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Space-Time Transients and Unusual Events

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tism would fade into the old order of amorphous, single-source mechanisms that have plagued men for centuries. It would no longer be science, but mysticism. In this chapter a concept is developed involving the role of large scale electromagnetic fields, normal in principle but abnormal in the geometry and size of application.

Recent Scientific Discoveries

One level of discourse that has been emerging rapidly in the era of satellite telemetry is the solar system as a functional unit. From this perspective, a normal G-2 star (called the sun) is surrounded by a number of planets that are in a dynamic equilibrium with it and each other. The earth is one of those planets, and as such, is susceptible to the changes and perturbations of the system.

During the last decade a number of discoveries were made and verified. First, the sun displays a weak field that moves out through three-dimensional interplanetary space, at least to the distance of Jupiter. This field is divided into four sectors: each sector has a polarity opposite to the adjacent sectors. Consequently, boundaries exist along each sector's edges within which unstabilities can occur. The sector sections rotate completely every twenty-seven to twenty-eight days along with the primary solar mass. It is now clear that these rotations are connnected with recurrent geomagnetic storms (Fraser-Smith, 1973; Lapointe and Vallee, 1970) and even to the circulation of the earth's atmosphere (Wilcox, et al., 1973). More elusive structures of the solar field contribute to an impressive semiannual variation in geomagnetic disturbance (Russell and McPherron, 1973) with activity peaks during March and September-October.

Periodically, massive unstabilities within the sun, perhaps induced by the planets, pump massive amounts of charged particles into interplanetary space. When these "dense" clouds of energetic particles collide with the earth's magnetic field, oscillations of the field begin like the movements of a large, invisible, bouncing spring. On the earth's surface, such oscillations are measured as geomagnetic storms. During the storm condition a

number of electromagnetic anomalies *transiently* exist in the upper atmosphere. Radio communication and other ionospheric-related processes are dampened; northern and southern lights may be seen on the night side.

One of the most spectacular forms of solar unstability is the flare. During periods of vigorous solar storm performance, gigantic tongue-shaped protuberances are ejected from the solar sphere. Like huge bolts of energy, preceded by a massive shock wave (Dryer, 1974), their products collide with the earth. Some of these flares, such as the August event of 1972, are so intense that the earth can be minutely displaced from its orbit.

However, the terrestrial consequences do not terminate with the immediate impact effects. For some days later the earth's electrical and magnetic systems continue to exhibit oscillations. These unstabilities can contribute to large scale events on the planet's surface. It is known now that the amount of geomagnetic disturbance is systematically related to the degree of wind turbulence (Beynon and Winstanley, 1969). Low pressure troughs in the embryonic stages seem to be directly affected by these geomagnetic excursions; low pressure areas evolving at this time display increased energy and severity (Roberts and Olson, 1973).

The sun's influence upon the earth's surface and electromagnetic events involves even greater time spans. The infamous eleven-year sunspot cycle has been correlated with a variety of terrestrial phenomena, from global magnetic field disturbance, whose mechanisms are in principle clear, to human turmoil, whose mechanisms are not so clear. In recent years, strong and still accumulating evidence suggests that the sunspot cycle and correlative fluctuations in solar disturbance are significantly related with extremities in weather. Periods of droughts, excessive rains and temperature extremes, on a transglobal level, show unexpected dependence upon the "vagaries" of solar disturbance. In 1974, M. F. Stringfellow reported impressive evidence, collected over a forty-three-year period, showing that solar sunspot cycles were highly correlated with the incidence of earthly *thunderstorms.*

Collectively, these data show important patterns in context of

what we have reported in this book. For example, significant correlations between tornado frequencies (a more severe form of turbulence) and Fortean areas have been mentioned. An increase in the amount of atmospheric turbulence might probabilistically enhance conditions required for transient or Fortean manifestations.

But perhaps the most interesting patterns involved with geomagnetic disturbances are concerned with the moon, the earth's closest major body with which a dynamic interaction is continually in progress. Presumably, by blocking or shunting the solar wind and by functionally penetrating the magnetospheric tail, the lunar phases significantly correlate with geomagnetic disturbances (Bigg, 1963) and thunderstorm frequency/severity (Lethbridge, 1970). These effects seem to peak about two days after full moon, although a second peak immediately after first quarter is also evident. A most remarkable relation exists between incoming meteor rates and lunar phases (Bowen, 1963); apparently peak meteor rates occur around first and third quarter.

Relevance to Transient and Unusual Events

These new discoveries concerning the interactions between the sun, the moon and the earth, may help us isolate and understand the mechanisms involved with both orthodox and unorthodox unusual events. Data have suggested that many Fortean phenomena are associated with thunderstorms and freak turbulence, a condition exacerbated by geomagnetic disturbances. Periods of drought and other weather extremes, correlates of changing solar conditions, are also the prodromes to Fortean episodes. Since transient and unusual events tend to cluster in time over different portions of the earth, the existence of a transglobal effect like the geomagnetic relation is required.

Such planetary effects would not induce the required changes for transient events everywhere, but only those areas that, at the time, show the greatest susceptibility. Thus despite the existence of pocket areas for unusual occurrences, the manifestation of any

event at any given time will be a function of a fluctuating susceptibility.

Infrequent and queer distortions in the solar wind and sector sections could be candidates for the "night flashes," "glows" and other localized luminous displays. We must not forget that the moon is also immersed in the solar stream and would also be susceptible to transient fluctuations. Whether by cause or correlation, the moon revolves around the earth and incoming meteors, the first symptom for many unusual episodes, are modified.

But perhaps the most important contribution of the solar complex to unusual events is the *pulse*, the short-term gush of cosmic energy that can send the earth-moon system reeling into long-term unstability. Typically, the oscillations are small and the geomagnetic earth only bounces like a shutter in the wind. There are times, however, such as the August event of 1972, when the sun can erupt with sufficient impact to knock the earth "off its orbit."

What happens during and after the impulse events? Presently, it is thought that the surface stabilities of our planet are a consequence of balanced forces beneath the earth's mantle where the giant dynamo induces the geomagnetic field. When a solar pulse strikes the earth's boundaries and the effects are mediated deep into the surface, are eddy-current-like forces induced which upset the surface equilibria and create the various forms of unusual events reported in this text? Are the unusual astronomical, geophysical, meteorological, animal, and *human* events merely expressions of our earth resonating in response?

The consequent events of that particular pulse strongly suggest the possibility. Between August 2 and 7, 1972, massive flare and sunspot series erupted within the solar atmosphere and shocked the earth. On August 10, huge multicolored fireballs were seen over many areas of the western United States and Canada. Were these storm-induced "clots" of magnetic flux lines within the solar wind, striking the upper atmosphere and releasing the energetic and visible plasma? Two days later, people in Alberta reported a stubby-winged metallic object and on August 19 the United States began one of its largest UFO flaps. Objects were seen

emitting light, football-shaped crafts were reported landing in fields. Then on September 2, one month later, Cygnus X suddenly increased its radio power to unprecedented levels only to decrease again about ten days later. Was the *detection* of this increase also related to some distortion in the solar field? The semiannual variation of sudden stars appearing/disappearing and the solar sector sections have already been shown to have a remarkable overlap.

The above event pattern is not unique in the annals of unusual phenomena. Similar manifestations were noted following the solar proton flare of July 7, 1966; northern lights were seen in several states, fireballs streaked through the skies, and UFOs were seen to land. Less spectacular but intense episodes, like the interplanetary shock wave of September 28, 1967, have heralded the onset of many transient and unusual occurrences. Unfortunately, only the recent sophistication in satellite reconnaissance has allowed the required data to be collected.

Explanations of Unusual Astronomical Events

Models can be constructed and predictions can be cast involving the role of solar perturbations in the occurrences of unusual astronomical events. Only two models will be presented here.

Solar Peculiarities

One class of reports noted in early astronomical journals involves the ostensible occurrence of "black objects" crossing the solar disc. It is difficult to differentiate, in these older reports, the exact distance of the objects. Quite possibly, some of these objects may have been very close to the observer. Still, however, occasional reports by astronomers over the decades involve dark, non-sunspot objects moving across the solar disc. Recent developments in plasma. physics have evoked some interesting modes of explanation.

Objects that pass between a luminous source and a measurement device are observed because a discrete amount of light is

blocked. Typically, the conclusion is made that an actual object exists, since "matter" is required to block the light. But this is not always correct. Sunspots look like dark objects, merely because the temperature in the sunspot is lower than adjacent areas. It has been speculated that the lowered temperature of the sunspot areas is maintained by tangled solar magnetic flux lines which act as a type of "magnetic bottle" to contain the solar plasma. One concomitant effect of the plasma retention is the temperature reduction.

During times of more disturbed solar conditions, a similar situation might be induced some distance away from the solar surface (Figure 56). Here the solar magnetic flux lines again would be tangled into a "magnetic bottle." Plasma contained or trapped within the bottle would remain at a reduced temperature. From earth, against the background of the brighter sun, the magnetic bottle might look like a dark object. As long as the conditions responsible for the formation of the tangled flux lines were main-

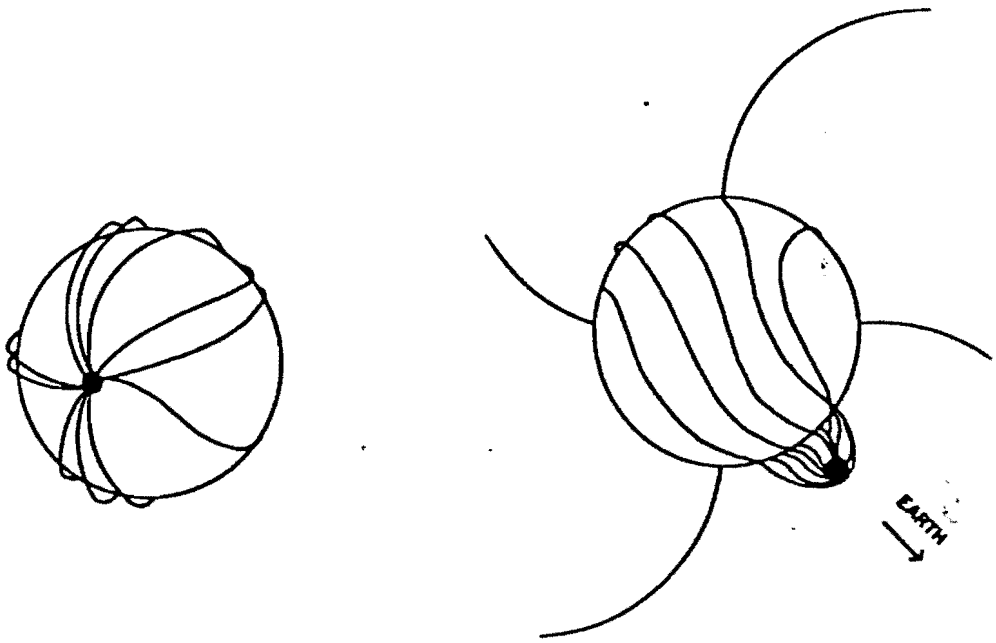

FIGURE 56. Hypothetical "magnetic bottle" produced by tangled flux lines in the solar magnetic field.

tained, the bottle would exist. Anything that disturbed this fragile condition would break the bottle, unravel the flux lines and send the trapped plasma dispersing to a lower density equilibrium in space. To the earth observer, the object would no longer be visible; it would have "disappeared."

The cause of the solar disturbance or the increment of space in which the magnetic bottle is formed does not directly concern us here. One might suspect that areas of great turbulence, such as a planetary barycenter outside the solar radius, would be a candidate space. In recent years, the possibility of an integrated planetary contribution to solar disturbances has been entertained with considerable seriousness. Dynamic changes in the balance of the planets would be an important factor here and may contribute to the relatively long intervals between these unusual events. We are *not* proposing here the view of a peripheral mysticism or simplified astrology. The point is merely being reiterated that the sun is a plastic mass around which changing distributions of smaller masses are arranged. At times there may be factors which push the plastic nature to its limits; the prodrome of these periods may be seen by us as unusual solar events.

The model can be further extended to accommodate the occurrence of atmospheric luminous objects, fireballs and other short-termed energetic displays that both precede and accompany Fortean and natural events. Suppose under the conditions shown in Figure 56, the magnetic bottle is pushed into interplanetary space and is carried by the solar wind. Assuming that the bottle could be maintained for this period, the solar plasma would retain its energetic nature. Since the ambient magnetic field would be less intense, the bottle, acting like a magnetic "clot," could maintain its integrity.

However, as the bottle approached the earth and began to intermingle with the geomagnetic field, unstability would result as the tangled flux lines were unraveled. At some point, the contained plasma would escape and begin to disperse. Observers beneath the event on the ground might see a number of phenomena: a sudden brightness, a large ball of light that disperses quickly within a few seconds, or a related display. If the energy dispersions were fast

enough and close within the atmosphere, large detonations and explosions could be recorded.

Transient Lunar Phenomena

The moon is also immersed in the environment produced by the sun. Consequently, this neighbor of the earth should also be susceptible to short-term perturbations associated with the sun's unstabilities. In a previous chapter, such reports of transient lunar phenomena were discussed. T.L.P. have been known to exist for centuries; their episodic existence is short and their recurrence time is long.

If the earth-moon twins share a similar solar environment, then perturbations on the earth's surface could be correlated with disturbances on the moon. The mechanisms of production, no doubt, may be different. For example, the moon has a very weak magnetic field compared to the earth's and the manner by which the moon responds to deviations in the solar field may be considerably different.

Figure 57 compares the seasonal variation of all transient lunar events during the years 1872 to 1930 with the U-index, a measure of geomagnetic variation, for that period. Assumptions have been made by many researchers in geophysics that this geomagnetic index is a rough estimate of geomagnetic disturbance associated with solar perturbations. If the source of both geomagnetic disturbances and T.L.P. is similar, then their variations should be correlated. The correlation coefficient between these two variables is +0.48; this value is in the anticipated direction but the statistical significance is marginal. Nonetheless the correlation is impressive since comparisons were made between *monthly* values of the events over *all* the years described. This indicates that the effect may be weak but consistent.

Explanations of Unusual Events on the Earth: Seismoelectricity

The authors contend that the existence of man upon a thin shell beneath which mammoth forces constantly operate, cannot

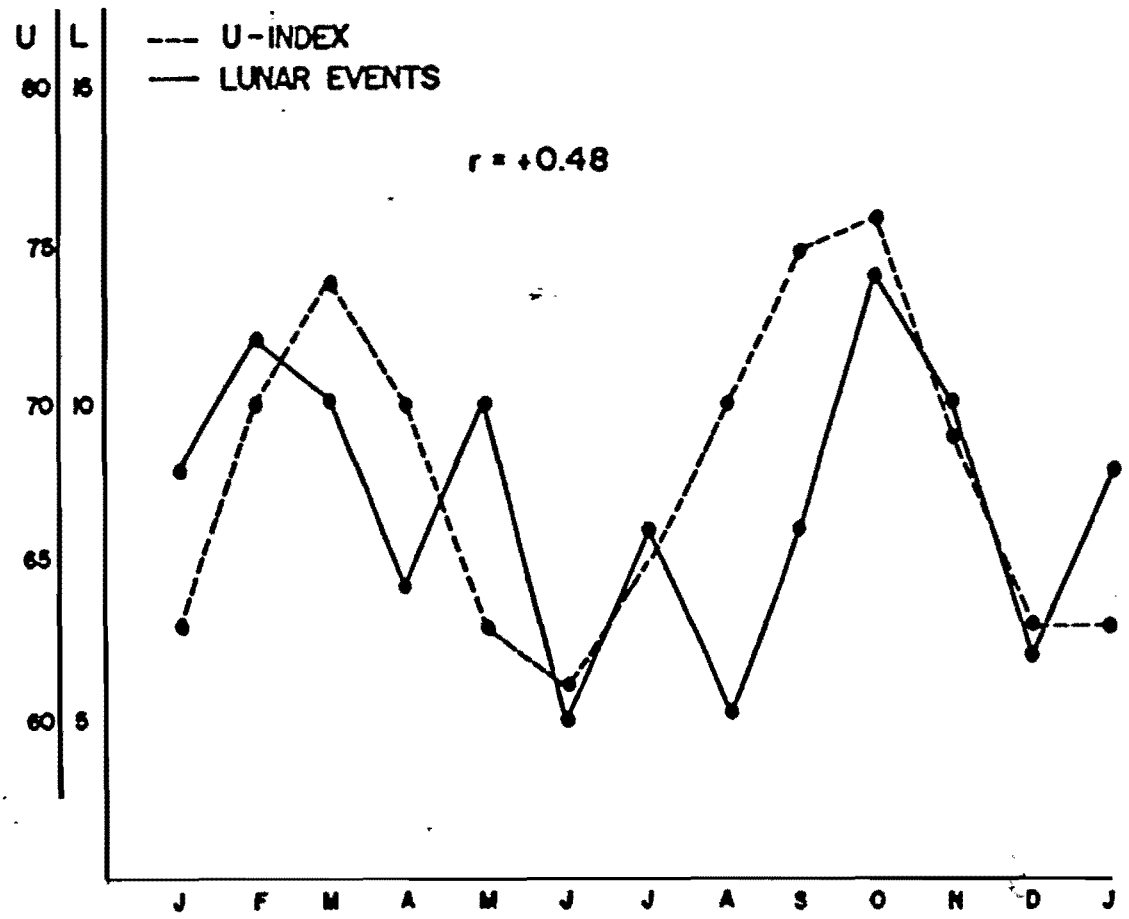

FIGURE 57. Percent of total monthly occurrences of transient lunar events and average monthly fluctuations of the geomagnetic field (U-index) for the years 1872 to 1930.

be over-emphasized nor is it exaggerated in perspective. Beneath the 2×10^8 square miles of surface life activities, geophysical forces continue to interact and induce changes upon that surface. Shifts in the crust are felt as earthquakes. Distortions in distributions of mass or metals result in large scale magnetic and gravity anomalies. These are the obvious, the blatant, and the easily measurable productions.

Probabilistically, there should be smaller areas, perhaps not more than a few feet in radius, in which these sub-surface forces are manifested. In areas where the constructions and compositions are more optimal relative to adjoining spaces, the forces could be significantly different or magnified. Such areas could be responsible for long standing "ghost light" regions, "magnetic vortices," "mana areas," "taboo areas," "no growth areas" and a variety of peculiar geographical manifestations reported in various cultures around the earth. Some of these areas would be long term manifestations while others would be produced by the transient shifting and settling forces deep within the earth's interior.

Tectonic and Pre-Seismic Sources

If the data patterns are closely scrutinized, it becomes clear that the majority of unusual and transient events are closely tied in time and space with the occurrence of seismic movements. Many unusual events occur before the manifestation of a severe earth jolt or a volcanic explosion. Could it be that unusual events are produced by the forces exponentially accumulating in seismic-prone areas? Are unusual events transient by nature because the accumulating stresses upon the subsurface structures pass through several *qualitatively* different expression modes until the structures finally break, and the earthquake is felt? Are the periodic manifestations of unusual and transient events in earthquake prone areas — like the faults of California, the New Madrid region and the New York-Vermont-New Jersey crescent — results of the seismic pressures waxing and waning below the surface? And, in context of the purpose for which this book was written, can unusual and transient events be used as warning signs for impending catastrophe?

We think that these hypotheses must be seriously and objectively tested, for the data consistently point towards seismic-related sources. It may be by no means spurious that unusual events cluster around these areas, despite the confounding contribution of population.

Recent developments in seismology have opened many avenues for understanding pre-seismic events. Perhaps the most outstanding idea has been pursued and elaborated by Finkelstein and Powell (e.g., 1970). These scientists have suggested that, during the strain of seismic pressure, forces pushing on rock crystals in a large area produce electric fields through a modification of the piezoelectric effect. These pre-fracture electric fields can reach values of several thousand volts per meter, intensities capable of ionizing the local area into visible "luminosities." Indeed, one of the more constant contiguities of unusual events has been between earthquakes and luminous airy displays. Empirical and theoretical supports for these phenomena have been reviewed by Derr (1973).

The extent of these fields may be by no means small. Consider the large subsurface regions, perhaps hundreds of square miles in area, with near-fracturing forces pushed upon them. The resultant electric and magnetic fields produced could involve large volumes of space, reaching high into the ionosphere. About one hour before the Hilo (Hawaii) quake of April 26, 1973, radio transmission ceased due to the apparent "disappearance" of the ionosphere; what extraordinary electric forces must have been generated before that fracture!

Pre-fracture strain may not only generate piezoelectric phenomena, but sonic energy as well. Finkelstein and Powell also mentioned this option for the quake situation. However, before the quake, as forces shift and move and rock-bursts increase in frequency, audible as well as non-audible (infrasonic and ultrasonic) sonic fields are theoretically possible. Antecedent rumblings and subterranean "groans" weeks to months before major surface dynamics around epicenters are frequently reported in Fort's data. As mentioned elsewhere, the mid-magnitude quake that jarred parts of the upper midwest and northeastern states in February,

1973 was preceded some weeks by hundreds of subsurface "rumbling" and "popping noise" reports from the local population. Some of the noises seem to originate "inside houses," indicating that the house area was merely a "hypocenter" for the localized activity.

In many respects, the prospect of sonic energy produced by seismic sources and strain conditions is a more palatable alternative than the electrical field hypothesis. By themselves, such energy bursts might explain many forms of short-termed Fortean episodes like the "phantom sniper" effect, any of the glass-related kinetics, as well as the more obvious "unknown hum" data.

Unusual Pre-Fracture Effects

In this portion of the chapter, we are concerned more with the intense, localized manifestations of slowly accumulating forces in a seismic area. Such forces may accumulate for weeks, or perhaps even months, and be expressed in a qualitatively different fashion, since the quantal sums of energy required for a fracture would not have been reached. A pictorial representation of this hypothetical area is presented in Figure 58. As can be seen, because the electrical field produced by the accumulating strain is not sufficiently intense to permeate large areas of surface space, it is concentrated into the most susceptible localized area. The net result is an "electrical column." In the figure, the radius of the column is assumed to be between 10 to 100 feet. However, larger radii are conceivable, including values in the order of a mile.

Now during the pre-fracture sequence or, alternatively, as long as the particular stress is maintained, a number of interesting possibilities could take place. First, due to the high electric field in the localized area, low level ionization of the air within and adjacent to the column could occur. Consequent collection of Bergstrom nuclei would allow precipitation of water vapor, even on a clear day. Second, if the field was of sufficient intensity, rocks or other dielectrics in the area might "bounce around" (especially if the field was time varying) and only appear to be "popping" out of the ground or "falling" from the sky.

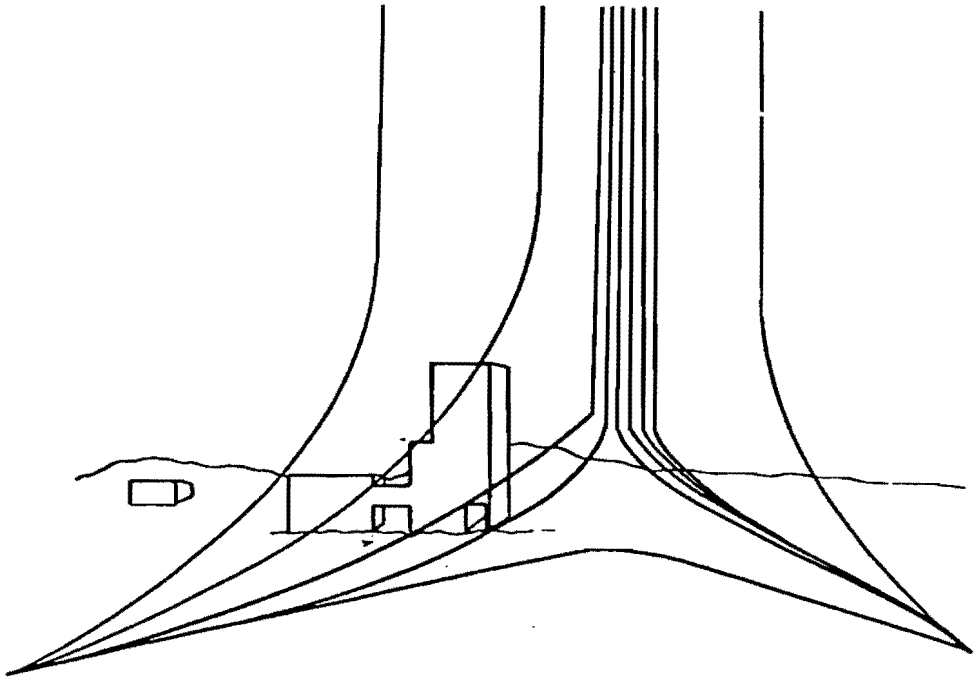

FIGURE 58. Pictorial representation of a hypothetical "electric field column" that might be produced by accumulating tectonic stress in subsurface areas.

Third, suppose an electrical apparatus approached the area. Under optimal conditions failure in lighting systems or even the electric field-dependent engine could take place. Of course, if the electric field strength reached a value sufficient to ionize the local air (in a manner analogous to ball lightning), then the viewer adjacent to the field might indeed see a luminous glob of substance and conclude a UFO has approached.

Dynamic Characteristics

It is important to realize that the electrical column hypothesized in the last section is not refrained from movement. In fact, its spatial dependency would be primarily determined by the subsurface forces producing it. If the subsurface stress is moving along the fault line or rift, the concomitant surface manifestation would also move in a similar manner. The actual shape or physical dimension (height above the ground) would depend wholly upon these forces

and their interactions with the characteristic electrical properties of local structures, including large buildings.

The occurrence of unusual events produced by the hypothesized model would not always precede actual earthquake production. In this statement lies the limitation of testing the model in a controlled fashion. For, if the same tectonic pressures responsible for the electric column did not exceed the limits of the local rock structures, then the quake would never take place. There are many areas of the earth where pressures build, only to be relieved; volcanoes become warm, only to become silent once again. Such waxing and waning is characteristic of a system adjusting to new or different matrices of forces. When the forces wax, a cluster of transient events occur — rocks move, "phantom sniper phenomena" appear, rain falls on a clear day, UFOs are seen, car engines suddenly stop, or a "force" pushes cars from the road. Since certain areas are most susceptible to the effects of these forces, when the forces reappear later, and the cycle waxes again, another burst of phenomena takes place in the same area and the concept of "a window" is recognized.

Herewithin also lies the seductive illusion of the phenomena. Transient phenomena occur, burst after burst within an area, and the human observer begins to satiate. Repeated and protracted presentation of stimuli, even the most odd, results in habituation after a while. But earthquake cycles do not oscillate on a constant probability curve; the baseline of the entire curve moves. There are cycles within cycles, like the twenty-eight-day solar cycle superimposed upon an eleven-year epoch. Whereas in a century, a few peaks are reached and a few instances of transients are seen, the maxima of an earthquake curve for an area may be hundreds of years apart. Between those maxima large cities may be built, complex civilizations instituted, and a world concerned with itself precariously exists on the surface. Then the earthquake curve slowly begins again to reach its maximum.

There are such areas in the world, where the earthquake maxima have long epochs, centuries between their peaks. Areas like the New Madrid region through Missouri, Illinois and probably through Ohio, or the New England cluster are examples.

California, that complex of earthquake cycles, may be included conditionally within the category.

Effects on Life Forms

The existence of electrical columns produced by accumulating tectonic stress would affect living electrical systems as well. Recent experiments indicate that animals may be sensitive detectors of electric, magnetic and infrasonic fields. Science is still not clear *how* animals detect ambient fields, but some species seem to use them for migration and perhaps even communication (Bullock, 1973). A frequent report from the observers of violent earthquakes is that animals display emotional behaviours *before* the occurrence of the first shock. Is the correlation a spurious one based upon the distorted and enhanced memory associations of the traumatic event within the human observer, or do animals detect the incident forces? Experimental verification still must be demonstrated.

In this context, the sudden appearance of animals of the same species within a small area would not require necessarily the postulation of "matter-transportation" hypotheses nor of similar untenable concepts. Instead, we could propose that animals normally dispersed in the immediate area of the electric field column would be attracted towards it, and consequently become *conspicuous*. Birds flying through the column would be adversely affected and lose their directional sense as well as flight coordination. Ten years ago, such an idea was unthinkable. Now, after the data and experiments produced by Talkington (1966), Walcott and Green (1974) and Southern (1975) the effects of magnetic and electric fields upon bird flight are a real possibility, but not the only possibility.

Further applications of the electric column concept can be made. In the context of the hypothesis, the electric field distortions do not have to be limited to land areas; similar conditions could be induced over water in oceans, seas or lakes. There is now strong evidence that certain fish communicate and are influenced by electric fields. If an electric column was produced over the surface

area, then such species would be influenced selectively. The same stimulus might also be the focal point for atmospheric turbulence that could pick up and carry the species. High electric field gradient precursors to sudden turbulence have been observed.

Effects on Human Life Forms

Perhaps the most complex bioelectrical system of all is man. Within a small three-dimensional locus called the body, unfathomable ensembles of electromagnetic circuits exist. These circuits are correlated with experiences of consciousness, memory, perception and all the various properties labeled "human." Typically, human bioelectrical field patterns are displayed in a systematic manner and consciousness and thought flow in a *perceived* orderly manner. But even this system is not infallible. Experiments by Leduc (see Herin, 1968) and more recently by others, indicate that small currents induced across the scalp can produce "dreamy-like" states, episodes of paralysis, or intervals of unconsciousness. Certain combinations of electric current polarities and intensities seem to influence the "d.c. battery" or steady potentials of the brain. Ironically, one of the most electrically unstable parts of the human brain is the hippocampus, an important component of the emotion and memory circuit. If this system is stimulated, even in the "waking" state, the person is inundated by stored images (real and unreal) that he or she cannot control.

The stimulating currents are not very large in magnitude, and could quite possibly be induced by transient electrical fields allegedly produced by substructure geological stresses. The implications of this supposition are immense in scope. Think of the many instances of Fortean events and UFO observations where the observer was paralyzed, or "blacked out" when he *closely* approached the luminous blob or vice versa. Remember the different forces that have not only stopped automobiles, but "knocked down" large numbers of men. These would be instances of pure and blatant assaults upon the brain's electrical system.

But the effects would not stop at gross distortions in bioelectrical systems; more subtle modifications in "thought" and

perception could exist. With this unnatural stimulation of the memory areas in the brain, the person could vividly and emotionally experience his stored images; he could richly perceive the nightmares and crude monsters normally suppressed from consciousness except during dreams. A human being, under this condition, could experience a "waking nightmare" of fear-inducing stimuli. They would seem quite real, quite material, for there would be no reason for the person to think otherwise.

Consequently, what the person sees could be shaped by his expectations, what he has heard or imagined or seen in movies. Each person might perceive the same stimulus in different ways. Where one person sees a globular UFO with men inside, another person might see a metallic ship. When one person sees a giant, beastly humanoid with fangs, another might see it with a hideous, wolf-like face. There could be combinations of animals in the monsters seen. Examples of these instances have been reported.

Sudden unconsciousness induced by the electroconvulsive-like shock of the intense electric/magnetic field column would be associated with pre-event amnesia. The person may awake after some interval with no recollection of events several minutes before and/or after the blackout. The latter amnesic condition could involve hours to days after which time the person might "suddenly become conscious" again some distance away from the locus of the event. That complicated skills, such as driving a car or talking, can be displayed during deviations in "normal consciousness" has been reported frequently in the literature concerning epilepsy. In light of the traumatic and unstructured nature of the experience, "missing" portions of the memory would have a marked tendency to be filled by confabulation; sources of confabulation might be derived from what the person has seen or heard (including incidental learning) about UFO-related instances or it may be a rich mixture of "fantasy." Interestingly, the nature of the details may involve representations of any parts of the body physically influenced by the processes associated with the event. For example, proprioceptive changes in gonadal tissue may be reflected in the confabulation details in a manner analogous to incorporation of somatic and visceral changes into dream sequences (such as

dreaming about running in the arctic tundra, elaborately detailed, while sleeping in a very cold room). In the former example, the person might believe that "space-men conducted tests on the genitals." All these features would have one major commonality: the individual would be convinced of the reality and validity of the confabulatory experiences (Persinger, 1976). Even the methods of "lie detection,, and "hypnosis" may not discriminate the source of the material.

The great nineteenth century physiologist, Johannes Mueller, once stated that we are only aware of the states of our nerves. This is a semiphilosophical statement, a normal product of that era. But it contains an important thread of information. Man's consciousness and experience are totally dependent upon complex series of electrical-chemical events in the brain. Normally, they are systematically and orderly related to the events in our environment. At times, transient changes in that environment can induce large modifications in those bioelectrical occurrences and change the course of thought.

This is an important hypothesis, and with it a number of favorite theories can be removed. One does not have to assume there are areas where people disappear, where crews evaporate and airplanes fade away. Instead we must consider the human factor. What did those men, who now make up the files of sudden disappearances, "see" on their fateful day? Were the pilots of the famous 1945 episode in the Bermuda Triangle merely victims of local electric disturbances, and not the victims of a fiendish plot by aliens or strange forces? Does the frequent and periodic occurrence of UFOs in this area at times of mysterious disappearances merely indicate that geologically or meteorologically induced field disturbances have reached a peak? In fact, the famous area, superficially described as the "Triangle" is notorious for rapidly accumulating and violent electrical storms. For these to occur, large and intensified electric fields must take place, but not necessarily with concomitant cues of cloudiness or blocks in visibility.

We are only beginning to learn about the thought distortions that can occur when the appropriate electric and magnetic field parameters are applied. Recently, some concerned aviation physi-

cians have suspected the role of high electrical gradients associated with quickly accumulating thunderstorms as strong correlational sources of air crashes. Despite moderate shielding by the aircraft itself, horizontal movement through an electric column might be sufficient to momentarily reverse the polarity of the pilot's brain potentials. During this period, perhaps only a few seconds, a black out would occur; essentially, the loss of consciousness would be analogous to a petit mal epileptic episode. Unless some objective time reference was being observed at the time of the blackout, there may not necessarily be any realization by the pilot of the episode.

If the electrical effects were more focal within the brain, the victim might still remain conscious, but experience a series of epileptic-like auras. He might have experiences of vertigo or an inability to orient in space and time. Interference with the stored experiences called memory would deprive the individual of a reference point to which comparisons of the present must be made. Concomitant visual distortions and auditory peculiarities would also be characteristic.

An interaction between transient geophysical/meteorological associated electric fields and bioelectric fields evokes some interesting prospects for the area of unusual events. For, with this theoretical capacity, a number of epileptogenic phenomena can occur in the brain. In addition to the visual stimuli, which in themselves could invoke fear behaviour, a number of epileptic-like experiences might take place. The person exposed to these contingencies might have experiences of putrid smells (a common epileptic aura), hear voices (another aura type), have strange feelings of "a presence" or "unknown force," as well as seeing "nightmare creatures." Similar experiences could occur with the field column at potentials below those responsible for the luminosities, especially if the field was slowly time-varying. As mentioned, the existence of these columns would be brief; by the time the reporter returned to the unusual area with witnesses, the phenomenon would have disappeared.

With such capacities, it is little wonder that death might result from close proximity to the source of the phenomena. One

conspicuous observation of death- or injury-associated reports has been the close spatial proximity of the subject to the ostensible luminous or landed object. The reports of tingling sensations, pins-and-needles sensation, paralysis, or burns invariably occur when the luminous object passes very close to the observer. At significant distances from the object, the person would be outside the area of the major field and consequently would be less influenced. That a luminous object is seen at all, suggests that the force intensities have become sufficiently large to ionize the local air. With the involvement of such large magnitude forces, the labile biological organism could be severely damaged.

Any intense *ionizing radiation* associated with the massive luminogenic-related potentials could induce serious biological changes. Very close and maintained approaches to the luminosity could result in a number of radiation-related symptoms such as "skin burns," "skin blotches," peripheral erythema/edema, "swollen eyes," nausea, vomiting, sleep disturbances, fatigue and endocrine tissue changes, hours to days after the encounter. Changes in gonadal tissue would be prominent, assuming whole body exposure, such as menstrual disruptions and possible genital discharge. However, the person could still maintain more or less normal behaviours. Depending upon the dosage and the type of radiation, malaise or fatigue—associated with psychological depression—could occur about two weeks later. Transient blood clotting problems and alterations in white blood cells would be expected with concomitant complications in the immune mechanisms; in some rare instances death could occur or malignant growths could develop.

Characteristically, at field strengths sufficient to produce the luminosity, the phenomenon would be transient and short-termed. If it were mobile, that is the subsurface stress forces were in a dynamic state of displacement, then the luminous object would move away. Alternatively, when the high electric fields had discharged through the intense ionization, the phenomena would be seen to just "disappear." Depending upon a number of local factors, the event might quickly "fade away" or "blink out like

a light" when the field level fell below luminogenic potentials.

No doubt the presentation of these unusual stimuli would be interpreted within an anthropomorphic framework, even though the kinetic operations would be based on ordinary physical principles. Approach of the luminosity towards a person standing upon a conductive hill would be interpreted as an "attack." Stationary displays over the luminogenic source could be interpreted as "surveillance." Movement of the observer's car along the line of the phenomenon's movement might be reported as a "chase." It must be remembered that less than a century ago lightning displays were considered acts of gods, St. Elmo's fire was diagnosed as the presence of demons, and "ball lightning" was interpreted within the contexts of "disembodied spirits." Within the comfortable framework of an *ad hoc* perspective, these explanations seem absurd, now.

There is no doubt that such luminosities could be photographed, as can the more intense displays of earthquake lightning (Yasui, 1974). They would be analogous to ball lightning, a phenomenon quite capable of being captured upon film. During such stages, the electric column might be detectable also by radar networks since modification of microwave reflection could occur. And, when the electrical potential fell below the ionization level, the "phenomenon" will merely "dissolve" off the radar screen.

Again, the hypotheses stated in this chapter involve electric and magnetic forces that are by no means meager. These are large area fields, capable of mobility as the subsurface pressures move and adjust in their complex and semi-predictable manner. When such fields moved across areas of human habitat, one would expect fluctuations in the *comparatively* small line voltages of the house; one would expect that fuses could blow, light bulbs crack and giant transformers overload to the extent of widespread electrical blackouts. It is no surprise that compasses, electronic instruments of various constructions and household machinery could suddenly start or fuse their internal parts when bathed in the intense fields hypothesized. Whether they do exist to this extent remains to be replicably verified.

The test of a model is the power of its predictive capacities.

From what has been described previously and hypothesized thus far, a number of predictions can be made.

Prediction 1: Spatial Geometries

In the immediate vicinity of an electric field concentration, the discharge (luminous) phenomena should concentrate in areas which allow maximum field and ionization potential. Consequently, transient luminous phenomena should be frequently located on the tops of hills, at the peaks of mountains or bluffs, or near the tops of large buildings. In less frequent situations, phenomena could cluster in swampy or dense vegetative areas under decomposition where gases capable of low level combustion could accumulate. This is not a marsh gas hypothesis; we are merely stating that phenomena will occur in environments that support luminous phenomena produced by electrostatic or low-frequency electrodynamic discharge. Consequently, a significant number of luminous reports should occur along power lines, especially high-voltage power lines and stations.

Prediction 2: Landing Effects

With extremely intense electric discharges, the ionization might be insufficient to dissipate the potential and a current may be produced momentarily into the earth. An observer of this event might see a luminous column of light slowly descending to the earth and "landing there." If the current was produced, then the most conductive minerals (which would vary with locality) in the adjacent soil would be liquified, like an overload melting the fuse in a household circuit panel. The most common conductive or thermoelectric materials like aluminum, silicate, iron, or manganese may be found in the locality; such an area might be described by the observer as a saucer nest.

Prediction 3: Movement Patterns

If the source of the electric field is due to mobile subsurface stresses, then the luminous phenomena should follow the local

fault lines, rift zones and other normal rock strata that locally dissipate the stress. Since the locus of the subsurface sources exists in a three-dimensional space, any movement of this source would be reflected, like a "transformation of axes," on the surface by the luminosity. Thus, the "object" may appear to move from side to side or up and down depending upon the source's subsurface position. Sudden displacement of the sources along stress lines, that could be located at right angles, would be associated with "high velocity, right angle" movements of the luminosity.

Prediction 4: Accumulating Tectonic Stress

Transient and unusual phenomena should occur in areas where tectonic stress is accumulating. Episodes may not necessarily involve areas of well known seismicity, since these areas may only reflect structural weakness along the stress axis. For example, there is now evidence that the New Madrid region is a fracture area for stresses generated along a zone beginning in Michigan and Ohio and moving down through Indiana and Illinois into the Mississippi Valley.

Consistent with the hypothesis, the areas most susceptible to the unusual events would be typified by slowly accumulating forces or in areas where mid-magnitude earthquakes are more frequent. Large quakes would have a tendency to dissipate the seismic energy and result in a more permanent adjustment (following aftershocks) and stability. A map of seismic activity in the United States is shown in Figure 59. According to the hypothesis, the more susceptible areas should be slightly northeast of the New Madrid (Missouri) zone and include Illinois, Indiana, and Ohio. A smaller cluster should occur around Charleston, South Carolina, and a lozenge-shaped pattern through western North Carolina and eastern Tennessee. A coastal pattern for unusual events should also exist, running through the interface of West Virginia and western Virginia, skipping through Delaware and Maryland and intensifying again around Philadelphia, Pennsylvania. From there the pattern should move through the densely populated areas of the eastern New England states. Minor unusual event clusters should also exist in the north-central New York area. such as Ithaca and Utica.

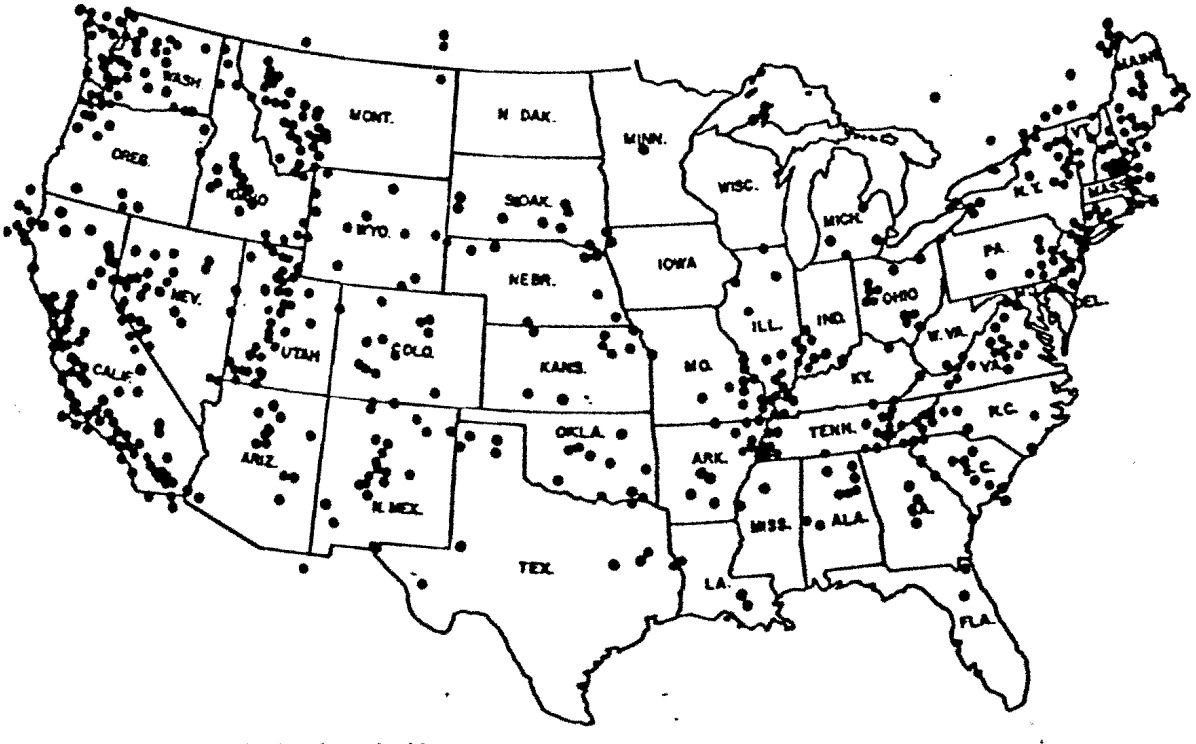

FIGURE 59. Distribution of mid-range (V to IX) earthquake intensities (Mercalli scale) in the United States (modified from E.S.S.A., 1973).

On the West Coast, pockets of unusual events should be conspicuous around Los Angeles and again around the San-Francisco-Chico area; Washington state would have a minor cluster in the central-western region. A final source of unusual events should exist through western states in a N-S direction. However, we would suggest that numerous unusual events would not have been recorded here (because of the low population) until quite recently.

It is clear that there is a striking relationship between the seismic map of the United States and the distribution of events in Figure 18 and Figure 50. England shows a similar relationship. Unfortunately, the enthusiasm is slightly dampened by the confounding involvement of population. In the summary chapter, significant correlations were noted between the various categories of unusual events and population when the analysis was completed on a regional (state) basis. This is not surprising, since, for events to be observed, human beings must be in the vicinity.

In a pilot study, we correlated earthquakes on a state level with the unusual events on a state level for thirty states bordering and east of the Mississippi River. This selection was made since a significant proportion of our reports occurred before 1900 when the population west of the Mississippi River was quite small. Such low population states were assumed to misrepresent the frequency of any unusual events occurring in these regions. Furthermore, states east of the Mississippi River are more consistently typified by "shallow focus" quakes than are areas west, an important technical feature of the model.

Our calculations indicated that a significant correlation of +0.58 existed between state minor earthquake activity (V-VI) and unusual events. The correlation for larger magnitude quakes was +0.48. Unfortunately, from the view of clarity, populations of these states for all years sampled (1900, 1930, and 1960) also significantly correlated with seismic activity. With the confounding factor of population added to the observation, it is presently difficult to conclude that the relationship between unusual events and seismic activity is not an artifact. One way to test the reliability of the effect is to divide the area into the window segments (one degree latitude-

longitude sectors). Alternatively, time series could be done to determine any parallel fluctuations in seismic and unusual events.

Prediction 5: Time Factors

Unusual events should occur in bursts some months or weeks before the occurrence of a slowly accumulating mid-magnitude shock. However, the converse is not necessarily true: unusual events will not always precede these types of earthquakes. In our model, the tectonic pressures responsible for the event are oscillating ones; not every peak of the time-varying pressures will result in sufficient force to precipitate a fracture.

A test of this prediction is shown in Figure 60, where the numbers of unusual events between 1950 and 1972 for Illinois are shown juxtaposed upon the temporal distribution of earthquakes in that state. For comparison purposes events involving "animal sightings," for example, the large cat and humanoid creatures, are separated from other types of unusual events. It can be seen that there is a marginal tendency for unusual event clusters to occur two to four months before mid-magnitude earthquakes in this state.

Prediction 6: Multifaceted Cluster Effects

During unusual event clusters, a number of parallel phenomena should also display increased frequencies. Statistical upsurges in disease states presumably associated with high intensity electric and magnetic field exposures should be reported, including blood clotting problems, heart attacks (due to repolarization failures), abnormalities in cardiac T-waves, and phantom limb reports from amputees. If the cluster event occurs during the evening, the effect should be intensified and include reports of insomnia, sudden awakening, nocturnal akinesis and similar disturbances from sleep by people close to the phenomena.

Increased emotional behaviours and thyroid-related disturbances would result if the unusual clusters lasted longer than a single day or two. Subjective feelings of depression, foreboding and desires to leave the area should be reported more frequently by

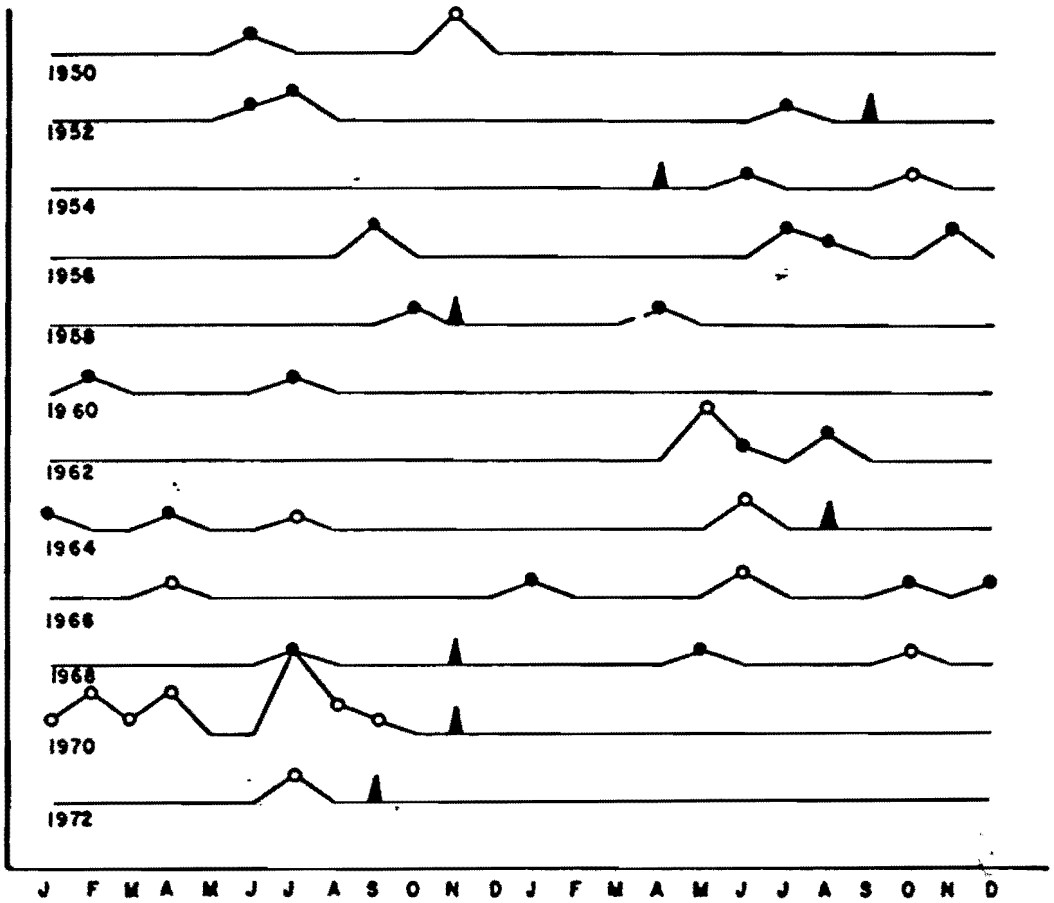

FIGURE 60. Reports of unusual events (o animal forms; ● other forms) in Illinois between 1950 and 1972 compared with occurrences of VI-VII intensity earthquakes. (▲)

the population as well as tendencies towards lethargy, marginal headaches and difficulties in recall or thinking. Unstable individuals would become more unstable and engage in irrational behaviours; they may be mistakenly identified as the causal feature of the episode. Post-cluster periods should be followed by increased frequencies of low level immunological disturbances, such as upper respiratory infections, allergies, and other stress-related manifestations. No doubt psychogenic facilitation of the medical manifestations would occur; merely observation of the phenomena could be an intense psychological stress for many persons.

Areas that are poltergeist or "haunt" prone should show increased activities. In a recent text (Persinger, 1974a), evidence was given suggesting the role of environmental factors in *some* aspects of unusual kinetic displays. The close relationship in patterns between Fortean-type events and orthodox parapsychological events is by no means spurious. Parallel features of cluster events would include unusual animal behaviours (chickens terminating egg laying, gonadal difficulties, birds and insects leaving the area), and various manifestations of electrical failures.

Impulse Effects

The model developed in the previous portions of this chapter assumes that the major energy source is derived from tectonic stress. Smaller displays could also be energized by lightning and meteorologically mediated electrical fields. However, other forces could contribute to each of these sources. The most likely candidate is the direct and indirect effects from intense solar disturbances.

Solar impulses, like any impulse instituted upon a homeostatic system, would have large magnitude effects upon the phenomena discussed in the previous sections. The earth as a control system, maintains a homeostatic-like condition by a number of internal adjustment mechanisms. However, the sudden and intense change in "demand" produced by a large solar flare would have the propensity to crush delicate stable-states or subsystems in the process of adjustment, and result in the unstability required for the occurrence of unusual events. For subsurface

systems already in an unstable condition, the impulse might be sufficient to precipitate a large scale change in activity; it might be the proverbial "last straw."

The implications of solar impulse effects upon transient and unusual phenomena are interesting in terms of mechanism and prediction. If the solar impulse theory is correct, the unusual events should also show oscillations with solar impulse cycles, such as the sunspot cycle. Consequently, predictions should be possible concerning peak occurrences of the events. Moreover, if those known conditions which contribute to solar disturbances are isolated in advance, then preparations for data collection could be made. For example, according to John Gribbin and Stephen Plagemann, who wrote *The Jupiter Effect* (1975), in 1982 a special alignment of the planets will occur; such alignments, theoretically at least, would have strong effects upon solar stability.

Set and Lunar Trigger Effects

In the laboratory occasionally one strikes a test tube at an odd angle and nothing happens; but a hairline fracture exists in the glass and the next time just a small amount of stress is placed upon it, the structure fails and one loses the contents of the test tube.

A similar concept can exist in the area of transglobal phenomena. The actual effects of a severe solar shock or a chain of volcanism could follow some time later, when the earth is again given that criterion amount of stress to precipitate the reaction. A problem of "lag reaction" would exist. In such cases, the effect would be masked by other events occurring in the region, as mentioned in the last chapter. For such events one would have to discriminate between the predisposing factor, like the intense solar shock, and the precipitating factor, an event concomitant with the manifestation of the transient episode. The precipitating agent may not necessarily be spectacular, nor unique in energy capacity. The uniqueness of the event only exists in its temporal contiguity with the predisposing factor. In fact, it is quite conceivable that the precipitating event could be one of the peaks of the many endogenous frequencies occurring within the earth's structures. One of the most common of these frequencies is the lunar cycle.

The lunar period of twenty-eight days is perhaps the most well-known of geophysical cycles. Confounded by a solar periodicity, very close in characteristics, the lunar cycle is still presumed to have an important effect upon the earth's dynamics. By its unique proximity alone, the moon has an impressive capacity to influence the "internal wiring" of the earth; the earth-moon barycenter, for example, is well within the earth's interior. Variations in lunar distance would characteristically modify the position of that barycenter, and the activities associated with it.

On the earth's surface lunar manipulations are also apparent. The most striking and conspicuous effect is upon the ocean tides, which in themselves can shift small (in proportion to their absolute masses) but significant weights over the earth's crustal features. It is now known that the crustal segments of the earth's surface also move like giant pressure plates in response to the passage of the moon. A significant correlation between lunar phase and distance and earthquakes has been suggested, but it is clear that the relationship is not a simple one. The moon seems to act more like a precipitating agent, "a straw that breaks the camel's back," and not a major source, per se.

Lunar effects do not terminate upon the solid surface either. They emerge even in the upper atmosphere, where lunar tides are induced in the oceans of air. However, within the dynamic vortices of air masses, the forces are so complex and variable that the contribution of lunar drag is difficult to quantify.

A new lunar effect has now been suggested to occur within the outer portions of the earth's magnetic field. Behind the earth exists a small, thin band called the neutral sheet, which expands several hundred earth radii away from the earth on the dark side. Within this sheet, trapped particles slowly accumulate, filled by the solar stream. Once a month, during the full phase, the moon passes through the sheet of trapped particles. The resulting turbulence allows the trapped particles to escape and make their way, after a lag time, to the earth's upper atmosphere. Apparently, the lag time is about two to three days, since processes known to be associated with particle accumulation increase in frequency at that time. The data are impressive; the closer the moon approaches the geomagnetic equator and the neutral sheet, the greater the effect.

Now suppose a giant flare has gushed an immense amount of charge particles into outer regions of the magnetosphere. A proportional amount of these particles has been trapped within the neutral sheet. They wait there and the moon proceeds along its inevitable course. Then the moon enters the area and releases the particles which flow down into the lower atmosphere. Is it then that the human population reports the increased UFOs and luminous displays? Is it the moon that is the latent trigger for the two to twenty-eight day post-flare upsurge in unusual reports? The reports are promising but much more data still must be collected.

Explanation of Unusual Events on the Earth: Geomagnetic Storms and Geomagnetic Variation Anomalies

Disturbances in the solar field and its violent interactions with the earth's magnetic field can induce a number of upper atmospheric phenomena, some of which may be Fortean in classification. However, the effects of such solar surges or of the earth's passage through an unstable portion of space are also represented on the earth's surface as a geomagnetic storm.

During the geomagnetic storm conditions, intensity fluctuations are only about 0.2 percent to 2 percent of the earth's steady-state average. However these changes are correlated with a number of ground communication disturbances, unstable meteorological developments, and diffuse behavioural disturbances in animals (Persinger, 1974b). The later have been reported so frequently that some of the national environmental research laboratories have begun serious documentation of these events.

The types of behaviours most frequently associated with geomagnetic storms vary from species to species, but in general the pattern is disruptive in nature. Bees display different dancing patterns, rodents display shifts in activity cycles, and human beings demonstrate increased psychiatric admission rates. Life forms on this planet evolved in and are immersed in a complex configuration of magnetic flux lines; it would not be surprising if experimental evidence clearly demonstrated fundamental behavioural changes at the *species level* during sudden deviations or time-varying changes in these flux lines.

When a geomagnetic field disturbance occurs, the effects are often assumed to be more or less evenly distributed over the surface of the earth. Some consideration is given to distance effects from the magnetic equator or poles, and occasional controls are made for large surface features, such as mountain ranges, that may distort the field. The potential modifying effects of subsurface structures, until recently, were not considered.

Now it is clear that the earth's crust can be responsible for localized and intensified field conditions during magnetic storm conditions. This conclusion is based on the model that depicts the earth's crust-mantel as a complex collage of heterogeneous mineral bodies, some of them hundreds of kilometers in length and width. Deposits of these mineral bodies have variable shapes, differing conductivities, and a variety of geophysical properties. Over these structures man and his productions exist.

During geomagnetic disturbances when the ambient magnetic field intensity changes frequently or when external current systems occur in the ionosphere, surface magnetic anomalies are produced above the bodies of optimal mineral material. The phenomenon is basically a large-scale application of the simple laboratory induction experiments whereby currents (and a magnetic field) are induced in the appropriate conductor by repeatedly passing an electric or magnetic field across the conductor's space. In both examples, the magnetic field associated with the conductor exists only as long as the current source is applied. Since in the former case, the source is typically a geomagnetic disturbance, the existence of the localized field is also transient. The occurrence of a variation anomaly can markedly modify the local field configuration and hence its potential to influence objects and organisms. An example of such a variation is shown in Figure 61.

Considerable research on geomagnetic variation anomalies has been completed by Porath and Dziewonski (1971). These authors point out that any conductive region (even hundreds of kilometers in area), surrounded by a lower conducting perimeter, could be the source for a transient anomaly. Deep basins filled with conductive sediments or ocean waters between two resistive continents or land bodies could be source areas of the anomalies associated with geomagnetic disturbances. Typically, the anoma-

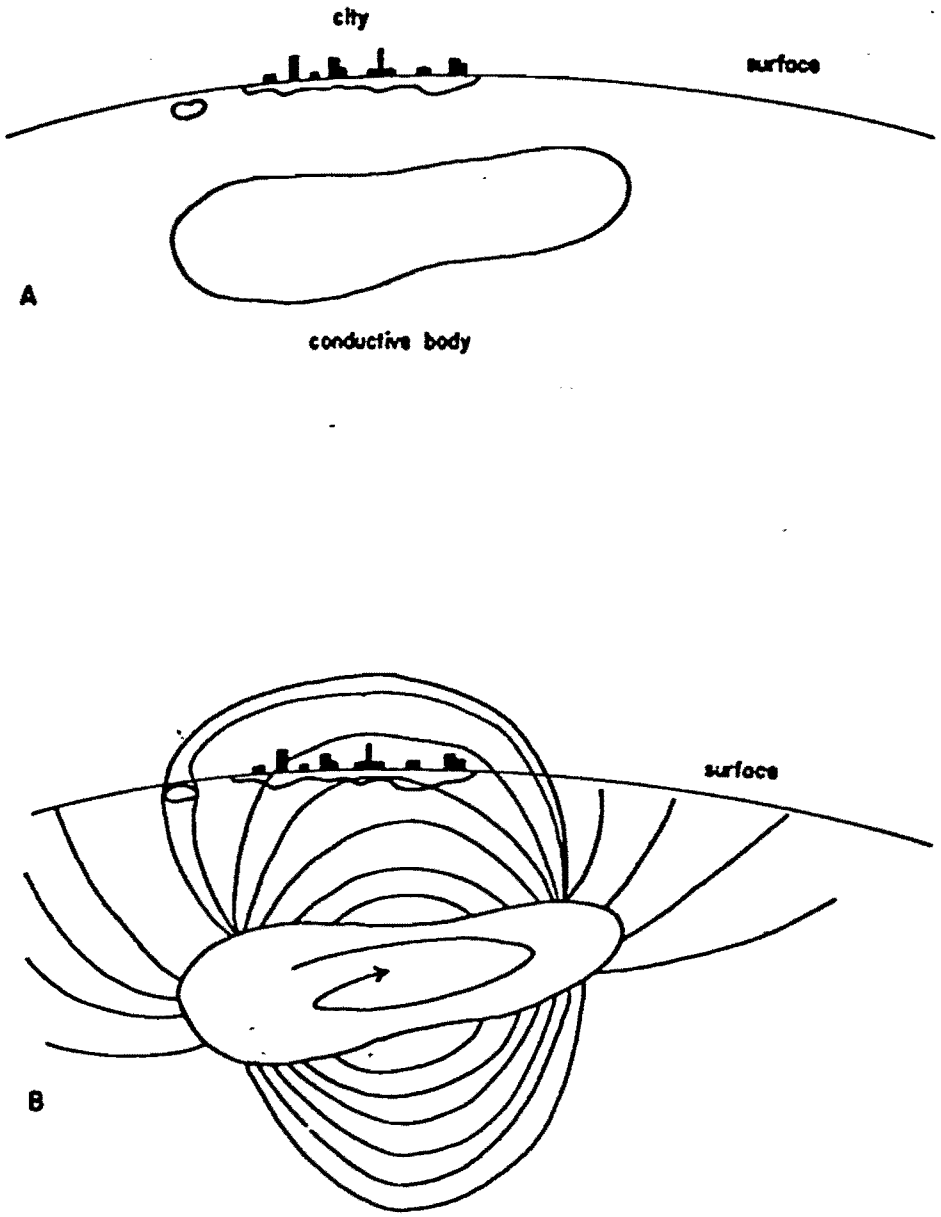

FIGURE 61. Hypothetical depiction of a city beneath which exists a large mass of conducting minerals during non-geomagnetic storm (A) and geomagnetic storm conditions (B). The latter situation results in the creation of a geomagnetic variation magnetic field anomaly that disappears when the storm is finished. The small figure near the surface at the edge of the city represents a very localized, highly conducting region within a highly resistive material.

lous field would be observed along the edges of the basin or along both sides of the channel, or along the interface of the differing conductive bodies.

Some of the more well known magnetic variation anomalies involve an east-west form in northern Germany, the Uinta basin in northern Utah, the Tucumcari basin in New Mexico, and the Black Hills basin in the Dakotas. Porath and Dziewonski (1971) suggest that other geological areas of the United States display the prerequisites for transient anomalies. These localities include the Delaware and Midland basin in the southwest United States, the Arkoma basin beneath Arkansas, Missouri, Kansas, and Oklahoma, the Illinois and Michigan basins through Arkansas, Missouri, Tennessee, Illinois, Kentucky, Indiana and Michigan, and the Allegheny basin which lies beneath the west side of the Appalachian Mountains and spreads into Pennsylvania, southern New York state and surrounding state areas. In addition, coastal areas that share conductivities with adjacent water bodies may facilitate the invagination of induced current deep into the interior of the mainland. Such areas may be found along the distal shores of South Carolina, the northern portions of Florida, the base of the Mississippi River, and along portions of the California coast.

The actual measurement of magnetic variation anomalies is recent, and despite complex and dense networks of magnetometers, only a few of the larger and grosser events have been recorded. Usually the intensity of the anomaly is only about twice that of the normal ("steady-state") magnetic field condition. Although such amplification may appear quite small, it must be remembered that the anomaly is spread over large areas; consequently the total energy within this transient system may be quite immense. If some form of short-term focusing of the induced currents took place, then relatively large amounts of energy would be available in a small area.

The mechanism of "focusing" the induced current, and hence the transient magnetic field anomaly, would involve the spatial distribution of *relative* conductivities of the materials within the area of the anomaly. Although in general the area associated with the anomaly would be more conductive than the bordering

regions, there would be subareas within the whole structure with even greater conductive properties. These areas would be analogous to "energy sinks" since current flow would be less restrictive within these regions. As a result, extraordinary currents would be momentarily maintained. The precise size of the effective areas would certainly vary with and depend upon local topographic and geophysical properties, but surface areas in the order of 10,000 square meters would be expected if our suppositions are correct.

One final feature of transient anomalies associated with geomagnetic storms is concerned with the time factor of the disturbance. Data collected by Porath and Dziewonski (1971) indicate that different potential anomaly areas demonstrate maximum effects with storms displaying particular periods of variation. Periods in the vicinity of 50 minutes (one "cycle" every 50 minutes; 0.0003 Hz) seem to produce the peak anomaly in the cases studied. Although many geomagnetic storms traverse a wide band of peak frequency variations in the course of their short existence, such time-varying dependence may be a source of local variance.

Application to Fortean Phenomena

From an ecological and global biological perspective, sudden changes in the geomagnetic field would be expected to induce or be associated with changes in species behaviour. As mentioned, life forms have emerged within the context of the earth's magnetic configurations and variation in these should induce low level changes which would be invisible at the level of the individual but obvious at the level of the group or species.

Probabilistically, one would suspect that a sudden storm condition could influence the susceptible group of organisms distributed over large areas. Group organisms *already* predisposed to "unusual" or related behaviours due to excessive population demands or physiological contingencies would respond to the sudden magnetic storm condition or the meteorological concomitants as a precipitating stimulus. An example might be the sudden appearance (synchronized "metamorphosis") of invertebrates as suggested in Figure 62. Since the same stimulus is applied to a

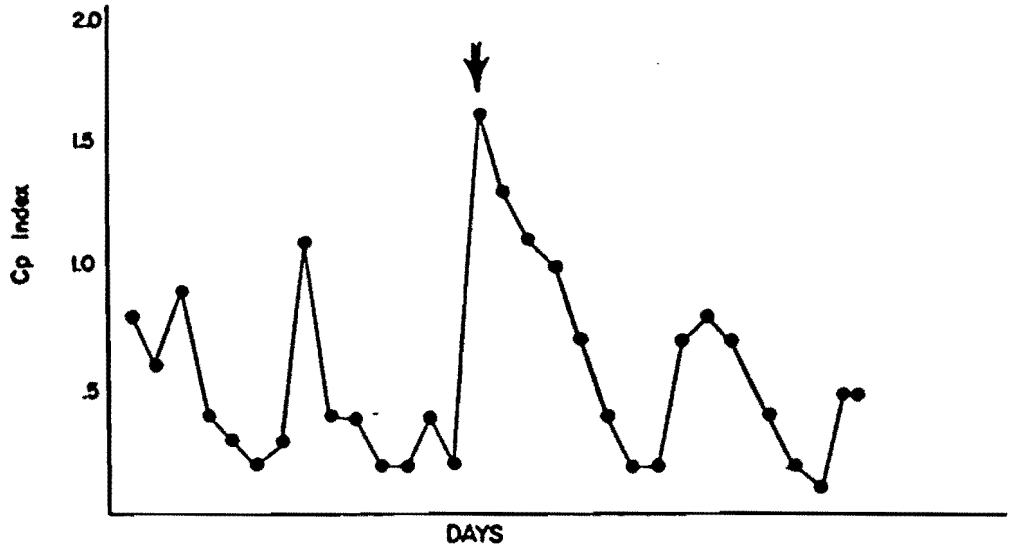

FIGURE 62. The sudden appearance of excessive numbers of caterpillars and army worms in portions of the United States during June 2, 1953, (arrow) with respect to global geomagnetic field activity (as measured by the Cp Index) for days before and after the event. Reports indicated that hordes of caterpillars halted the operation of the New York Central Railroad for 35 minutes, while "millions" of army worms devoured the clover crop in Jackson County, Indiana (after L. Gearhart, private communication).

large area, a similar change in behaviour within a large number of organisms would be more obvious to the human observers. If the storm (and its temporally correlated stimuli) had not occurred, the behaviours may have been less synchronized in time, less obvious to the observer, and produced by different stimuli in different localities during different time periods.

A similar argument could be applied to sudden increases of unusual or infrequent human-related Fortean events. In an extremely large population with a statistical number of unstable or susceptible human organisms, the extra environmental stimulus of sudden geomagnetic disequilibria might be sufficient to precipitate the bizarre behaviours or accident-related events at more or less the same time; the effect would be compounded by recruiting those population elements that are not only prone but have shown

increasing propensities to be prone to the unusual behaviours. As a result, the number of unusual cases above baseline would be increased, and more noticeable to the observer.

The usefulness of studying geomagnetic storm records in context of Fortean phenomena does not terminate with only the cases of unusual animal behaviour. We have already noted that "flaps" or episodes of unusual events frequently occur following solar disturbances which in themselves elicit intense geomagnetic perturbations. Since both magnetic storm dates and periods of Fortean occurrences have been recorded for more than forty years, the empirical verification of their relationship, if any, is a matter of data preparation, computer time, and careful statistical analysis.

However, the existence of magnetic variation anomalies in real-world geophysics presents the study of Fortean events with another potentially important variable. The existence of these variations indicates that Fortean episodes may be dependent not only upon time of the triggering event but upon space as well. If indeed the major correlative factor behind unusual events is analogous to magnetic variation phenomena, then the precise prediction of a given Fortean episode would depend upon certain space-time properties or combination of these properties, as discussed in Chapter 1. Thus the time of occurrence would depend upon the optimal spatial characteristics and the space would depend upon the temporal characteristics of the geomagnetic variation.

Furthermore, there should be localities within which Fortean events occur statistically more frequently over many years of measurement. Areas which contain optimal conductive properties should remain relatively invariant in space, although their properties could certainly be modified by local geophysical changes such as structural stresses or secular-related variations. From these assumptions, one would predict concentration areas for some Fortean events to overlap with areas prone to transient magnetic anomalies. Such a prediction is testable and appears to have support from the general pattern of event distributions.

The central issue of transient geomagnetic field variation-like occurrences in Fortean-related phenomena rests upon some

mechanism capable of momentarily localizing intense physical conditions (for example, ground currents) within a prone area. Although Fortean phenomena can include spatial areas of considerable magnitude, most are relatively localized to a few meters or hundreds of meters, at any given time. For a short time the susceptible area would have to exist within a kind of magnetic field "lens." One might expect many types of electromagnetic variations (power failures, unusual receptions, modifications in electrical apparatus or conductors/dielectrics, local changes in atmospheric electric field gradient with consequent modifications in charge attractions, water condensation and "clouds"), similar to those discussed in the previous section on tectonic and pre-seismic sources. It is difficult to predict the upper limit of the physical quantities involved with the transient anomaly. Interestingly, Gearhart (1975b) has reported that his collection of SHC and poltergeist cases seem to occur with large scale geomagnetic deviations. The mechanisms for such phenomena are presently obscure.