101.00 **Definition: Synergy**

101.01 Synergy means behavior of whole systems unpredicted by the behavior of their parts taken separately.

102.00 Synergy means behavior of integral, aggregate, whole systems unpredicted by behaviors of any of their components or subassemblies of their components taken separately from the whole.

103.00 A stone by itself does not predict its mass interattraction for and by another stone. There is nothing in the separate behavior or in the dimensional or chemical characteristics of any one single metallic or nonmetallic massive entity which by itself suggests that it will not only attract but also be attracted by another neighboring massive entity. The behavior of these two together is unpredicted by either one by itself. There is nothing that a single massive sphere will or can ever do by itself that says it will both exert and yield attractively with a neighboring massive sphere and that it yields progressively: every time the distance between the two is halved, the attraction will be fourfolded. This unpredicted, only mutual behavior is synergy. Synergy is the only word in any language having this meaning.

104.00 The phenomenon synergy is one of the family of generalized principles that only co-operates amongst the myriad of special-case experiences. Mind alone discerns the complex behavioral relationships to be cooperative between, and not consisting in any one of, the myriad of brain-identified special-case experiences.

105.00 The words synergy (*syn*-ergy) and energy (*en*-ergy) are companions. Energy studies are familiar. Energy relates to differentiating out subfunctions of nature, studying objects isolated out of the whole complex of Universe—for instance, studying soil minerals without consideration of hydraulics or of plant genetics. But synergy represents the integrated behaviors instead of all the differentiated behaviors of nature's galaxy systems and galaxy of galaxies.

106.00 Chemists discovered that they had to recognize synergy because they found that every time they tried to isolate one element out of a complex or to separate atoms out, or molecules out, of compounds, the isolated parts and their separate behaviors never explained the associated behaviors at all. It always failed to do so. They had to deal with the wholes in order to be able to discover the group proclivities as well as integral characteristics of parts. The chemists found the Universe already in complex association and working very well. Every time they tried to take it apart or separate it out, the separate parts were physically divested of their associative potentials, so the chemists had to recognize that there were associated behaviors of wholes unpredicted by parts; they found there was an old word for it—synergy.

107.00 Because synergy alone explains the eternally regenerative integrity of Universe, because synergy is the only word having its unique meaning, and because decades of querying university audiences around the world have disclosed only a small percentage familiar with the word *synergy*, we may conclude that society does not understand nature.

108.00 **Four Triangles Out of Two**

Fig. 108.01

108.01 Two triangles can and frequently do associate with one another, and in so doing they afford us with a synergetic demonstration of two prime events cooperating in Universe. Triangles cannot be structured in planes. They are always positive or negative helixes. You may say that we had no right to break the triangles open in order to add them together, but the triangles were in fact never closed because no line can ever come completely back into itself. Experiment shows that two lines cannot be constructed through the same point at the same time (see Sec. 517, "Interference"). One line will be superimposed on the other. Therefore, the triangle is a spiral—a very flat spiral, but open at the recycling point.

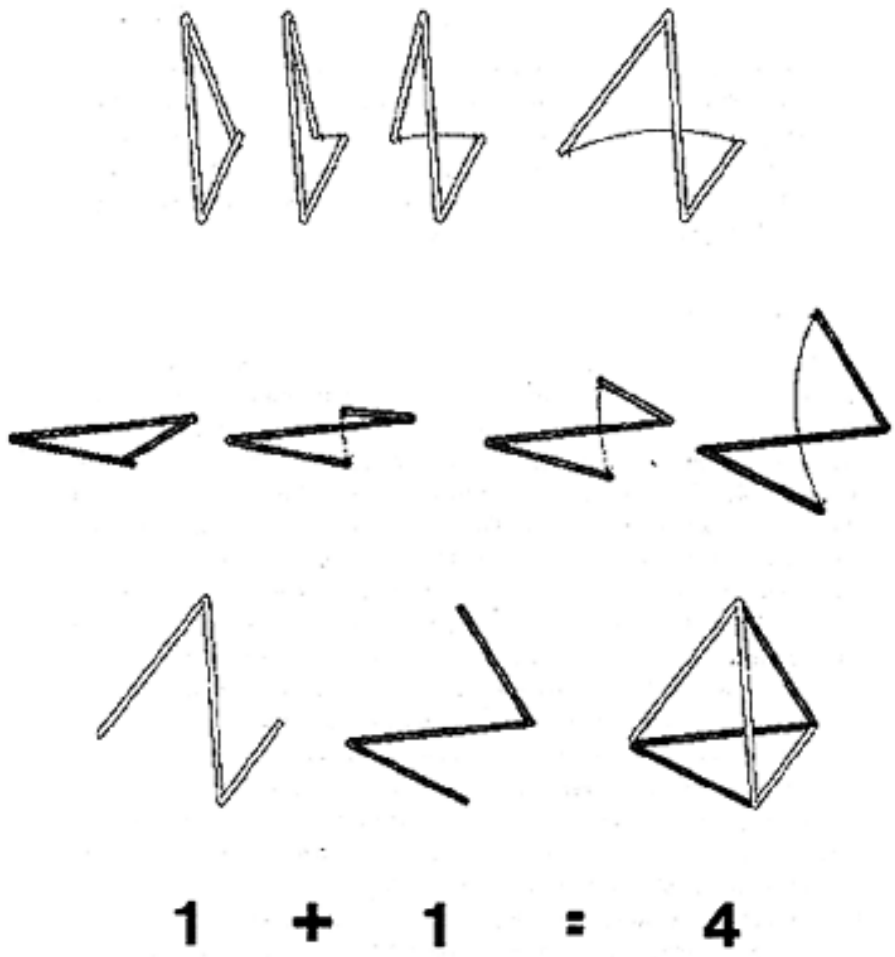

Fig. 108.01 *Triangle and Tetrahedron: Synergy (1 + 1 = 4):* Two triangles may be combined in such a manner as to create the tetrahedron, a figure volumetrically embraced by four triangles. Therefore one plus one seemingly equals four.

108.02 By conventional arithmetic, one triangle plus one triangle equals two triangles. But in association as left helix and right helix, they form a sixedged tetrahedron of *four* triangular faces. This illustrates an interference of two events impinging at both ends of their actions to give us something very fundamental: a tetrahedron, a system, a division of Universe into inside and outside. We get the two other triangles from the rest of the Universe because we are not out of this world. This is the complementation of the Universe that shows up time and again in the way structures are made and in the way crystals grow. As separate actions, the two actions and resultants were very unstable, but when associated as positive and negative helixes, they complement one another as a stable structure. (See Sec. 933.03.)

108.03 Our two triangles now add up as *one plus one equals four*. The two events make the tetrahedron the four-triangular-sided polyhedron. This is not a trick; this is the way atoms themselves behave. This is a demonstration of synergy. Just as the chemists found when they separated atoms out, or molecules out, of compounds, that the separate parts never explained the associated behaviors; there seemed to be "lost" energies. The lost energies were the lost synergetic interstabilizations.

109.00 **Chrome-Nickel-Steel**

109.01 Synergy alone explains metals increasing their strengths. All alloys are synergetic. Chrome-nickel-steel has an extraordinary total behavior. In fact, it is the high cohesive strength and structural stability of chrome-nickel-steel at enormous temperatures that has made possible the jet engine. The principle of the jet was invented by the squid and the jellyfish long ago. What made possible man's use of the jet principle was his ability to concentrate enough energy and to release it suddenly enough to give him tremendous thrust. The kinds of heat that accompany the amount of energies necessary for a jet to fly would have melted all the engines of yesterday. Not until you had chrome-nickel-steel was it possible to make a successful jet engine, stable at the heats involved. The jet engine has changed the whole relationship of man to the Earth. And it is a change in the behavior of the whole of man and in the behavior of whole economics, brought about by synergy.

109.02 In chrome-nickel-steel, the primary constituents are iron, chromium, and nickel. There are minor constituents of carbon, manganese, and others. It is a very popular way of thinking to say that a chain is no stronger than its weakest link. That seems to be very logical to us. Therefore, we feel that we can predict things in terms of certain minor constituents of wholes. That is the way much of our thinking goes. If I were to say that a chain is as strong as the sum of the strengths of its links, you would say that is silly. If I were to say that a chain is stronger than the sum of the strengths of all of its links, you might say that that is preposterous. Yet that is exactly what happens with chrome-nickel- steel. If our regular logic held true, then the iron as the weakest part ought to adulterate the whole: since it is the weakest link, the whole thing will break apart when the weakest link breaks down. So we put down the tensile strength of the commercially available iron—the highest that we can possibly accredit is about 60,000 pounds per square inch (p.s.i.); of the chromium it is about 70,000 p.s.i.; of the nickel it is about 80,000 p.s.i. The tensile strengths of the carbon and the other minor constituents come to another 50,000 p.s.i. Adding up all the strengths of all the links we get 260,000 p.s.i. But in fact the tensile strength of chrome-nickel-steel runs to about 350,000 p.s.i. just as a casting. Here we have the behavior of the whole completely unpredicted by the behavior of the parts.

109.03 The augmented coherence of the chrome-nickel-steel alloy is accounted for only by the whole complex of omnidirectional, intermass-attractions of the crowded- together atoms. The alloy chrome-nickel-steel provides unprecedented structural stability at super-high temperatures, making possible the jet engine one of the reasons why the relative size of our planet Earth, as comprehended by humans, has shrunk so swiftly. The performance of the alloy demonstrates that the strength of a chain is greater than the sum of the strengths of its separate links. Chrome-nickel-steel's weakest part does not adulterate the whole, allowing it to be "dissolved" as does candy when the sugar dissolves. Chains in metal do not occur as open-ended lines. In the atoms, the ends of the chains come around and fasten the ends together, endlessly, in circular actions. Because atomic circular chains are dynamic, if one link breaks, the other mends itself.

109.04 When we break one link of a circular chain continuity, it is still one piece of chain. And because atomic circular chains are dynamic, while one link is breaking, the other is mending itself. Our metal chains, like chrome-nickel-steel alloys, are also interweaving spherically in a number of directions. We find the associated behaviors of various atoms complementing each other, so that we are not just talking about *one thing* and another *one thing*, but about a structural arrangement of the atoms in tetrahedral configurations .

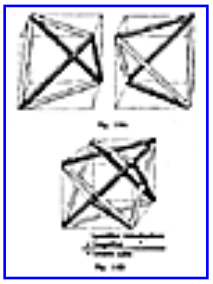

Fig. 110.00

110.00 We take one tetrahedron and associate it with another tetrahedron. Each of the two tetrahedra has four faces, four vertexes, and six edges. We interlock the two tetrahedra, as illustrated, so that they have a common center of gravity and their two sets of four vertexes each provide eight vertexes for the corners of a cube. They are interpositioned so that the vertexes are evenly spaced from each other in a symmetrical arrangement as a structurally stable cube .

111.00 Each of those vertexes was an energy star. Instead of two separate tetrahedra of four stars and four stars we now have eight stars symmetrically equidistant from the same center. All the stars are nearer to each other. There are eight stars in the heavens instead of four. Not only that, but each star now has three stars nearer to it than the old stars used to be. The stars therefore interattract one another gravitationally in terms of the second power of their relative proximity—in accordance with Newton's law of gravity. As the masses are getting closer to each other, synergy is increasing their power of interattraction very rapidly.

112.00 The distance between the stars is now in terms of the leg instead of the hypotenuse. The second power of the hypotenuse is equal to the sums of the second powers of the legs, so we suddenly discover how very much more of an attraction there is between each star to make each one more cohesive in the second power augmentation. There was no such augmentation predicted by the first power addition. Thus, it is no surprise to discover that the close interassociation of the energy stars gives us a fourfolding of the tensile strength of our strongest component of the alloy chrome-nickel- steel of 350,000 p.s.i. in relation to nickel's 80,000 p.s.i. Gravity explains why these metals, when in proper association, develop such extraordinary coherence, for we are not really dealing in a mystery—outside of the fact that we are dealing in the mystery of how there happened to be gravity and how there happened to be Universe. How there happened to be Universe is certainly a great mystery—there is no question about

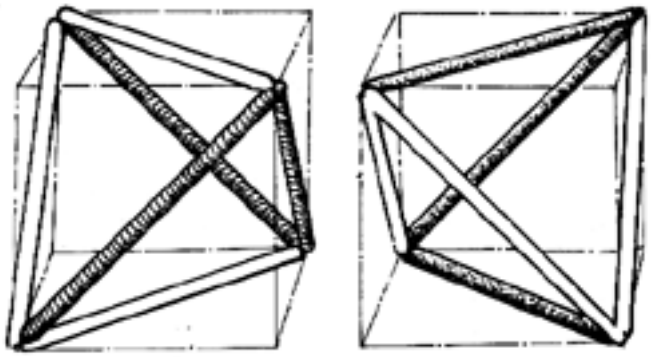

Fig. 110A

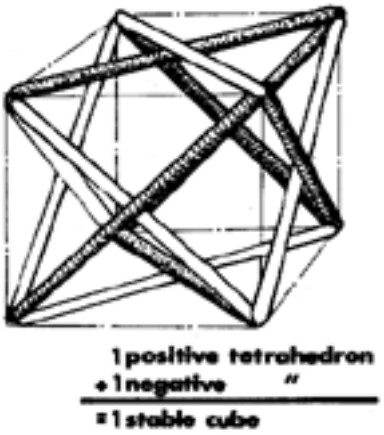

Fig. 110B

that—but we are not dealing with any miracle here outside of the fact that Universe is a miracle.

113.00 When we take two triangles and add one to the other to make the tetrahedron, we find that one plus one equals four. This is not just a geometrical trick; it is really the same principle that chemistry is using inasmuch as the tetrahedra represent the way that atoms cohere. Thus we discover synergy to be operative in a very important way in chemistry and in all the composition of the Universe. Universe as a whole is behaving in a way that is completely unpredicted by the behavior of any of its parts. Synergy reveals a grand strategy of dealing with the whole instead of the tactics of our conventional educational system, which starts with parts and elements, adding them together locally without really understanding the whole.

114.00 It is a corollary of synergy (see Sec. 140.00) that once you start dealing with the known behavior of the whole and the known behavior of some of the parts, you will quite possibly be able to discover the unknown parts. This strategy has been used—in rare breakthroughs—very successfully by man. An example of this occurred when the Greeks developed the law of the triangle: the sum of the angles is always 180 degrees, and there are six parts (three edges and three vertexes—forming three angles); thus the known behavior of the whole and the known behavior of two of the parts may give you a clue to the behavior of the other part.

115.00 Newton's concept of gravity also gave him the behavior of the whole. Other astronomers said that if he were right, they should be able to explain the way the solar system is working. But when they took the masses of the known planets and tried to explain the solar system, it didn't work out. They said you need two more planets, but we don't have them. There are either two planets we cannot see or Newton is wrong. If he was right, someday an astronomer with a powerful telescope would be able to see sufficient distance to pick up two more planets of such and such a size. In due course, they were found. The known behavior of the whole explained in terms of gravity and the known behavior of some of the parts permitted the prediction of the behavior of some of the other—at that time unknown—parts.

116.00 Physicists had predicated their grand strategies upon the experience of trying to make something like a perpetual motion machine. They found that all local machines always had friction, therefore energies were always going out of the system. They call that entropy: local systems were always losing energy to the rest of the Universe. When the physicists began to look at their total experience instead of at just one of their experiences, they found that while the energy may escape from one system, it does not go out of the Universe. It could only disassociate in one place by associating in another place. They found that this was experimentally true, and finally, by the mid-19th century, they dared to develop what they called the Law of Conservation of Energy, which said that no energy could be created and no energy could be lost. Energy is finite. Physical Universe is finite. Physical Universe is just as finite as the triangle of 180 degrees.

117.00 Dealing with a finite whole in terms of our total experience has taught us that there are different kinds of frequencies and different rates of reoccurrence of events. Some events reoccur very rapidly. Some are large events, and some small events. In a finite Universe of energy, there is only so much energy to expend. If we expend it all in two big booms, they are going to be quite far apart:

boom boom

Given the same finite amount of time, we could alternatively have a great many very small booms fairly close together:

boom boom boom boom

In others words, we can take the same amount of copper and make a propeller with just two blades, with three smaller blades, or with four much smaller blades. That is, we can with the same amount of copper invest the whole in higher frequency and get smaller wavelength. This is the quantum in wave mechanics; it is a most powerful tool that men have used to explore the nucleus of the atom, always assuming that 100 percent of the behaviors must be accounted for. We are always dealing with 100 percent finite. Experiment after experiment has shown that if there was something like .000172 left over that you could not account for, you cannot just dismiss it as an error in accounting. There must be some little energy rascal in there that weighs .000172. They finally gave it a name, the "whatson." And then eventually they set about some way to trap it in order to observe it. It is dealing with the whole that makes it possible to discover the parts. That is the whole strategy of nuclear physics.

Next Section: 120.00