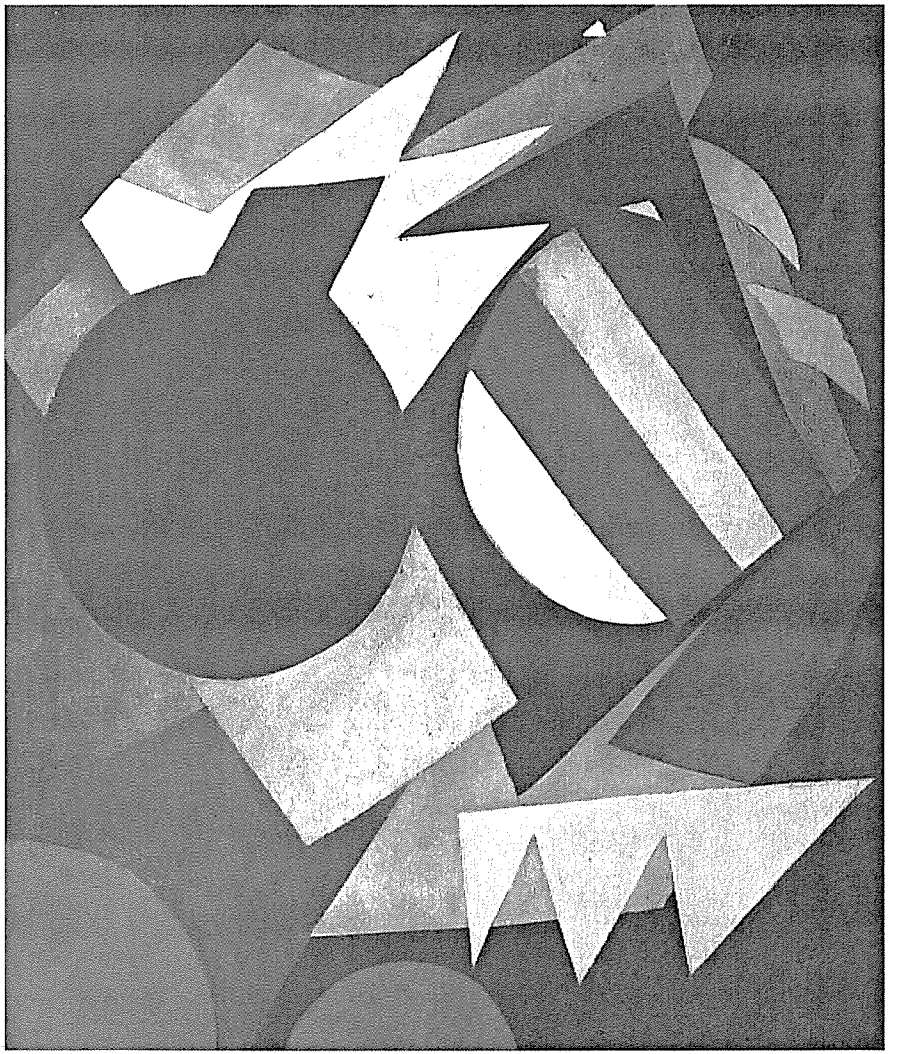
ANPA WEST

Journal of the Western Chapter of the Alternative Natural Philosophy Association



Volume Three, Number Two – 1993

ANPA WEST

Journal of the Western Chapter of the Alternative Natural Philosophy Association

Volume Three, Number Two – Fall 1993

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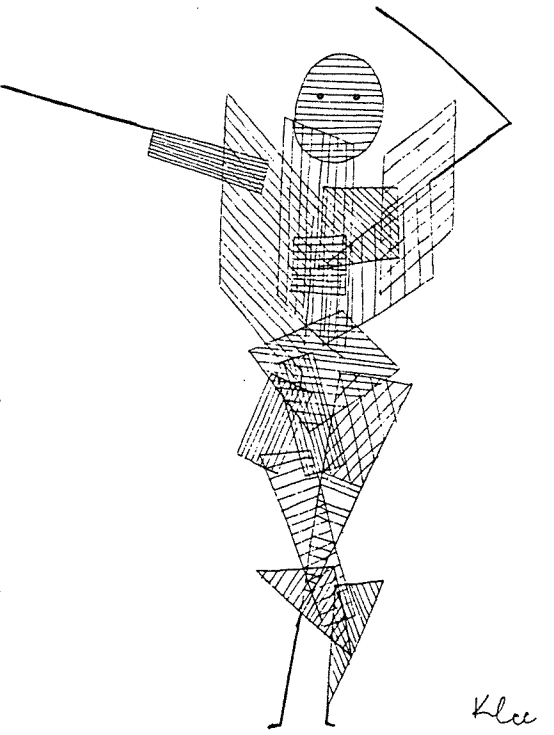
Managing Editor: Suzanne Bristol

A NOTE FROM THE MANAGING EDITOR

With this issue I will be coming on board to help Tom with the detail work of getting the ANPA West Journal out each quarter. Rather than publishing larger issues at fairly long intervals, we plan to put out shorter issues on a regular quarterly basis. However, since we are behind this year, this issue is the first of a two part expanded fall edition. Part two will follow next month.

We wish to thank our subscibers for your ongoing support and we encourage you to write us; continue to send us your thoughts either as letters or as articles for possible publication.

Suzanne Bristol



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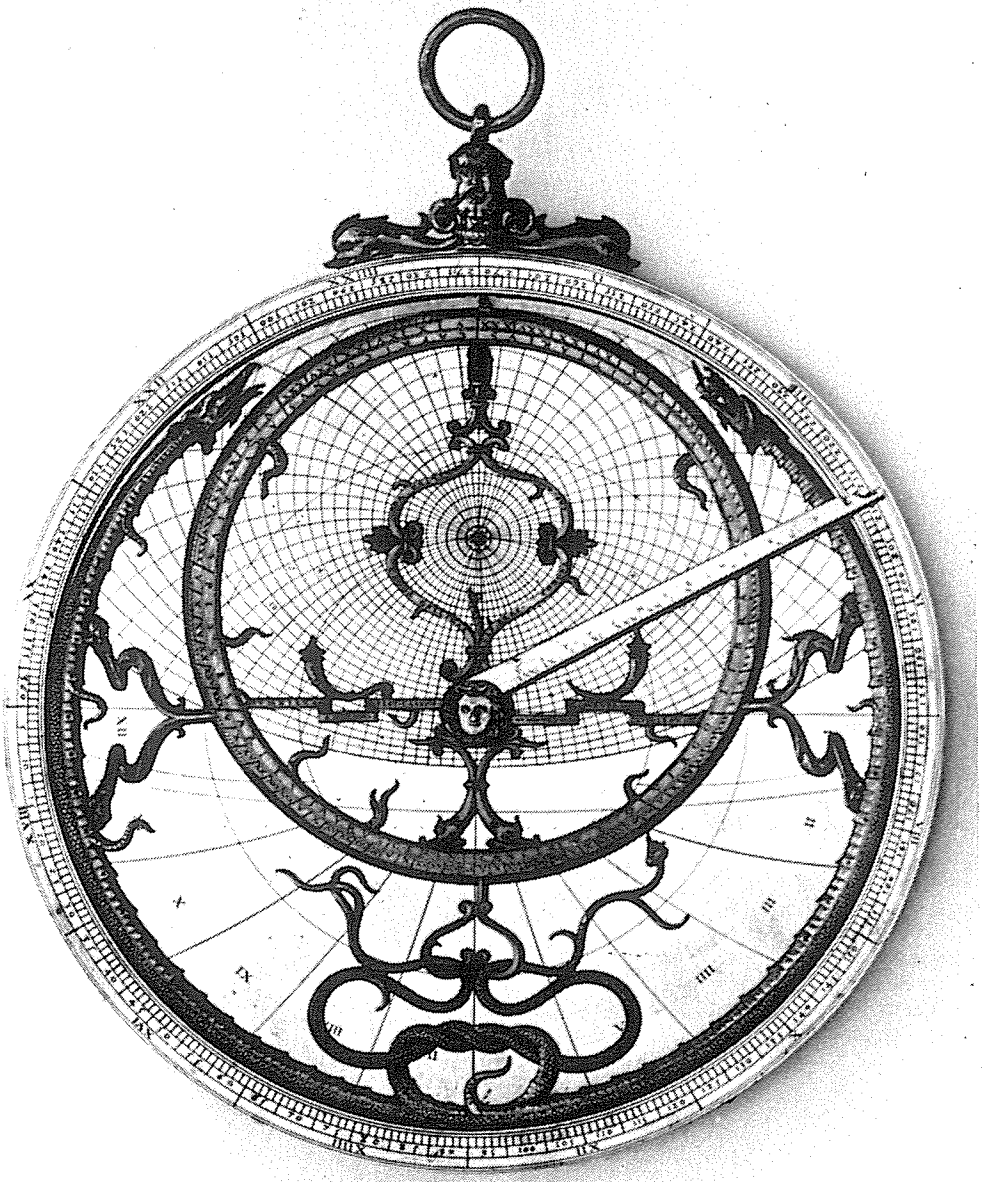


WHAT ARE WE WILLING TO TAKE FOR GRANTED?

by John L. Dobson.

Newton's law of motion takes inertia for granted. As he says in the Principi, "Corpus omne perseverare in statu suo quescendi, vel movendi uniformiter in directum, nisi quatenus illud a viribus impressis cogitur statum suum mutare." (Bodies all persevere in their states of quiescence, or of uniform motion in direction, unless by forces impressed upon them they are compelled to change their states.) As I said, Newton's laws of motion take inertia for granted.

General relativity takes gravity for granted. "Matter tells space–time how to bend; space–time tells matter how to move." But gravity is taken for granted.

Quantum electrodynamics takes electricity for granted.

Special relativity changes the geometry from 3D to 4D, but space and time are taken for granted.

Most physicists and cosmologists seem to take non–existence for granted. The Big Bang cosmologists expect us to believe that nothing made everything out of nothing. As Puck said "What fools these mortals be!"

And all our physics seems to take matter and energy for granted.

But I am not willing to take any of this for granted. I side with the mystics. On observational grounds I have to take existence for granted, rather than non–existence, simply because I see it.

Suppose we do take existence for granted but leave out space and time, can we, from what remains, get a Universe of gravity, electricity and inertia? That is the problem.

First, what remains when we leave out space and time? What cannot remain? In the absence of time, we cannot have change, since change takes place in time. Similarly, in the absence of space, we cannot have division or separation, since separation exists in space. What remains then must be one and undivided. But with no "other" to limit it, that one must also be infinite. So we are left with the changeless, the infinite, the undivided. And the question is: can we, from that, get a Universe of change, made of minuscule particles, and divided into atoms? Can we get from the changeless to the changing without changing

the changeless? Can we get from the infinite to the finite without limiting the infinite, i.e. without fencing it? And can we get from the undivided to the divided without dividing it? How can we do it?

That is easy. We simply mistake the one for the other. But the question still remains: can we, from such a mistake, get a Universe of gravity, electricity and inertia? What are the consequences of such a mistake?

First, although it may sound counterintuitive, what I am suggesting is that the Universe, as we see it in space and time, may be apparitional. What are the consequences of such a mistake? One consequence would be that the nature of the underlying existence must show through in the Universe, just as the length and diameter of the rope shows through in the snake for which the rope has been mistaken. Inertia, as I see it, is the changeless showing through in the changes. Electricity is the infinite showing through in the finite. And gravity is the undivided showing through in the divided.

As I see it, energy can only arise by apparition, by the nature of the underlying existence showing through in space and time. If the Universe were not apparitional, the dispersed particles would not have to fall together, and the Universe would not be wound up to five hundred atom bombs per pound against what we see as gravity. If the Universe were not apparitional, the minuscule particles would not have to be electrical, and the Universe would not have to be wound up to five hundred atom bombs per pound against what we see as electricity. And if the Universe were not apparitional, and if we were able to know both the position and the momentum of the particles, then the nuclear energy could also fall to zero.

It is not that these are three different energies. Rather they are three different ways of looking at the energy that arises because we see what we see in space and time. We see time against two directions in space, the electrical direction (self repulsive) and the gravitational direction (self attractive). From the standpoint of time we say that the underlying existence must be changeless. From the standpoint of the electrical direction of space we say it must be infinite, and from the gravitational direction in space we say it must be undivided. These are not different statements. Rather they are the same negative statement made from three different points of view.

When a rope is mistaken for a snake, there is a necessary uncertainty in the snake. Similarly, when we see what we see in space and time, there is a necessary uncertainty in what we see. If we know where a particle is in space, we cannot know its momentum. If we know that an electron is sitting on a proton, then the momentum associated with our

necessary uncertainty in that momentum will be enough to blow it off. If the electron is sitting on two or more protons, then its position is less certain and the energy can fall. If the electrical disruption of atomic nuclei beyond uranium could be avoided, so the size of the nucleus could increase without bound, then the nuclear energy could fall to zero.

But if the Universe is apparitional, then as I see it, it should appear as pairs of opposites in order that it should represent no change in the changeless. We see time against two directions in space, the electrical direction and the gravitational direction. We see gravity against two directions in the electrical field, the plus direction and the minus direction. And we see electricity against two directions in the magnetic field, spin up and spin down.

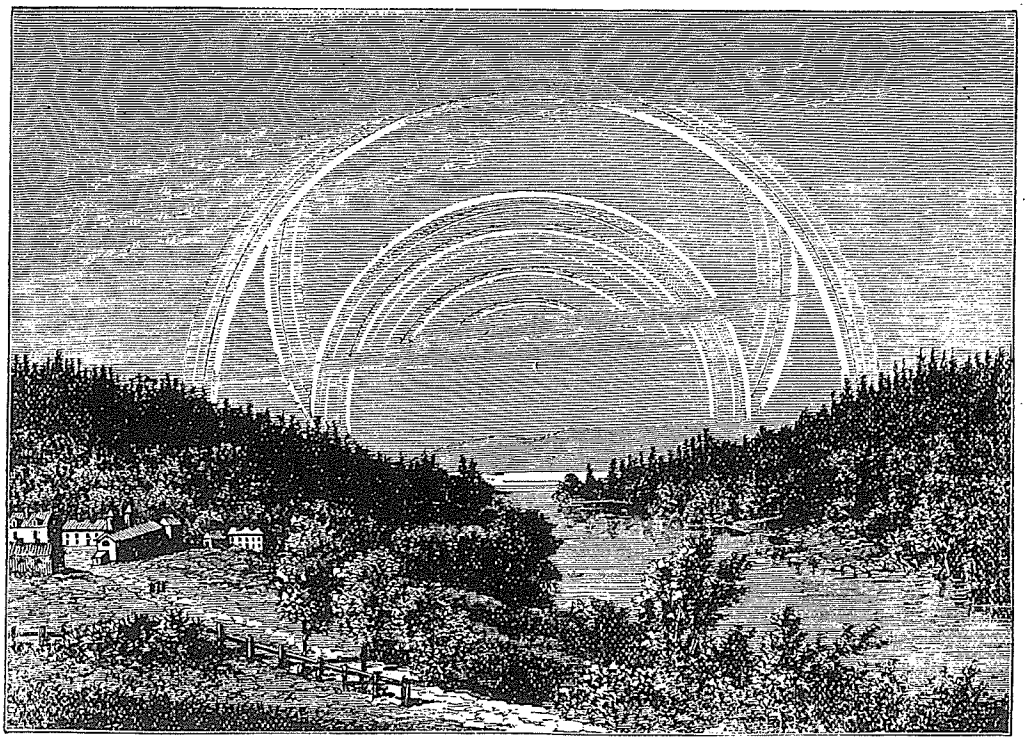
We see the momentum to the right against the momentum to the left so the total momentum goes to zero. We see angular momentum clockwise against angular momentum counter-clockwise so the total angular momentum goes to zero. We see plus charge against minus charge so the total charge goes to zero. And Einstein's 1905 equations put the total space-time separation between the seer and the seen at zero. They put the separation between the emission and the absorption events of a single photon at zero.

If it can be shown that the Universe has an overall momentum or an overall charge, or if it can be shown that the protons decay, I'll have to throw in my sponge.

REMOTE CITIZENS OF THE MOON

PART I.

by Tom Etter



I. TO GO OR NOT TO GO.

Discussions of going into space usually revolve around what's in it for us, and whether it's worth the cost. At the peak of the space program, which was also the height of the cold war, the issue was pretty clear: we had to beat the Russians, whatever the cost. But with the cold war over, the issue has become much fuzzier. The question is not just what are the benefits, but also just who is this "us" who are to be the beneficiaries? Us in America? All of us on Earth? Us alive today? Does "us" include our descendants? If so, and if we move into space in a big way, then most of "us" will eventually be inhabitants of other planets, other stars, maybe even other galaxies. If we don't, then, with limits to Earth's population, most of that "us" won't even exist. How do we, living now, apply cost/benefit

analysis to that?

I must confess to having rather divided feelings about the whole thing. One side of me, call him "Outward Bound", finds the idea of space travel terribly exciting, and longs to throw himself into speculating, planning, and helping to make it happen. But I also have a cautious side that thinks about things like star wars and says, "hey, wait a minute." The dialogue goes back and forth something like this:

OUTWARD BOUND: A cosmic biologist would look at the Earth today and see a dandelion about to burst into seed. Terrestrial life, after five billion years of making do with bio-chemical technology, suddenly feels the need to invent radios, computers, rockets and nuclear energy, all completely new phenomena on Earth, and, taken together, just what's needed for Earth's life-forms to live and multiply in outer space! Doesn't that say something? The time has come; we're outward bound!

CAUTIOUS: You paint a pretty picture of a bursting dandelion, but how do you know that the cosmic biologist wouldn't see a metastasizing cancer? Of all the animals on Earth, only ants, rats and humans make war. Do we really want this nasty genetic quirk to fill the universe? Even if, as some people say, human culture is slowly taking the place of human genetics, shouldn't we at least wait to see whether this process can prevent total catastrophe here on Earth? And even if it's our destiny to populate space, what's the hurry? Why not wait until the world has had 500 years of peace, clean environment, restored wilderness, prosperity, democracy, law and order; then we will be worthy of such a destiny.

And if that time never comes? Then we'll almost certainly blow ourselves up, and isn't it better to blow up just one planet than the whole galaxy?

OUTWARD BOUND: Well! Conservatives lack many things, but what they really lack is imagination! This guy thinks we're going off into space just to continue life as usual. In fact, we're talking now about a fundamentally new kind of life, a new life form.

CAUTIOUS: Do I hear echoes of the old Communist fantasy of the New Man? You visionaries never seem to learn that there's more to a plan of action then an abstract idea. Talk about lack of imagination! Communism failed because communist planners were totally unable to imagine real people with real human failings trying to carry out their fine-sounding plans. People are greedy, timid, habit-ridden, lazy, devious, confused, gullible, stubborn, quarrelsome, perverse, jealous, cruel, and often downright malicious. If you suddenly hand people tremendous new powers, which is what you are proposing to do with your new super space program, you will suddenly have tremendous new disasters.

OUTWARD BOUND: Ah, at least we agree on one thing, that communism failed. If you plan to fly by tying canvas on your arms, you won't get very far. You've got to take into account your materials. You just gave an eloquent litany of things wrong with the materials of human society. But hear the rocket engineer's litany of things wrong with his materials: foul-smelling, poisonous, corrosive, explosive, volatile, brittle, etc, etc, etc. Working with that stuff isn't easy, but that's his job. The raw materials of a society are our imperfect selves; working with that stuff isn't easy either, but is it any harder than going to the moon?

Etc. etc. So where do I stand on the issue? I'm still not sure, but I find myself less swayed by the voice of caution than I used to be. One important factor is that today there appears to be a historic window of opportunity, to use a NASA expression. With the ending of the cold war we have, for the first time ever, a situation where no major powers are making or plotting war on each other. The super-patriots in Moscow and Washington are laying low and, for the time being, reasonable people are calling the shots. A space program today would be an international effort, not answerable to the war department of any nation, and there's no guarantee that this will be true 50 or 100 years from now.

The right space program would not only take advantage of the current world peace, it could do much to preserve that peace and discourage the kind of nationalism that might in the future lead to star wars. When Apollo landed on the moon in '68, there was a brief moment when people all over the world forgot their ongoing quarrels and said "Wow! We did it!" If people everywhere could continue to say "Wow! We're doing it!", maybe some of our human problems on Earth wouldn't seem so intractable.

As I said, I'm still not sure. I still have reservations. But I think the time has come to let Outward Bound have his uncensored say, so from now on the floor is his.

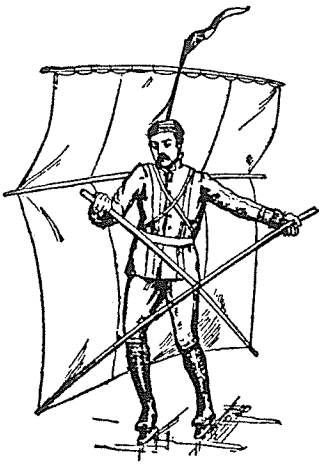


Fig. 3.

Fig. 2.

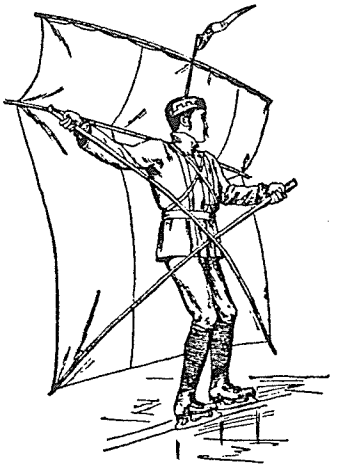


Fig. 4.

II. OUTER SPACE, WHERE THE LIVIN' IS EASY.

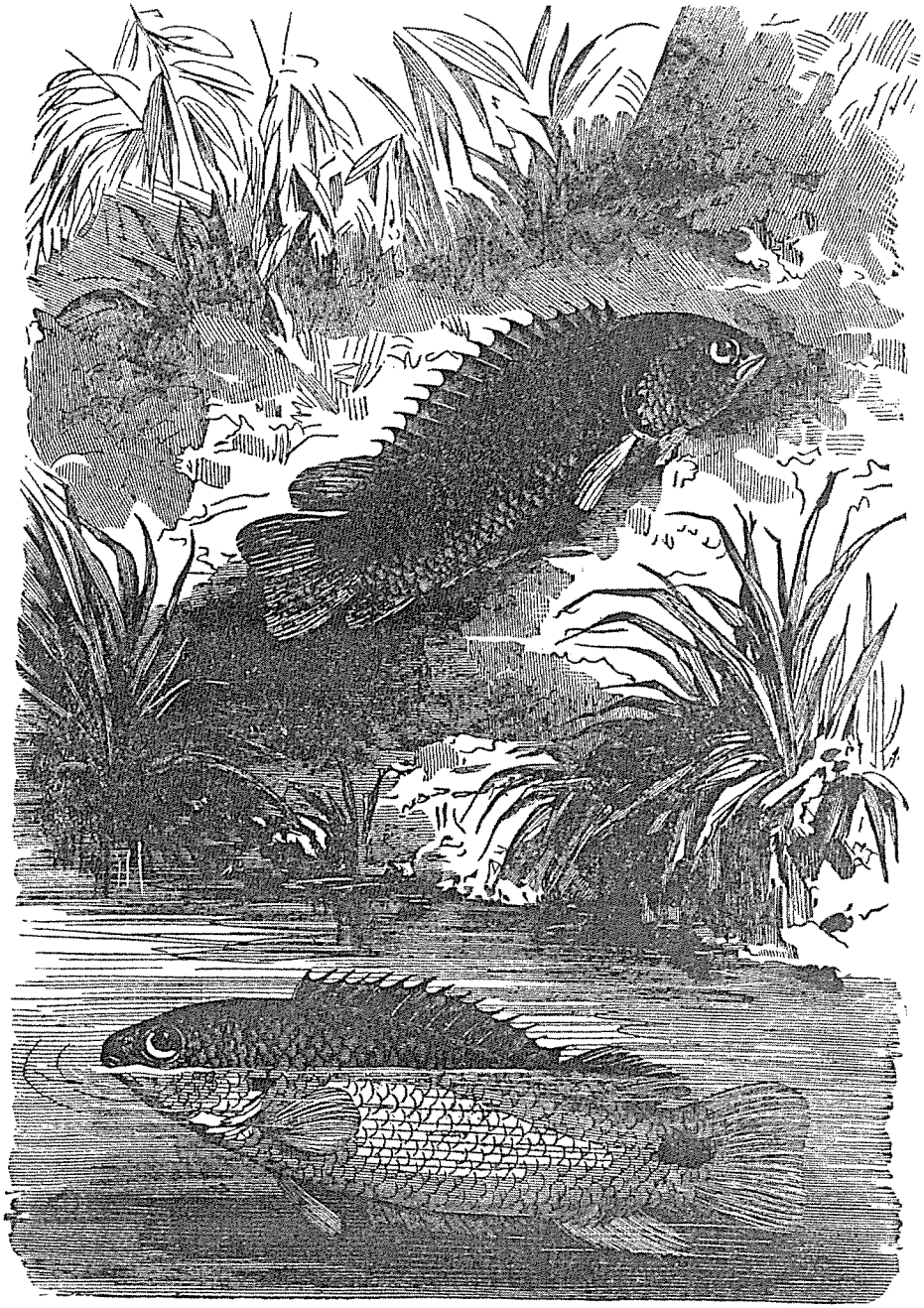
Going to the moon is certainly one of the hardest things that anyone ever did, maybe the hardest. In order to do it, a million things had to go right, and if one thing had gone wrong it would have meant instant failure, instant death. But we did it! We briefly defied the guardians of the heavens and were bodily present at a place almost infinitely hostile to human life. And then we went home. It was a heroic feat, but it was only a temporary victory; it didn't leave the universe at large any less hostile to our presence. Living in space still looks awfully hard. In the twenty five years since Apollo, the enthusiasm and focussed energy that brought this heroic project about seems to have vanished, and our trip to the moon is receding into the mythic past.

Speaking of the mythic past, there was once a time, very very long ago, when our ancestors lived in their food. That's right: *in* their food! To be sure, it was pretty thin gruel but it kept body and soul together, body and soul being what they were at the time, which wasn't much. But then something stirred our ancestors up a little, a kind of itch. "It's nice to live in our food, but then maybe it's not completely wonderful to live in our food." Some of them got together and became *multicellular organisms* who could venture away from their food for a while and wander around without eating.

Of course at that time wandering around meant swimming around. The more philo-sophical swimmers remarked that it was a provident God that allowed them to swim around in their own drinking water. But then the old itch returned. Providence is good, providence is kind, but alas, providence is boring. What if we could swim beyond our drinking water, swim out there into the infinite dryness?

That was indeed a challenge. But the curious thing is that we who have met it, we who have learned to live in the infinite dryness, to carry a reserve of drinking water and stand rather than float, walk rather than swim, would find it an even greater challenge to go back. There are enormous advantages to being out of the water. Life has found a myriad of new things to do that are nearly impossible when water fills your living space. To go back into the ocean today, we have to carry our own *dryness.*

Now we are looking restlessly out at the infinite vacuum. We'd like to try living there, but how would we breath? The absence of air would seem to be a great drawback, making space a very inhospitable place. But when we take a longer view, we see that this is an illusion. Not being immersed in air, once we adjust to it, is really an enormous asset; it's like not being immersed in water only much better! Carrying our air with us isn't hard, and the practical advantages of a surrounding vacuum are so great that before the end of the



next century I predict it will be far easier to live in space than on Earth!

Just what are these advantages? They are mainly two: the absence of frictional resistance to motion, and the absence of heat conduction. Note that these are the same advantages that air has over water: a bird can many times faster than a fish, for instance, and the insulating qualities of air make it much easier to stay warm, and also make it possible to use fire. But, of course, the improvement with vacuum is far greater.

Because there is no resistance to motion in vacuum, it takes no energy to move. A celestial body gets infinite gas mileage. Properly speaking, the state of rest doesn't exist. This is the main thing to keep in mind in thinking about transportation in vacuo. It's also something to keep in mind in thinking about concepts like *territory* and *place.*

What are places in space? They are certainly not fixed regions of space, since that's a meaningless concept. Let's look at some places: A planet, a moon, a region of a planet or moon, an asteroid. How about a comet? A man-made satellite? Why not? Note that what these things all have in common is that they persist in a state of motion that involves no change in their energy and no change in the gravitational (or accelerational) field in their vicinity. Let's take that as a definition:

PLACE: The near-vicinity of an object whose motion is neither losing or gaining energy and has constant gravity.

What then is a vehicle? A vehicle is something that goes from one place to another. But, from, the above definition, a vehicle could very well be a place! This is something else to keep in mind when you're figuring "gas mileage".

There's an important kind of space vehicle that I'll call the zero-energy shuttle, which is exemplified by the ordinary child's swing. A swing in vacuo with a perfect bearing would lose no energy and could go back and forth between its termini forever (note that a swing is not a place because its local gravity changes in transit, being highest in the middle and lowest at the extremes.) Another example of the zero-energy shuttle is a train on a frictionless track that is caught and launched at each end by a perfectly efficient spring.

This train example brings us to advantage number two of vacuum: heat insulation. Without air to conduct heat, it's very easy to maintain temperatures near absolute zero. But this means that's it's very easy to make use of that amazing phenomenon known as superconductivity. A superconductor is a material in which an electric current can flow forever without losing any energy. It can be used to magnetically float trains on frictionless

tracks. Also, it can be used to make perfect springs to catch trains and launch them; these springs consist of perfectly efficient electric motors together with perfectly efficient storage devices.

Shuttles needn't be confined to tracks; they can bounce around empty space among the many kinds of places where humans and their artifacts will live and work. It's most likely that the distinction between place and vehicle will become very fuzzy. Residents of the moon, for instance, will live in moving houses whose motion around circular tracks will make up for the deficit in the moon's gravity. But then, when they want to visit friends that they don't pass in their normal orbit, they will turn their houses into cars. As long as the flux of traffic has a constant statistical pattern, over the long run, no energy is required.

This takes some getting used to: Transportation in space takes no energy! It's tempting to compare superconductivity to fire. For us, fire *supplies* the energy to travel; for the inhabitants of space, superconductivity *replaces* that energy.

I hope a picture is beginning to emerge of the convenience, one could say the luxury, of living in space, a luxury that will all too quickly become necessity. Space dwellers visiting Earth will encounter (horrors) *weather.* What do poor Earthlings do when the sun goes behind the clouds? How do they cope with the irregularity of solar electricity? And lightning, snow, floods, tornadoes, earthquakes, disease, even war, God have mercy, how can they possibly stand it!

Even more addictive than the conveniences of space, though, will be the opportunities. If life found lots of new things to do in the "dryness", that's nothing to what it will find in vacuo. Easy low temperatures open up a vast domain of coherent quantum effects. Heat is noise; what might one hear if one could massively quiet that noise? What if our descendants learned to meditate at -459 F instead of at 98.7 F? Visiting Earth might be far more difficult for them than we can possibly imagine.

So far I have been deliberately sketchy and abstract, since there are so many different possibilities for the details. In Part 2 I'll outline a concrete plan, but there are still a few generalities to address at this point. I shall mostly draw my information from Gerard K. O'Neill's book "The High Frontier", which is the essential starting point for any serious discussion of living in space.[1]

O'Neill's saw our first step into space as the establishment of a mining camp on the Moon. Using what he called *mass drivers,* which are essentially the shuttles mentioned above, this Moon camp would heave a steady stream of materials out to a stable orbiting

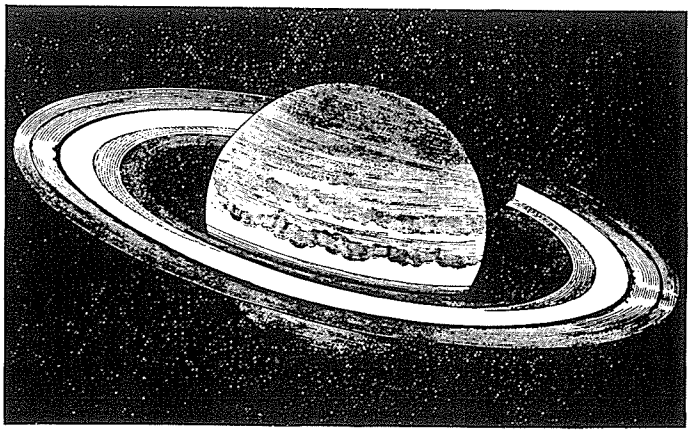
point in free space where they would be turned into free-floating industrial colonies. As he correctly observed, it's much easier to build in free space due to the absence of gravity, which is also a great help in many manufacturing processes. With this scenario it's reasonable to expect the project to pay for itself in a rather short time by sending high tech products back to Earth, including space craft; more on this later.

What about raw materials? Let me quote "It comes as a surprise to most people to learn how rich a source of raw materials the Moon is. ... A typical Apollo sample contains by weight more than 20 percent silicon, more than 12 percent aluminum, 4 percent iron, and 3 percent magnesium. Many of the Apollo samples contained more than 6 percent titanium .." In short, it appears that the Moon has an abundance of all the elements we need except carbon, hydrogen and nitrogen. For these we must mine the Asteroid belt, which will supply an incentive for creating a network of shuttles and solar orbiters throughout the solar system; it's this circulating network that will eventually become the living quarters for most of the humans in near-space.

What about energy? We may not need it for transportation, but we certainly need it for mining and manufacturing. Here's where the free-space factories really come into their own, since without gravity it's very easy to construct huge solar collectors. Nuclear energy isn't worth the trouble until we get to the edge of the solar system and beyond.

What will our human communities look like? O'Neill painted a picture of enormous factory-centered revolving donuts, where, thanks to artificial gravity, the factory workers live in towns resembling the sitcom suburbs of the '50's. Here I radically part company, as we'll see in Part II of this essay.

1. Gerard K. O'neill, (1977), *The High Frontier,* Morrow.



Poem

by Herman Mueller

I don't think that I would get sick
moiling about in my home out there.
No, I wouldn't get sick
as I flattened my face to the window,
a child homeward bound.

Celestial sparklers,
pinwheeling galaxies,
rocketing comets.
Three of light ornamenting the night.
Christmas in the sky.

Load me on. Torch me off
in rippling robes of fire,
riding my taper, unafraid.
Coming home.

Highlights of ANPA 15

Clive Kilmister opened the meeting by discussing the proposition that Alison Watson's thesis, "The Birth of Structure," provides the metaphysics for Mike Manthey's actor semantics. Clive concluded that Alison's approach is closer to his and Ted Baston's – discussed by Ted later in the meeting – than to Mike's.

Pierre Noyes claimed that measurement accuracy can forge the connecting link between classical "determinism," chaotic phenomena, and quantum coherence; which will have enormous consequences if true. Clive likened Pierre's pitch to the "South Sea Bubble" a centuries older version of the Savings & Loan scam.

Mike Manthey's speculations on his actor semantics hierarchy, from particles to atoms to biology to social structures to the cosmos, was enthusiastically received. There were several other interesting papers, but the highlight was undoubtedly Michael Redhead's invited talk on "Identity and Indistinguishability," tracing this tension from Leibnitz up to the present day. It was unanimously decided to designate his paper as the Parker Rhodes Memorial Lecture. □

Book Review

The Interrelationship Between Mind and Matter
Beverly Rubik, Editor
(Reviewed by Jean Burns)

In May, 1989, an assemblage of 18 scientists and scholars met a Temple University in Philadelphia. Their research fields ranged from physics to parapsychology, from psychiatry to philosophy. Their purpose: to explore the nature of consciousness.

This book contains the proceedings of that meeting. Articles include a presentation of a quantum theory of consciousness (Henry Stapp) and a discussion of evolution as an expansion of coherent quantum states (Fritz Popp.) A parapsychologist (Helmut Schmidt) presents a review of psychokinesis experiments in which the outcome of random processes is influenced by a person's intention, and several other parapsychologists discuss possible interpretations. A biophysicist (Beverly Rubik) presents an experimental study showing the effect of human intention on the reproduction rate and motility of bacteria.

A psychiatrist (Frank Putnam) points out that the different personality states of an individual with multiple personality disorder sometimes have substantially different physiological and cognitive capacities; he suggests that study of the psychophysiological changes between these states offers an window into the organization of consciousness. And a psychologist (Steve Rosen) presents the philosophical ideas of Heidegger and shows how they can provide insight into the nature of the mind–body interaction.

Overall, the book contains many insightful discussions about the nature of consciousness. Importantly, many of the articles are concerned with experimental data, as it amy shed some light on this subject. And it should be mentioned that many of the researchers are eminent in their fields. A worthwhile book for anyone interested in the subject of consciousness.

The Interrelationship Between Mind and Matter
Available from: Center for Frontier Sciences,
Temple University,
Ritter Hall 003–00,
Philadelphia, PA 19122; (215) 787–8487.
$20 plus shipping ($2 US; $5 foreign.)

Letter to ANPA West, vis vol 3, 1, 1992 vis.
Article by Tom Etter, *Racter Report n. 1: Acausality.*

In his article, Tom Etter, as he always does, makes a very clear and well reasoned case for a generalized quantum theory employing a flowchart methodology akin to that used in ordinary computation but with states and transformations as its elements. Since he states that this is a new field of inquiry, I must point out that such theories already exist. For example Keith Bowden of ANPA has published his *General Physical Systems Theories*[1] which follows on from the work of Kron's *Diakoptics*, published in 1963; so have G. Resconi and M. Jessel[2], based on the conceptual model of General Systems Theory[3] [by Takahara and Mesarovich], and earlier work by both Resconi and Jessel. These theories all raise the level of abstraction in the way Tom now suggests.

Furthermore, using General System Logical Theory, I, together with Resconi, Jessel and H. E. Fatmi, in a paper entitled *Theory of Cybernetic and Intelligent Machines*[4], show that this methodology constitutes an extended definition of computability, GSLT computability, expressible through flowcharting, but incorporating both Turing computability, and quantum computability as submodels. Specific examples are given [to] explain why such flowcharts are considerably more general than those that can be constructed for Turing computability, and of how such flowcharts can be applied to such phenomena as sound and antisound, the control of an aerofoil in flight, robots, etc., that have been experimentally validated; thus demonstrating excellent support for the new methodology. Thus it can be postulated with a high degree of confidence that there exist machines considerably more general than any grounded on Turing computation alone.

This confidence was independently boosted during the period while waiting for the publication of the Theory of Cybernetic and Intelligent Machines, by the publication by H. A. Fatmi and G. Resconi, of their paper *A New Computing Principle*[5] in which, using the same abstraction, they advanced the Gabor formulation of his Universal Non-linear filter, Predictor, and Simulator which optimizes itself by a learning process. This was the title of the paper published in 1960[6] by Gabor and his coworkers following the construction of their prototype machine at Imperial College, London in the late '50s. And, as the Gabor title makes clear, such computers (and GSLT computability) concern machines of the non-linear analogue and quantum mechanical types which optimize themselves by learning. And, if such quantum mechanical possibilities are doubted, S. A. Rice had given a perspective in Science[7] in which the optimum control of an uncertain quantum system has been achieved in the laboratory using a laser, a

measuring device, and a sample of molecules acting as an analogue computer that solves Schrodinger's equation exactly in real time!

Thus such novel computers are prime candidates for the modelling of brains. And using the GSLT methodology which Resconi and Jessel show describes the generalization of Huygens' Principle of secondary sources (used and experimentally validated by Jessel to describe any kind of wave process), B. E. P. Clement, P. V. Coveney, M. Jessel, and I have in press a paper entitled *The Brain as a Huygens' Machine,* which explains the morphology and dynamics of such novel computation. It is, we believe, in broad agreement with that found in brains, and was obtained by identifying the morphology of the machines with the non-linear medium of Huygens' Principle, and the propagation of the wavefronts in the non-linear medium, with the signals needed so that such machines perceive, cognize, learn, and, it turns out, may compute quantum mechanically by interaction with the dynamic quantum vacuum. This is an interaction which I believe can, with considerable confidence, be identified with consciousness because it uses, the model says quantum non-locality, to switch such machines from one massively parallel computation to another instantaneously. And once again, if such an application is doubted, it has been recently reported, by D.R.A. Malvern in the UK, that such instantaneous effects have been observed taking place between locations several kilometers apart using fibre optic interferometry, and so the distances in brains present no problems as the GSLT methodology predicts to be the case[8].

Thus the intellectual riches presaged by Tom are already being mined and in many different guises. For example, as I show in my many ANPA papers, the Combinatorial Hierarchy can be inferred from the GSLT methodology, and so is itself such intellectual riches in abundance. Another approach is D. Dubois' *Fractal Machine* and his and G. Resconi's *Hyperincursivity*[9] [10]. The theory of hyperincursivity, starting from the non-linear dynamics of fractal structures, explains the theory behind the structure of such flowcharts as Tom envisages where it may be said that the present is already the past of the future, and how these new concepts may be used in general problem solving, so as to overcome the butterfly effect that chaos usually introduces into digital simulations or computations associated with non-linear systems. Resconi and Dubois give numerous examples in their books.

Thus there now exists both abundant theory and experiment substantiating the fact that both the uncertainty produced by chaos, and inherent in quantum mechanics, can be overcome to yield totally novel mechanisms. Indeed the evidence is that such mechanisms utilizing chaos and/or quantum mechanics, provide the most effective

means, i.e. optimum control in the case of quantum mechanics, and optimum rapidity of learning through simulation. (See Dubois' *Fractal Machine,* and, for independent confirmation, *De Nouvelles Voies Vers l'Intelligence Artificelle.*[11]) And these are the means, I postulate, by which life and living systems work.

Peter Marcer
Keynsham, England

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Tom Etter replies:

I want to thank Peter Marcer for his letter concerning my Racter paper. It's not clear to me from what he said how the results he sites bear on causality and time direction, but if they do indeed "raise the level of abstraction in the way Tom suggests," then I am surprised and encouraged to find there are so many people today in what used to be a very lonely field.

Peter takes me to task for saying in my Racter article that this is a new field of inquiry, and I must admit that I did use the word "new" a bit loosely. To help clarify the point, let me sketch some historical background.

My own interest in the general subject began in the 1950s and I wrote my first article on it in 1960. At the time I had been impressed by the laboratory evidence for precognition which strongly suggests that what is *going* to happen is sometimes a *boundary condition* on what is happening now. It's our habit to think of the past as the unchallenged master of the future, or more accurately, as a master unchallenged by anything except chance. What I realized in 1960 is that it makes perfect mathematical sense to assume otherwise. We can calculate the statistically expected behavior of any stochastic process given a *double boundary condition* on both its initial and final states. The resulting class of processes are an essential generalization of algorithmic and Markhovian processes, and also show some curious mathematical links to both quantum mechanics and relativity.

At about the same time, quite unknown to me, astro-physicist Helmudt Schmidt was having very similar thoughts. What led him in this direction was the idea that there should be a statistical symmetry between the big bang and the big crunch in an oscillating universe. In 1964 he published an important paper on how this would affect quantum statistics. Later he did some rigorous experiments on precognition that produced highly significant results. In theorizing about these results he came up with a mathematical reformulation of "two-way" time in which the influence of the future was represented by weighing factors rather than by a constraining state. This led me to discover the mathematical vector duality of forward and backward temporal influence, from which it is a short step to the generalized Schrodinger equation and Born rule that I describe in the Racter paper.

This was in the late '70s. The math here was very simple, and it looked like a very nice explanation of quantum mechanics except for one thing: you need to assume that probabilities can go negative! The meaning of this completely eluded me at the time. I've come slowly to realize that, in fact, it has no meaning at all of the kind I was looking for. It does have a mathematical tie to the deeper level that I call pre-logic; this I've learned from ANPA physics. But at the level of flowcharts, which are a representation of predicate logic, it just has to be

swallowed whole. More exactly, what has to be swallowed whole is that a predicate may be satisfied in fewer than zero cases.

But once you do swallow it, you find that the core of quantum mechanics is subsumed under two very general theorems of relational logic, which also subsume the dynamics of computers, Markhov chains etc. This is what I've come to recognize in the last few years. As I said in my article, classical and quantum are two small islands in a vast sea of other forms that exhibit the same essential principles but which we've never thought to look for.

A homely analogy may help here. Putting two apples in a basket containing three apples gives the same total number as putting three apples in a basket containing two. "Oh that's just the commutative law of addition" we say, but this isn't quite true; it's more accurate to say that it's an *empirical regularity* for which the commutative law supplies a good deal of explanatory force. Note that there are similar cases where the commutative law fails: putting five mice in a cage with two cats doesn't give the same number of animals as putting two mice in a cage with five cats, or at least, not for long. But most of the time the commutative law succeeds: 7+3 points on the scoreboard is 3+7 points, 100+200 dollars in the bank is 200+100 dollars, etc. The commutative law captures the essence of what we notice when we become aware of such facts.

The laws of logic mentioned above play the same kind of role. It's not that quantum mechanics is a branch of logic, but that what I call the *node* law and the *link* law of relational logic capture the essence of what is lawful about the Born rule and the Schrodinger equation, and also about their classical counterparts. It's like the commutative law capturing the essence of what is lawful about both 3+7 = 7+3 and 100+200 = 200+100. Once we understand the commutative law, it's very reasonable to look for empirical instances with other numbers. By the same token, it seems to me very reasonable to look for empirical instances of the node and link laws with other than quantum or classical parameters.

Where do we look? I can think of three places:

1. Exotic physical devices of the kind Peter refers to, such as quantum computers, that fuse the classical and quantum levels in a new and more intimate way.
2. Weird anomalies like the so-called psychic phenomena.
3. Familiar everyday events that we wrongly assume have causal explanations. This is to me the most interesting place to look, and is the place that I hope to explore with Racter.

As a postscript, here's the latest Racter bulletin: Racter code writing is on hold pending the completion of a theoretical paper that I hope will finally clear up the role of complex scalars in the general formalism, a point that could be crucial for the details of how Racter operates. □

ALTERNATIVE NATURAL PHILOSOPHY ASSOCIATION

Statement of Purpose

1. *The primary purpose of the Association is to consider coherent models based on minimal number of assumptions to bring together major areas of thought and experience within a natural philosophy alternative to the prevailing scientific attitude. The combinatorial hierarchy, as such a model, will form an initial focus of our discussion.*
2. *This purpose will be pursued by research, conferences, publications and any other appropriate means including the foundation of subsidiary organizations and the support of individuals and groups with the same objective.*
3. *The Association will remain open to new ideas and modes of action, however suggested, which might serve the primary purpose.*
4. *The Association will seek ways to use its knowledge and facilities for the benefit of humanity and will try to prevent such knowledge and facilities being used to the detriment of humanity.*

ILLUSTRATIONS