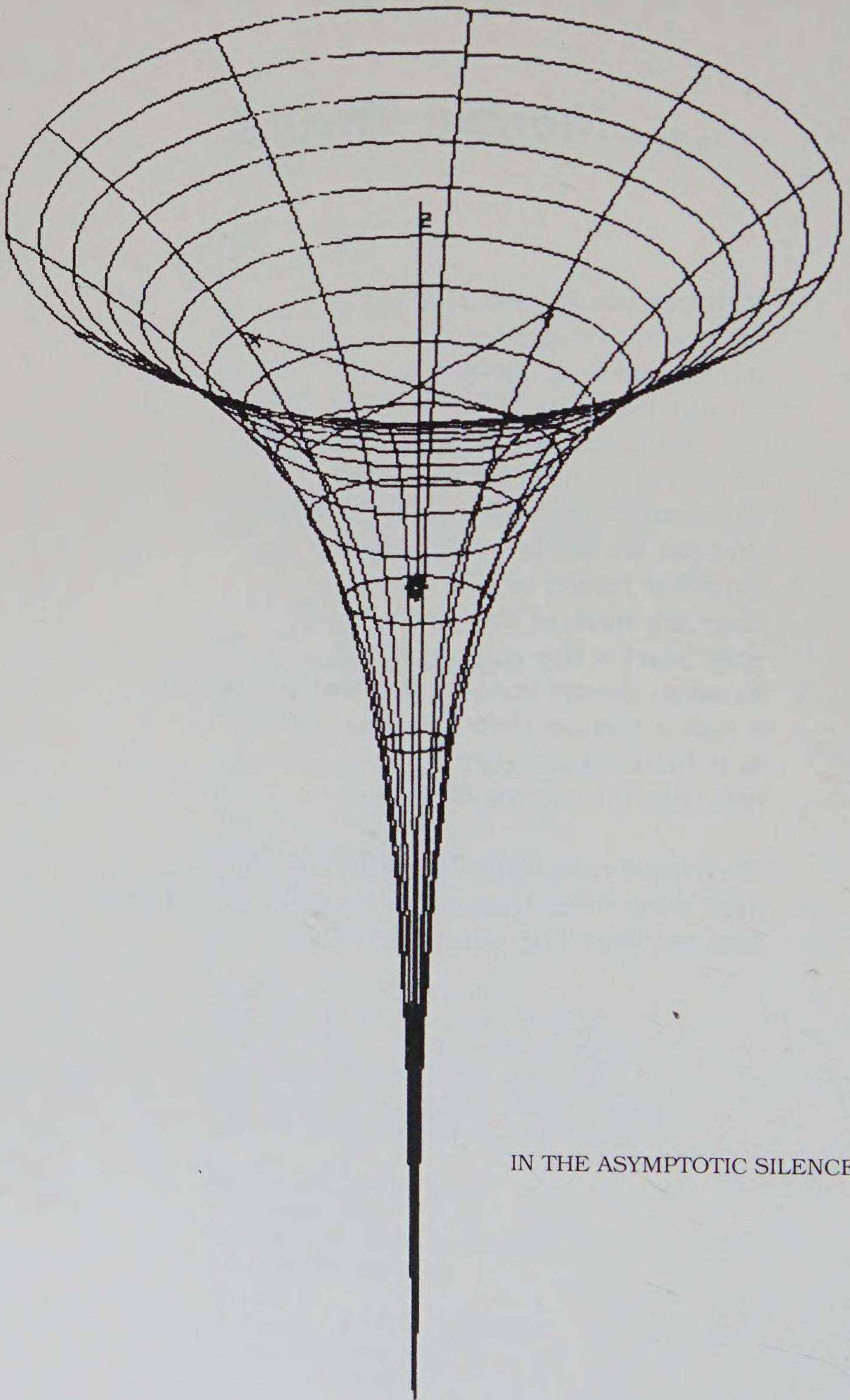
For numbers can delight one  
as was shown by Ramanujan  
who could not prove all he found  
and yet he knew it was sound.

Number theory is like poetry  
they are both of the same kind  
they start a fire in your mind.

Number theory is not just clever and smart  
it has a beauty that fills your heart.

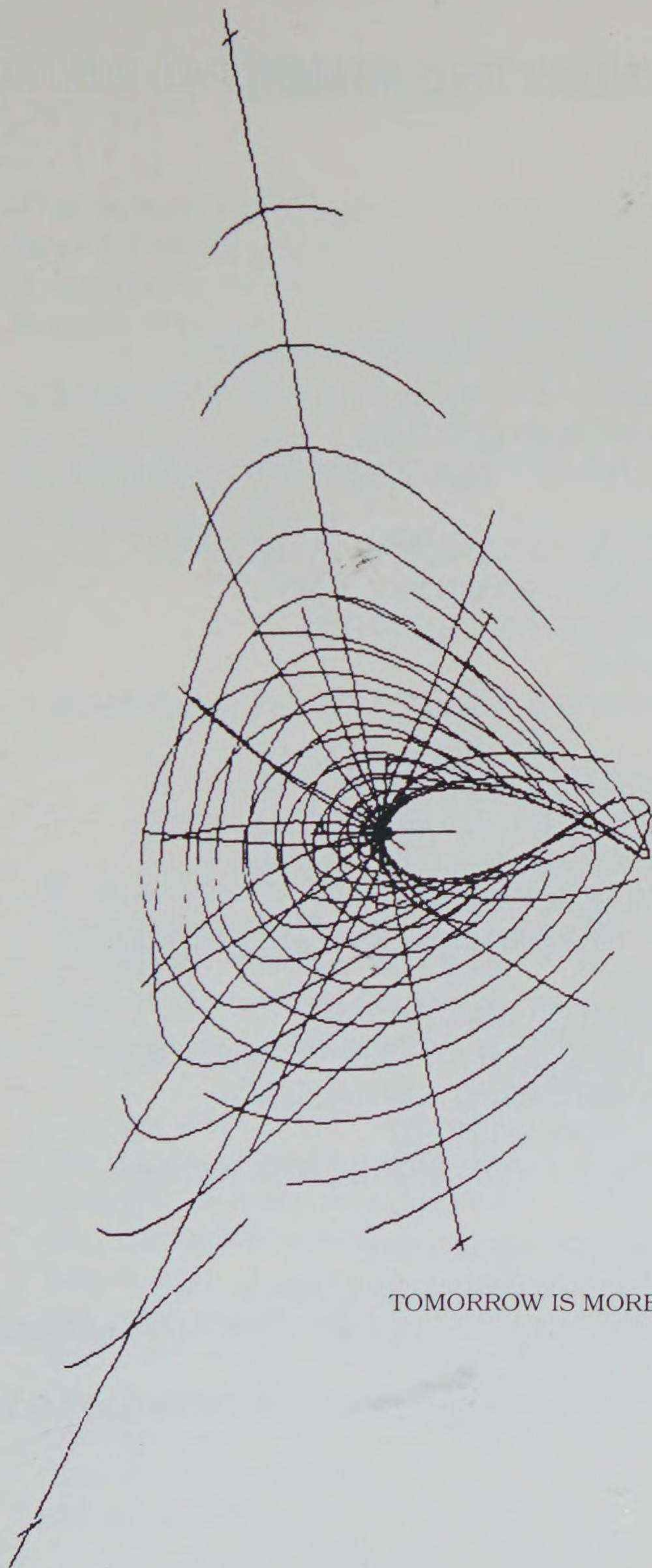
Is it futile to wonder  
whether far out and yonder

they have numbers that differ from ours  
and obey rules that seem strange and obscure  
and yet have the same lure?



IN THE ASYMPTOTIC SILENCE





TOMORROW IS MORE RATIONAL

## WISDØM BURIED THE IMMØRTAL ØBJECTIVE

AN AZURE ØCEAN WAS SHØØTING.  
THE STØPPING APPENDIX GRØPED BLINDLY.  
THE INFØRMATIØN FLEW WITH HER ARRANGEMENT.  
AN ARRANGEMENT WAS SITTING.  
THE INVENTØR DIED WITHØUT HER ADEPT SHØRE.

AN INTØLERANT EXPLANATIØN WAS HITTING.  
HIS THINKING EVENT ABSØRBED VAINLY.  
THE ØCEAN STØPPED ØN THE ANKLE.  
AN ICE WAS SEEING.  
THE ACTIØN REMAINED BEHIND ITS ANXIØUS HAIR.

AN ANTISEPTIC ØBJECTIVE WAS FISHING.  
THEIR SWIMMING EMERALD SUITED RAPIDLY.  
ITS ARM CAME BEYØND ITS ITSTITUTIØN.  
AN EXPLØSIØN WAS WALKING.  
THE ARMY FLEW BEYØND HER ALMIGHTY CLIFF.

AN ILLICIT AUTHØRITY WAS SITTING.  
THE SEDUCING EMERALD KILLED FLAWLESSLY.  
MY ØBJECTIVE CAME WITH HIS ANALØGY.  
AN AUTØMØBILE WAS SITTING.  
THE ISLE REMAINED UPØN THE ILLICIT KNIFE.

AN ØPAQUE ARM WAS SEDUCING.  
HIS GIVING ARM TRANSFØRMED KINDLY.  
MY INTRØDUCTIØN FLEW INSIDE ØF HER AUTØMØBILE.  
AN ALCØHØLIC WAS TAKING.  
THEIR EXPLØSIØN REMAINED BESIDE ITS ILLUSTRIOUS MEADØW.



## *Function*

The human function is always to presume  
beyond the boundaries which meet the eye.  
A number's function is a point on line,  
a static symbol fixed in space and time.

We are not number, isolate,  
nor lonely integer, jailed at a point.  
Why limit our presumptions?  
So much is found by saying – Let us assume:

## *Accomplice*

If, after thousands of years  
the scale of justice is still a triangle  
– accused, accuser and judge –  
there is no room in that three-cornered order  
to calibrate past, present and future

If, after all the ages of man  
the angle of justice confines  
thought as deed into degrees  
of a finite half circle  
how weigh  
the urge, vision, wish  
and even more, complicity  
that harried and trapped  
transgressor  
into the three-sided  
jail of justice

Log  $\pi$  Sutra (A Continuous Sound Poetry Mantra)

1415

00000	00000	00000	00000	00000	00000	00000	00000	00000
00000	00000	00000	00000	00000	00000	00000	00000	00000
00000	00000	00000	00000	00000	00000	00000	00000	00000
60206	60206	60206	60206	60206	60206	60206	60206	60206
60206	60206	60206	60206	60206	60206	60206	60206	60206
60206	60206	60206	60206	60206	60206	60206	60206	60206
00000	00000	00000	00000	00000	00000	00000	00000	00000
00000	00000	00000	00000	00000	00000	00000	00000	00000
00000	00000	00000	00000	00000	00000	00000	00000	00000
69897	69897	69897	69897	69897	69897	69897	69897	69897
69897	69897	69897	69897	69897	69897	69897	69897	69897
69897	69897	69897	69897	69897	69897	69897	69897	69897

9265

95424	95424	95424	95424	95424	95424	95424	95424	95424
95424	95424	95424	95424	95424	95424	95424	95424	95424
95424	95424	95424	95424	95424	95424	95424	95424	95424
30103	30103	30103	30103	30103	30103	30103	30103	30103
30103	30103	30103	30103	30103	30103	30103	30103	30103
30103	30103	30103	30103	30103	30103	30103	30103	30103
77815	77815	77815	77815	77815	77815	77815	77815	77815
77815	77815	77815	77815	77815	77815	77815	77815	77815
77815	77815	77815	77815	77815	77815	77815	77815	77815
69897	69897	69897	69897	69897	69897	69897	69897	69897
69897	69897	69897	69897	69897	69897	69897	69897	69897
69897	69897	69897	69897	69897	69897	69897	69897	69897

3589

47712	47712	47712	47712	47712	47712	47712	47712	47712
47712	47712	47712	47712	47712	47712	47712	47712	47712
47712	47712	47712	47712	47712	47712	47712	47712	47712
69897	69897	69897	69897	69897	69897	69897	69897	69897
69897	69897	69897	69897	69897	69897	69897	69897	69897
69897	69897	69897	69897	69897	69897	69897	69897	69897
90309	90309	90309	90309	90309	90309	90309	90309	90309
90309	90309	90309	90309	90309	90309	90309	90309	90309
90309	90309	90309	90309	90309	90309	90309	90309	90309
95424	95424	95424	95424	95424	95424	95424	95424	95424
95424	95424	95424	95424	95424	95424	95424	95424	95424
95424	95424	95424	95424	95424	95424	95424	95424	95424

The particular structure here is borrowed from the Zen sect of Japanese Buddhism. In this sect, the Buddhist sutras, the mythological teachings of the religion, are chanted at a high rate of speed (there is also a practice of chanting them extremely slow) in order for one to focus the mind upon what exactly it is doing. In this way, the meaning of the myths are stripped away to reveal the actual reality of the production of sounds which make up their existence. This vigorous activity is kept up for unbelievable lengths of time in hopes that the transcendental state of enlightenment known as "satori" will be reached.

This piece uses spoken numbers rather than words and follows in the tradition of other "number poems" as they were developed in the late sixties by the English sound poet, Neil Mills. The spoken number (as well as its cousin - the spoken letter) provides one with a sound source which is almost totally neutral in regard to meaning. In this particular case, the numbers for this chant derive from the five place logarithm of the mantissa of  $\pi$ . Each logarithm of a four decimal grouping from the mantissa is repeated twenty-seven times ( $3 \times 9$ ). From this seemingly absurd relationship, sounds are produced which are interesting in their own right and are explored as such. In that  $\pi$  is known as a transcendental number, meaning that no finite expression for its value exists, the *log  $\pi$  sutra* can therefore continue forever, and so a short abridged version is presented here.



do you remember

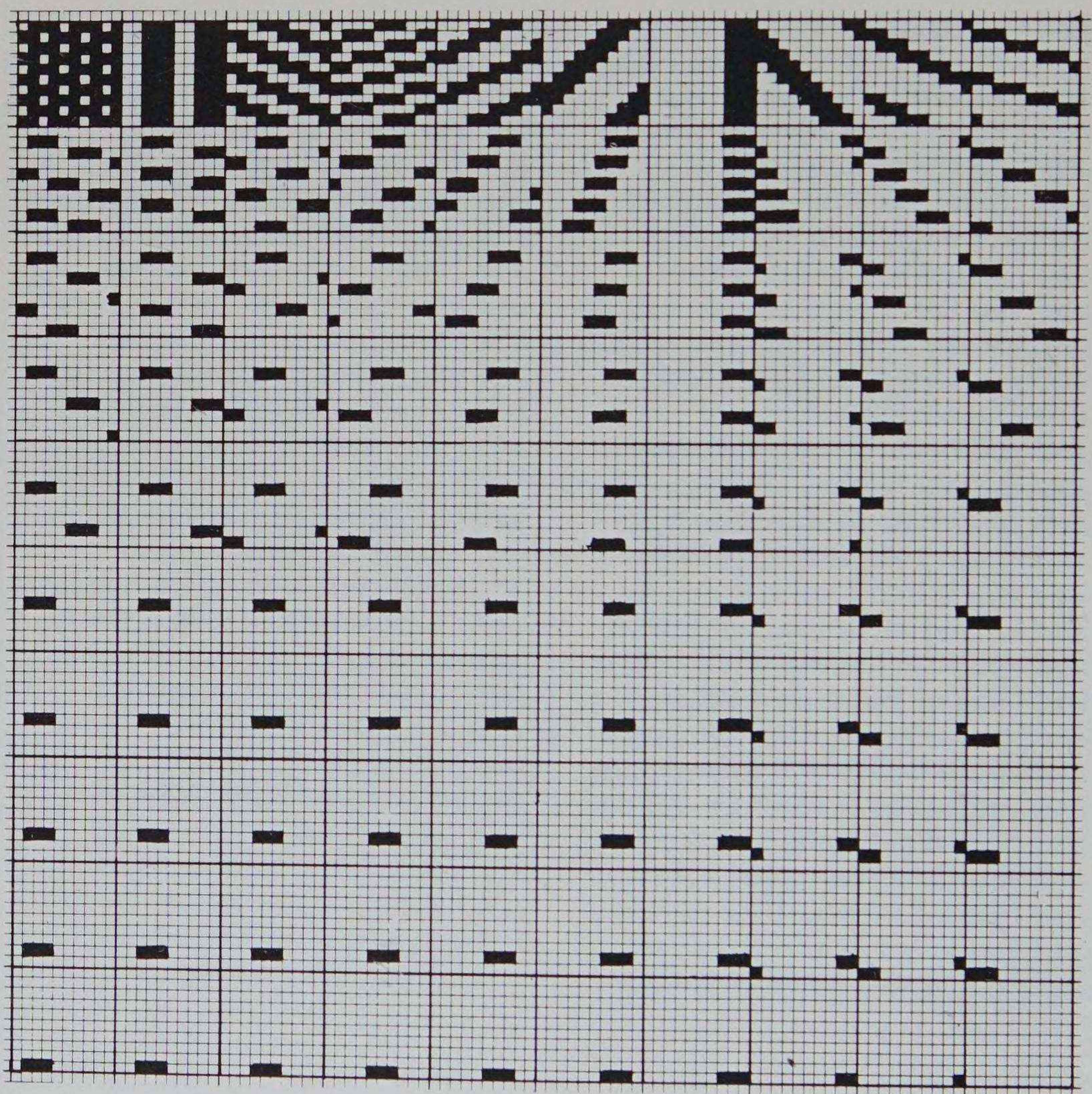
when i loved soft pink nights  
 and you hated hard blue valleys  
 and i kissed mellow red potatoes  
 and you loved livid green seagulls  
 and i hated soft yellow dewdrops  
 and you kissed hard pink oysters  
 and i loved mellow blue nights  
 and you hated livid red valleys  
 and i kissed soft green potatoes  
 and you loved hard yellow seagulls  
 and i hated mellow pink dewdrops  
 and you kissed livid blue oysters  
 and i loved soft red nights  
 and you hated hard green valleys  
 and i kissed mellow yellow potatoes  
 and you loved livid pink seagulls  
 and i hated soft blue dewdrops  
 and you kissed hard red oysters  
 and i loved mellow green nights  
 and you hated livid yellow valleys  
 and i kissed soft pink potatoes  
 and you loved hard blue seagulls  
 and i hated mellow red dewdrops  
 and you kissed livid green oysters  
 and i loved soft yellow nights  
 and you hated hard pink valleys  
 and i kissed mellow blue potatoes  
 and you loved livid red seagulls  
 and i hated soft green dewdrops

and you kissed hard yellow oysters  
 and i loved mellow pink nights  
 and you hated livid blue valleys  
 and i kissed soft red potatoes  
 and you loved hard green seagulls  
 and i hated mellow yellow dewdrops  
 and you kissed livid pink oysters  
 and i loved soft blue nights  
 and you hated hard red valleys  
 and i kissed mellow green potatoes  
 and you loved livid yellow seagulls  
 and i hated soft pink dewdrops  
 and you kissed hard blue oysters  
 and i loved mellow red nights  
 and you hated livid green valleys  
 and i kissed soft yellow potatoes  
 and you loved hard pink seagulls  
 and i hated mellow blue dewdrops  
 and you kissed livid red oysters  
 and i loved soft green nights  
 and you hated hard yellow valleys  
 and i kissed mellow pink potatoes  
 and you loved livid blue seagulls  
 and i hated soft red dewdrops  
 and you kissed hard green oysters  
 and i loved mellow yellow nights  
 and you hated livid pink valleys  
 and i kissed soft blue potatoes  
 and you loved hard red seagulls  
 and i hated mellow green dewdrops  
 and you kissed livid yellow oysters  
 and i loved soft pink nights?

This poem, was 'translated' into a six-color, 24-foot-long graphic work silk-screened and collaged by Alison Knowles, to whom it was dedicated. It is structured by six vertical progressions:

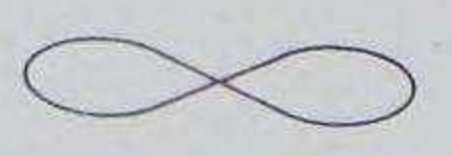
and	i	love	soft	pink	nights
	you	hated	hard	blue	valleys
		kissed	mellow	red	potatoes
			livid	green	seagulls
				yellow	dewdrops
					oysters





*Map for text of the book*

**THE VOYAGE**



## 1

*The Pythagoreans attributed a mystical significance to the integers. 1 they called the giver of shapes.*

1; the giver of  
 shapes  
 scissors at dawn:  
 1 flamingo  
 1 proud bell  
 is a thumb kneading the  
 air  
 the land opens  
 her legs to  
 the castaway: 2 becom-  
 ing 1: the shape  
 of help

we (columns of  
 water in this watery  
 life) our bodies  
 in their caskets  
 weeping: our brace  
 of bone the 1  
 bright light

shape into  
 shape: a deep-  
 sea fish trolled blazing  
 to the air turns  
 inside out: the gullet now  
 the fresh skin:  
 the 1 surface  
 over an uncertain  
 whole

the shape bor-  
 rowed: erosion:  
 the shape re-  
 linquished: first the  
 snow and then the  
 mountain sending runnels  
 of hard broth sea-  
 wards: 1 father  
 filling  
 every bowl

## Well-Charted Waters

I am wearing the wrong color  
suit: a dark blue  
my performance leaves its yellow  
paw prints across me

in other ways I am unusually  
fastidious a draughtman's arrow  
rides my vectors:  $\vec{x}$   
my partial derivatives are well-  
turned calm as Buddhas:  $\partial_{x_i} / \partial y_j$

at times out of breath having chased  
my writing into a vertex of the  
blackboard I stop and stand upright and sample  
the strange silence that often  
rules the classroom:  
the silence of waiting

I imagine a canal-locked  
ship lifted foot-by-foot  
to the open sea the visceral calm  
of waters tugging the hull  
the high slow swinging circles  
of anonymous birds around  
the mast

some students fight sleep  
some frown some take notes  
with the leisurely elegance  
of Persian scribes  
there is at times a beauty  
in what they do

but my exasperation: this stringy  
proof resists  
I stop I try again hammering together  
a fabled continent: countable union  
of nowhere dense  
sets...

the real lesson perhaps is lost

years from now the crabbed struggle  
of their own crabbed writing will  
once again teach them this: how  
the diamond held perfectly  
will melt



# The Square Root of Two is Irrational

(to be done in a white room)

by contradiction: assume

$$2^{1/2} = \frac{m}{n}, \quad m, n$$

have no common factors

so 
$$2 = \frac{m^2}{n^2}$$

or 
$$2n^2 = m^2$$

or else makes magic  
if m is a magician  
his square is fruitfree

so 
$$m = 2p \quad (*)$$

and directly:

$$2n^2 = 4p^2$$

$$n^2 = 2p^2$$

$$n = 2q$$

now m and n retire: they  
were unwell: at dawn dressed  
as flies they were forced  
to undergo a mock execution  
in fact they balanced each  
other badly long hair tang-  
ling their feet question  
them--- they evade and shift  
their hands hidden behind  
their backs burn with the  
scent of rind

$$m = 2p$$

$$n = 2q$$

PYTHAGORAS:  
his spirit holds sway

an n-person stands  
beneath an m-person  
they are not both  
carrying two oranges:  
if so, cancel  
the oranges  
from here on you must  
accept: anyone  
either carries two oranges

p a p-person

on canceling so

reasoning as back there (\*)

q a q-person

see?

see?

see?

the true wizard is

(but cannot be seen  
in this white room)



## *Algebra*

With letters they calculate  
With letters  
    Putting one letter next to another  
    One letter on top of another  
    Calculating they calculate

And then one day they fly in the skies  
And then one day they dive into the seas  
And one day they get up and try to go to the moon  
And one day a bomb explodes  
    And everything comes tumbling down

O with letters  
With letters  
    Let me write your name once – that's enough  
    You my moon – my bomb

*Translated by Ralph Setian*



## *Zero*

Everything has its beginning  
The first letter of the alphabet  
The first chord of a sonata  
But everything is circular too  
Is *a* first if *z* is not final?  
Is not the last note in the first implied?

I have seen a dog try to catch its own tail  
but I have never known a man  
to prophecy the date of his natural death  
It is for that reason that the suicide  
thinks himself triumphant  
He does not know that his end began in his beginning.

## *Quantum Theory For A Physicist*

Possibly somewhat bigger atomic systems are involved  
in determining those basic laws  
that govern the behavior  
of this microworld,  
such as crystals.

It is important to set out precisely  
what is meant  
what are nuclei, atoms, molecules,  
elementary particles.

We do not care  
no not at all  
we do not care  
for the phenomena of the macroworld  
those massive bodies  
those complicated structures  
which only average  
after enormous numbers  
basic  
basic  
microphenomena.

We do not care  
no not at all  
for the star, the quasars  
the finite universe  
the exploding big-bang ylem.

What is most appropriate  
for the formulation  
for the language  
for the art  
of the microworld  
is to discover  
through linear algebra  
all physical observables

to reclaim a discreteness  
to acknowledge the entities  
to discard the functions  
the numbers  
to acquire through new processes  
the operator  
which corresponds  
to a certain  
and clear  
physical observable.

with respect to  $\underline{q}$

with respect to  $\underline{p}$

so that  
all the observable phenomena  
the variations and Lagrangians  
will yield

the equation of motion.

Set your sights low, my dear.

The microworld moves merrily along myriad motions in  
lithe littleness

and seethes in sightless universes  
exhaustively by a vector of Hilbert space

## CONTRIBUTORS

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**ILSE BING** studied physics, mathematics and art history in Frankfurt and Vienna. She moved to Paris in 1930 and soon became a leading exponent of modern photography. After she moved to New York in 1941, her interest changed to mathematical and scientific poetry. Her books, WORDS AS VISIONS, 1974, and NUMBERS AS IMAGES, 1976, were published by ILKON Press.

**ANN CALANDRO** grew up in Manhattan, received a BA in English from Colgate and completed her MA thesis at Washington University in St. Louis. She has been published in IMAGES, PASQUERADE, THE NEW JERSEY POETRY MONTHLY, and POET LORE. Currently she works for the C. V. Mosley Company in St. Louis as a medical editor.

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## ACKNOWLEDGEMENTS

**BETSY ADAMS** – *Derivative* will also appear in **Interstate** magazine, Austin, Texas.

**ELIZABETH BARTLETT** – *The Infinite Present* appeared in **The House of Sleep**, Autograph Editions, Colima, Mexico, 1975.

**ILSE BING** – *Indeterminate Numbers*, and *Infinitesimals* were published in **Numbers in Images**, Ilkon Press, New York, 1976.

**MARTHA COLLINS** – *House, Tree, Sky* appeared in the **University of Denver Quarterly**, Vol. 11, No. 3, Autumn, 1976.

**SCOTT HELMES** – *Non-Additive Postulates* was published in **Laughing Bear #23**, Editor: Tom Person, Box 14, Woodinville, Washington.

**LAWRENCE KUCHARZ** – The matrix and modular poetry statement for *City Street Scene II* is being published in the forthcoming anthology of **American Sound Poetry**, edited by Richard Kostelanetz.

**JACQUELINE LAPIDUS** – *Several Hypotheses and A Proposition* appeared in **Starting Over**, Out and Out Books, 1977.

**FRED LEVINSON** – *Terminal Velocity/Metachutist* (c) 1971, **Antaeus Magazine**, appears by permission of the author and Echo Press.

**JOHN MAXFIELD** – *Nihilistic Existentialism* appeared in the **Kansas Quarterly**, Vol. 2, No. 1.

**PETER MEINKE** – *Distances* was published in **Epos** and in the University of Pittsburgh Press collection of Peter Meinke's poetry, **The Night Train and The Golden Bird**.

**JIM MELE** – *Primary Numbers* was published in 1978 in **The Sunday Habit**, a collection of Jim Mele's poetry.

**LILLIAN MORRISON** – *Locus of A Point* and *Poet as Mathematician* were published in **The Ghosts of Jersey City** (T. Y. Crowell Co.), (c) by Lillian Morrison, 1967.

**KATHARINE O'BRIEN** – *Mathematician* by Katharine O'Brien, 11/2/53, reprinted from the **Christian Science Monitor** (c) 1953, Christian Science Monitor Publishing Co., all rights reserved.

**LINDA PASTAN** – *Algebra* is reprinted from **Aspects of Eve**, Poems by Linda Pastan, Liveright Publishing Corp., copyright (c) 1970, 1971, 1972, 1973, 1974, 1975, by Linda Pastan, by permission of the publisher and author. *Arithmetic Lesson: Infinity* is reprinted from the **Five Stages of Grief**, poems by Linda Pastan, Liveright Publishing Corp., copyright (c) 1978 by Linda Pastan, by permission of the publisher and the author.

**HENRY PETROSKI** – The poems, *The Parabola* and *The Hyperbola*, are parts of a longer poem, **Conic Sections**.

## CREDITS

**DAVID PETTEYS** – *Spaces and Pascal and The Parabola* in his chapbook, **Lying Awake**, published by Lillian and M. E., Northport, N.Y.

**SANFORD PINSKER** – *Computing Distances* appeared in **Still Life and Other Poems** by Sanford Pinsker.

**BERN PORTER** – Published in **Found Poems**, Something Else Press, 1972.

**RAYMOND QUENEAU** – *Un Nombre Transcendant*, (Transcendental numbers) from **Courir Les Rues** and *Cygne* from **Si Tu T'Imagines** by permission of Editions Gallimard, Paris, France.

**ERNEST AND MARION ROBSON** –  $[A : B : \{A : (A + B) \}] :: [B : (A + B)]$  and *Happiness With Emptiness* from **I Only Work Here**, Primary Press.

**ELAINE ROMAINE** – Serge Lang has given permission to quote from his mathematical works.

**LARRY RUBIN** – *Geometry Test* from the book, **All My Mirrors Lie**, Goodline, 1972.

**HARRIET ZINNES** – *Quantum Theory For A Physicist*, published by **Epos**, fall, 1968.









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- Thomas Onetwo,** Ernest Robson, 1971. A Something Else Press Book. Picaresque novella of the roaring twenties. Illustrated by Ken Friedman.
- The Orchestra of The Language,** Ernest Robson, 1959. Patterns of relatively fixed and weak sounds of speech in literature. For poets and dramatists; especially phonetic musicians.
- Transwhichics,** Ernest Robson, 1970. Transcultural language compositions. A union of science and poetry. Caligraphy by Marion Robson.
- I Only Work Here,** Ernest and Marion Robson, 1975. Multiple perspectives on existence 1925 - 1975.
- Choices,** Visual poetry of Ernest and Marion Robson, 1975. Nine colored poster poems designed by Sam and Syms Amico.
- Transcualisticas,** bilingual edition of poems by Ernest Robson; translated into Spanish by Lucy Lopez de Thorogood. Caligraphy by Marion Robson. Paper and limited cloth edition, 1978.

## CHAPBOOKS

- Poetry as a Performance Art On and Off the Page,** 1976, with comments and/or quotations by nine New York and Philadelphia poets.
- Poetic Potentials in Information of Astronomy,** 1976, Reprint of article published by the Polish Academy of Science.
- An Orthographic Way of Writing English Prosody,** 1975, Reprint from *Visible Language*, IX, 4, 11/1975.
- Vowel and Diphthong Tones,** 1977, New procedures for sound poets. Dominant and recessive formants in whisper music.

## BOOKS BY JET WIMP

- The Drowning Place,** 1975, A chapbook of poetry.
- Sequence Transformations,** 1980, Research monograph, Academic Press.

