

Guy Beckley Stearns, M. D.

*and*

Edgar D. Evia

---

THE PHYSICAL BASIS OF  
HOMOEOPATHY  
AND A NEW SYNTHESIS

★

ROY & COMPANY  
Princess Street, Bombay 2

*Guy Beckley Stearns, M.D.*

*and*

*Edgar D. Evia*

---

THE PHYSICAL BASIS OF  
HOMOEOPATHY  
AND A NEW SYNTHESIS



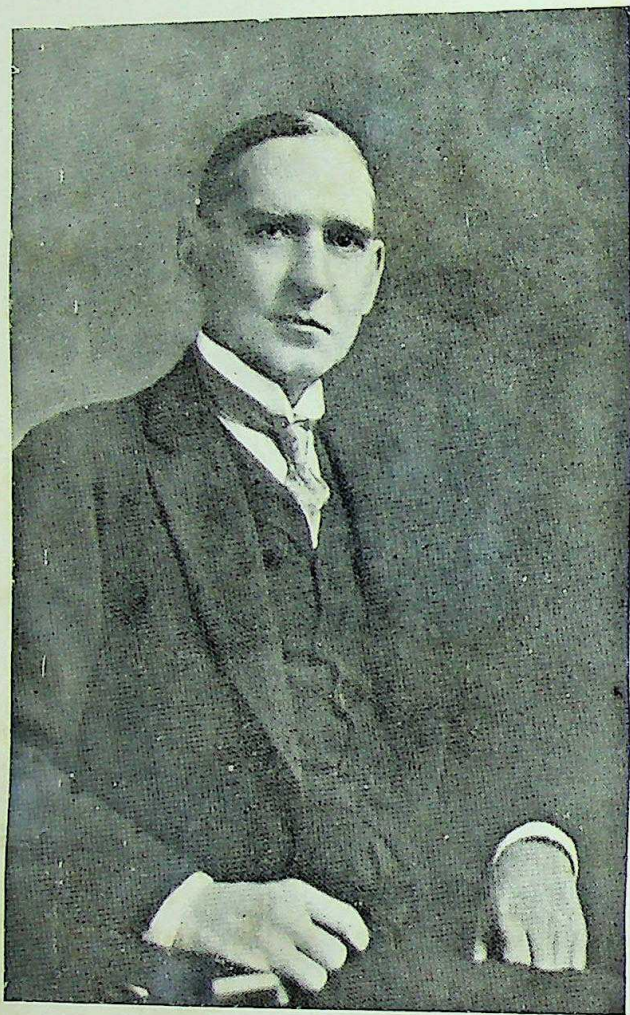
ROY & COMPANY  
Princess Street, Bombay 2

*Printed by*

B. G. DHAWALE  
KARNATAK PRINTING PRESS  
Chira Bazar  
Bombay 2

*Published by*

MANOHAR ROY  
Roy & Co.  
Princess Street  
Bombay 2



GUY BECKLEY STEARNS, M. D.

## FOREWORD

The years 1880 to 1920 saw the rise of Homœopathy with its symptomatic approach, and the succeeding years witnessed its decline with the impact of modern pathologic approach. A renaissance of Homœopathy became necessary and the task was undertaken and accomplished by the late Dr. Guy Beckley Stearns. In an obituary, Dr. William Gutman, President of the Foundation for Homœopathic Research, Inc., New York, said of Dr. Stearns as follows :—

“He was the first who tried to prove experimentally the effect of high potencies through animal experiments, using guinea pigs and fruitflies.

“When Abrams reported his findings concerning body reactions and their evaluation, Stearns became immensely interested in this field. He recognised that such reactions could have nothing to do with electronics, but must be reflex-reactions transmitted through the autonomic system. The body reflexes aroused his interest. Again, he was the first to introduce the scientific development of these new conceptions, as expressed by the work of Boyd in Glasgow, into American homœopathy. He was the first to use Boyd’s emanometer in this country (America). As an outgrowth of all these endeavours, he established the Foundation for Homœopathic Research for a systematic study of all reactions of the autonomous system toward potencies.

“Finally, in a book, *A New Synthesis*, written together with Edgar D. Evia, he gave a summary of his medical, biological, and philosophical conceptions. It contains a great number of most interesting facts and a comprehensive philosophy of important aspects of homœopathy and general biology—pointing far into the future.”

*A New Synthesis* appeared serially in *The Journal of the American Institute of Homœopathy* from March to June, 1942, and we are taking the liberty of republishing it, along with *The Physical Basis of Homœopathy* by the same authors, which appeared in the February 1942 issue of the *Journal*, as it is of permanent interest to the homœopathic world.

ROY & COMPANY

10th April, 1960.

## CONTENTS

	Page
FOREWORD	iii
THE PHYSICAL BASIS OF HOMOEOPATHY	1
REFERENCES	20
A NEW SYNTHESIS	
1 The Birth of the Universe	23
2 Purposeful Life	24
3 The Birth of Life	26
4 The Adjustments of Life	28
5 Dowsing	33
6 The Work of Abrams	39
7 Boyd and the Dynamis	45
8 The Dynamis and Parapsychology	61
9 Physics and Creation	65
10 Summary	73
11 Medical Aspects	75
THINGS TO DO	
1 Retrospect	77
2 Tissue Tonus	79
3 Other Reflexes	88
4 Conclusion	91
REFERENCES	97
INDEX	100

## THE PHYSICAL BASIS OF HOMOEOPATHY

Q. Jowett  
2/11/81

I

**W**HAT, exactly, is a homœopathic potency ?

And by what mechanism does the human body respond to the potentised drug ?

Both these questions have had but scant place in modern scientific investigation. Yet they represent the foundation upon which the homœopathic system is based. Even Homœopathists know little about the dilute drugs they dispense or the mechanism underlying the response of their patients. Orthodox physicians and a great many Homœopathists themselves have questioned all but the lower potencies. There is much skepticism about drugs diluted to more than a millionth or a hundred millionth. Yet Hahnemann, who discovered Homœopathy, regularly used drugs in a one-decillionth dilution, and history records that he was extraordinarily successful. Von Boenninghausen, his pupil, who used much higher potencies, was one of the greatest healers of his time. Evidently, the question of potency cannot be dismissed on the basis of one's opinion. It must be scientifically investigated. As for the body's response, it has been credited to suggestive factors or to spontaneous recovery. The same Von Boenninghausen was often asked to prescribe for sick animals, and he records<sup>1</sup> that when he gave them the high potencies at which so many doctors of the day scoffed, the animals recovered more promptly than ever. In this way, he thought he had disposed of the criticism that the cures were the result of suggestion, since it would be difficult for a physician sending a remedy by messenger to suggest to the animal, or for the animal to suggest to itself. Von Boenninghausen was too naive. By the average doctor, Homœopathic or Allopathic, this part of his work was soon forgotten. L  
x

We are obliged to re-examine this double aspect of Homœopathy in the light of the newer science. For this

purpose, the Foundation for Homœopathic Research was established in 1918.

## II

1) The problem of potency (especially high potencies) has been a stumbling-block ever since Hahnemann's day — principally because, since then, potentization has never been approached *de novo* with a mind open to all the relevant facts. High potency Homœopaths have clung tenaciously to Hahnemann's purposely non-committal expressions: "spirit-like" and "dynamic." They claim that as an imponderable a potency is incapable of scientific analysis. 2) Physicists examining the problem are, however, unimpressed by nomenclature. They find the potency hypothesis incompatible with physical facts. For this reason, it is futile for the Homœopathist to insist that potencies have been giving him clinical results for over a century. These two concepts, the vitalistic of the Homœopathist and the materialistic of the physicist, are the two extremes. Which comes closer to reality?

“ Briefly, the physical facts are these. A potency appears to be a progressive dilution through geometrical stages. Each potency stage reduces the amount of original material (solute) in proportion to solvent. After several stages the solute becomes very thinly distributed, just as the color of a dye becomes fainter the more water is added.

Mathematics indicates that, when the dilution is prepared in ten separate vials according to Hahnemann's instructions, none of the solute can remain in a dilution beyond the 10th centesimal. The use of a single vial to run up a potency is not permissible, due to absorption of solute by the glass and subsequent release back into solution — the so-called oligodynamic effect.<sup>2</sup> As Wm. E. Boyd points out,<sup>3</sup> “ a subdivided cube divided in decimal stages will have, at the ninth stage, particle about  $0.01\mu\mu$  in length of edge. The estimated diameter of one hydro-

gen gas molecule is  $0.067\mu\mu$ , while that of the NaCl molecule is  $0.26\mu\mu$ .” That is, the particle size in a 10th potency is smaller than the dimensions of the solute molecule, implying that that molecule has suffered fragmentation. But molecular fragmentation would at once destroy the characteristics of the substance, and these characteristics would be replaced by those of whatever component atoms happened to remain at that particular stage of dilution.

Yet for over a hundred years Homœopaths have been using and deriving benefit from potencies much higher than the 10th, and it has been their experience that the same indications are called for in using Arsenicum alb. 30th as 6x — and this despite the conclusion that the molecule of Ars. alb. ( $As_2O_3$ ) evidently cannot survive the 10th potency.

The physicist must at once make a bold adjustment of attitude. To him “ potency ” is a nebulous label for “ dilution,” and “ dilution ” means a *more or less* dense distribution of one phase (solute) in another (solvent). Now, since there is no way of accepting the presence of solute molecules in potencies above the 10th, and since these potencies nevertheless retain a characteristic solute effect, suppose that these potencies are not dilutions in the usual sense but express an entirely different function of matter? What is this function, and amongst which phenomena must we search for its illumination?\*

Two interesting approaches to the problem are offered by the work of E. Pfeiffer on crystallization and Bridgman's investigations into high-pressure effects on ice. PFEIFFER These approaches typify a group of diverse phenomena related to the potency question. They involve certain aspects of the behavior of different kinds of molecules to one another.

It has long been known that soluble substances tend to crystallize in characteristic patterns and that the presence of impurities modifies the typical crystal pattern. Even

\* For the present, the enquiry is restricted to physical phenomena. The reality of biological high potency effects will be taken up in the following section and, we hope, proved.

traces of impurities profoundly affect appearance, physical structure, and other properties.\* Pfeiffer's experiments stem from this fact; Bridgman's are less directly related to it, but not less significant. In each case, the essential factor was the molecule as a whole rather than its constituents. Let us, therefore, review at once certain fundamental facts about material particles.†

In nature, all substances are compounded from 92 basic elements. These elements, in their simplest states, exist as atoms. Usually atoms of a pure element tend to cling together in groups of two, three or more rather than to stand alone. Such clustering results from electrical charges leaking from within the interior of the atom: "residual charges," as the physicist says. It is the amount and kind of charges in relation to one another that determine whether adjacent atoms will cluster, the shapes of the clusters, or whether the atoms will repel one another and remain unwedded (rare occurrences). Since an atom is in constant random motion, the presentation of its electrical facade to another atom for attachment is partly directed by the laws of chance. Atoms may unite, as mentioned, with others of their own kind — forming groups that contain several atoms of the same element — or they may unite with atoms of entirely different elements — forming motley atomic groups of which most, indeed, of our familiar substances are composed. Any clustering of

\* J. Alexander<sup>4</sup> lists some interesting cases. In paper manufacture traces of iron in the digester discolor the whole batch. The sense of taste can detect one part of copper in a million of coffee. The properties of metals are altered by impurities, and this fact is turned to advantage in the preparation of alloys. For instance: .05 per cent of lead renders gold brittle; the conductivity of copper is reduced 39 per cent by the addition of .216 per cent of arsenic; one part of carbon to 10,000 of iron causes changes in property; and iron containing as little as .01 per cent of sulphur is useless as a catalyst.

† For simplicity the present survey will treat atoms and molecules as units without going into the details of atomic structure, in which originate all molecular and atomic electrical phenomena. It will be understood that the electropositive and electronegative ions provide the chief factors for the formation of the atomic and molecular aggregates here described.

two or more atoms, of the same or dissimilar kinds, into a larger physical unit is called the *molecule*. And the *molecule appears to be the significant unit in the phenomena of potentiation*.

Much of the internal electrical charges which leak out of an atom and enable it to form molecules is used up in the act of clustering. Some, however, remain "unsatisfied" despite the clustering and form a further residual field weaker than the original but sufficient to permit the molecules to adhere into still larger groups. Molecular communities of this type, often exceedingly complex, are known as "molecular aggregates." They are sometimes large enough to be visible, as in the case of crystals, which are really vast clumpings of invisible crystalline units. Since molecular aggregates cohere by means of feeble end-residual charges, they are relatively unstable except under restricted conditions, much more unstable than single molecules, which in their turn lack the powerful cohesion of the atom, in which all the attractive forces have their birth.

Each kind of atom or molecule presents a characteristic set of residual charges. Hence, union of molecules into molecular aggregates tends to form structural patterns that are typical for each material; another material, shaped by different residual forces, possesses quite a different structure. That is why approximately pure crystals of a substance always take the same pattern provided conditions are the same. Impurities, however, added to a homogeneous particle system introduce new electrical factors of their own which modify the cluster-tendency of the original molecules. Hence the changes in property suffered by a substance containing impurities. These facts should be kept in mind in relation to what follows because they are intimately linked to the mechanism of potentiation.

The work of Pfeiffer<sup>5</sup> mentioned above had a curious start. In Switzerland, he observed that frost patterns on a butcher's window were angular and chaotic whereas those on a florist's window were graceful and fernlike even as the plants in the store. Pfeiffer's philosophy included a concept of "formative forces" directing the structure

and properties of substance. In part, of course, the "formative forces" are the electrical agencies described in the previous paragraph. He began experimenting with artificial frost-patterns and found that their shapes were profoundly modified by impurities. Presently he turned to mineral crystals, which were more easily controlled. He found that a pure copper chloride solution gave a constant crystal formation when the environment was fixed. He then deliberately introduced impurities and found that the resultant modifications of the normal copper chloride pattern were always characteristic for the material added. This was also the case for added blood. In fact, the crystallization differentiated between human blood and blood from every species of animal. Finally, Pfeiffer by very painstaking techniques discovered that there was a typical copper chloride crystallization for healthy blood. And blood from an ill person further modified the crystal pattern and did so differently depending on the disease from which the blood donor suffered.

This resulted in a new and extremely sensitive diagnostic procedure. Patient's blood was added to a dilute solution of copper chloride. This solution was crystallized in a petri dish. The crystal patterns within the dish were then studied in the light of ample clinical experience, and thereby one could make a surprisingly accurate diagnosis. By observing the disposition of the crystals with reference to the perpendicular axes on the dish, it was even possible to conclude where the illness was localized. Thus the crystal distribution on the dish represented the patient as a whole. Fantastic as this technique may sound, it stood up under test at the Hahnemann Hospital in Philadelphia, where the results in testing for cancer were more than 80 per cent correct.

Pfeiffer decided to investigate the influence of dilutions on the copper chloride crystallizations. As he added substances in increasing dilution he found that the modified crystal pattern became more delicate. It also became more susceptible to random influences, and he was obliged to refine his technique. Eventually, however, he obtained

crystallization effects from added substances in a  $10^{-30}$  dilution (15th potency). This is far beyond the point ( $10^{-20}$ ) where the solute molecules would have to be subdivided for perpetuation of solute according to physical theory. And the same kind of crystal pattern occurred whether the impurity was added in medium concentration or as an ultra-molecular dilution, just as the indications for a homœopathic drug remain unchanged regardless of the degree of potency in which it is given, low or high. Only that a high dilution crystallization produced a far more delicate crystal structure, and one more susceptible to irrelevant factors.\*

On the basis of Pfeiffer's work we may now make two important generalizations: (1) An ultramolecular potency is capable of producing a distinctive effect which can be demonstrated in a physical fashion such, for instance, as crystallization. (2) Here also is definite reinforcement of our earlier assumption that the ultramolecular potency is not a regular "dilution," that it never involves molecular fragmentation, but expresses instead a different function of matter. The second point will be further corroborated later.

Similar to Pfeiffer's early work with frost crystals was the hobby of W. A. Bentley of Vermont, who spent his life photographing snowflakes. He has left a monumental work<sup>6</sup> showing the infinite variety of flake patterns. Although all flakes form a six-pointed star, the tracery, the detail of each flake is different; even a single storm probably does not yield two identical flakes. The pattern formation of snowflakes is considerably influenced by environment—i.e., atmospheric impurities, atmospheric electricity, variations in ground radiation of the type involved in dowsing,<sup>7</sup> temperature, humidity, and so forth. Another influence of course is interparticle electric forces and also the chance manner in which minute crystal cores unite to form the larger, visible snowflakes. But the

\* The concentration of copper chloride solvent (the detector) always remained the same for a given test, varying in different experiments between 5 and 20 per cent.

dominant factors affecting the natural flakes are coarse compared with the highly attenuated impurities used by Pfeiffer.

As one studies Bentley's published collection of over 2000 photographs of flakes, it is interesting to observe how the tracery in individual cases reminds one of various plant or flower forms. One cannot help wondering whether the roots of last season's growth or the seeds about to sprout in spring do not exert a formative influence on the details of flake structure.

It is not a fantastic thought. Pfeiffer's published crystallization pictures<sup>5</sup> show clearly that the factors in a plant determining its structural arrangement tend to reproduce that structural plan in the crystal patterns when plant extract is mixed with the copper chloride solution. Pfeiffer himself says: "It is easy to discern a relation between the crystallization forms and basic forms of the plants themselves.... It is undeniable that each plant extract produces an individual typical form." Thus, the straight spiked leaves of the century plant (*Agave americana*) are reproduced in the sharp, thin, concentric needles of the crystallization; whereas waterlily flower extract (*Nymphaea*) produces a plumelike, closed arrangement. In a lecture Pfeiffer once showed crystallizations of a straight healthy pine and of a pine twisted as a result of disease. The difference in the form of the trees was clearly reproduced in the crystallization, showing how powerful are the formative agencies at work. These agencies are evidently precursors and directors of the physical configuration in the case of plants as well as of human beings. Moreover, crystallizations of wheat, potatoes and other foodstuffs indicate the quality of the plant by the crystal pattern. Healthy, vital plants invariably give sharper, better defined, and more regular patterns.

The formative factor, as we have seen, is partly the particle electric charge of solute modifying the particle charge of solvent, with ultimate rearrangement of crystal orientation. But the formative factor is also more than that. An ultramolecular potency contains no solute parti-

cles. Nevertheless, it continues to manifest an effect which bears the impress of original solute, as if the solvent had been permanently modified by a formative agency from the solute. And it is with this permanently modified solvent, representing a hypothetical dilution of  $10^{-30}$ , that Pfeiffer succeeded in obtaining altered crystal patterns.

Langmuir<sup>8</sup> of General Electric evolved a technique similar to Pfeiffer's. He observed changes of stearic acid crystallizations in the presence of minimal amounts of impurities. The stearic acid was deposited as a monomolecular film on the surface of water in which the impurities were dissolved. The acid was then scooped up and crystallized. Each kind of impurity characteristically modified the normal stearic acid crystal formations. Just as Pfeiffer elaborated a diagnostic procedure with regard to blood, so Langmuir elaborated a diagnosis of the impurities present in water. The diagnostic reagent was the crystallizable stearic acid. From the crystal arrangements it was possible to tell what were the impurities in the water. And the method was delicate enough to detect one part of aluminum in 500 million of water. LANGMUIR

Both Langmuir's and Pfeiffer's discoveries collide at the same spot. But there is one difference, a difference of degree. Langmuir's aluminum-water ratio of one to 500 million is not quite a fifth centesimal potency: it is well within the molecular phase. Pfeiffer however attenuated beyond the ultramolecular frontier (as high as  $10^{-30}$ ). Thus Langmuir's results, involving the constant presence of what are effectively solute particles, can always be explained by comparatively gross physical factors (residual electronic fields, etc.), whereas Pfeiffer's achievement requires a more complicated scaffolding. In effect, Pfeiffer has taken the high potency, derided by orthodox physics and by Homœopaths who should know better, and has physically demonstrated its two outstanding characteristics: its effectiveness beyond the ultramolecular frontier; and its conservation, beyond that frontier, of characteristics which theoretically should have disappear-  
1)  
2)

ed with the last solute molecule in the process of potentization.

We are now justified in asking : What possible impress could be carried by the mobile molecules of solvent ? So long as solute particles remain, they exist either in solution or as colloidal dispersions. Eliminate them, however, and what remains except sterile solvent ? Until recently physicists considered the very nature of liquids to be structureless, because of the wide, disordered orbits of their molecules in thermal agitation ; yet the retention of an impress would seem to require the rigid structure of a solid body. These interrogations are important. Let us carry them a step further and ask : What is the proof that liquids are structureless ?

There is, as a matter of fact, no such proof. But many experiments suggest on the contrary that liquids possess some sort of large-scale molecular organization. Bridgman,<sup>9</sup> working with ice under high pressures in carefully constructed pressure chambers, found that at various levels of increased pressure the ice crystals underwent sudden structural changes. As these changes occurred in a fixed order with rise of pressure and at definite pressure levels, he numbered them consecutively 1, 2, 3 ... and so on. Then he discovered that if ice in one of the median pressure-states was melted back to water, upon refreezing at the same pressure the crystals snapped at once into the structure normal for the pressure *without passing through the state regularly preceding* ; that is, ice type No. 3 formed at once without first going into type No. 2, which it would invariably do when frozen from fresh water and subjected to ascending pressures. Another way of saying this would be that the water melted from the ice retained a memory of the structure it had acquired under pressure, an impress of the abnormal frozen state, and was able to reassume that structure by skipping an intermediate stage. When water was allowed to stand more than several hours it lost the impress. =

= Note the analogy with the impress which the solvent in a potency retains from the solute. The analogy is

extraordinarily close with respect to an ultramolecular potency, which bears an effect after the solute has disappeared — again figuratively, the “memory” of an impurity that was. Bridgman's water bears the memory of a state, not of an impurity. Both cases are alike in that they articulate a modifying agency not associated with the gross physical influences that accompany an impurity in solution. The modification, the “memory”, is somehow linked with the structure of the liquid.\*

As regards the physical structure of liquids, more direct evidence has been lately uncovered. Liquids are usually considered to be amorphous ; that is, the molecules of a liquid are said to be oriented at random with respect to one another instead of being arranged in a regular space lattice as is the case with crystals. Recent work with X-rays however has shown that most substances formerly supposed to be amorphous, such as metals, are not so ; and J. Alexander,<sup>10</sup> speaking of the X-ray diffraction patterns† which are always obtained from materials with structural orientation, says that “Even liquids produce diffraction halos indicative of transient molecular arrangement in the course of thermal agitation.” Such molecular arrangements are basically determined by the physical composition of the liquid plus the influence of dis-

\* It should be recalled that Swan prepared the so-called “imponderables” by placing a substance to serve as vehicle in the path of a radiation and then proceeding to potentise the vehicle. Thus were born such members of the homœopathic materia medica as “Sol” and “Luna”, reputedly beneficial for those aggravated by the sun or at full moon. Swan's solid vehicle could as readily assume an impress as the solvent of a homœopathic potency or as Bridgman's water. It is not necessary for the vehicle to be liquid, and theoretically Swan was justified in exposing sac. lac. instead of the usual water or alcohol.

† This is accomplished by sending an X-ray beam through the substance to be studied and catching it on a photo-sensitive plate, where it develops an image. Whereas material particles in orderly arrangement scatter the beam in definite and characteristic patterns, true amorphous structure scatters the beam uniformly, resulting in a shapeless fogging of the plate.

solved impurities ; and the actual molecular orientations would be a compromise between the attractive electrical forces and the dispersing kinetic activity of the molecules.

That structure exists in liquids helps to explain the Bridgman effect with ice. Reciprocally, if no other evidence were known, the Bridgman effect would lead one to suspect that liquids, at least under certain conditions, were capable of specific molecular arrangements. Crystal formation likewise depends upon structural elements — i.e., upon the interaction of solute and solvent electric charges.\*

So far, the cardinal objections to the whole problem of ultramolecular potencies have been the arithmetical calculation showing that molecules cannot survive the 10th centesimal potency ; the inability of physical instruments such as the spectroscope to demonstrate characteristic solute effects in such high potencies ; the unreliability of scattered and uncontrolled clinical results where such potencies were administered ; and the lack of imagination on the part of students in collecting the relevant evidence from varied sources.

But the establishment of molecular orientation in liquids provides a theoretical outlet. It is now clear that changes in molecular orientation unaccompanied by chemical effects are demonstrable through the crystallization technique. Probably X-ray diffraction studies would further illuminate the subject. In this connection it is significant that E. Heintz<sup>11</sup> has succeeded in obtaining variations in infrared absorption spectrums when the beam was passed through different potencies of the same substance. There was alternation of effects over a series of potencies : for instance, in the case of Natrum nitr. maximal effects occurred at decimal potencies 9, 14, 18, 21, 23, 26, 28, and minimal effects at 10, 16, 19, 22, 25, 27 and 30. As

\* The influence of the solvent on the crystallization must not be overlooked. For instance, the crystallization of a copper chloride aqueous solution presents a different crystal formation from the crystallization of a copper chloride alcohol solution. In each case, the crystal configurations depend upon the total of factors.

Heintz pitted these tests against the absorption spectrum of distilled water, there is no doubt of the importance of his results, particularly with the potencies beyond the 20th decimal — i.e., in the ultramolecular region. — These facts all suggest the ability of a liquid to assume a structural impress or "set" which can be maintained after the impressing agency has been withdrawn.

What actually takes place in a potency may now be visualized thus. Upon the introduction of salts or of particles small enough to undergo suspension, the solvent ion charges are at once reshuffled by the presence of solute charges, resulting in the formation of new molecular aggregate patterns. This is the beginning of the molecular "set". So long as solute remains, the "set" is maintained chiefly by the electrical activity of solute particles. But the solvent is able to perpetuate the "set" without solute assistance, as shown by the fact that an ultramolecular potency continues to give a characteristic modification of crystal pattern and also carries on the alternation of effects shown by Heintz's infrared spectrograms. Once, indeed, a solvent has acquired a "set" it tends not only to preserve it unaided throughout its own volume\* but to communicate it to fresh, sterile solvent. This process of communication, or reinfection, is peculiar. Wm. E. Boyd working with the Emanometer has shown<sup>12</sup> that unless succussion is used in the preparation of a potency

\* To Wm. E. Boyd we are also indebted for the proof that dry heat applied long enough to an ultramolecular potency dissipates its characteristic activity and, presumably, destroys the molecular "set" impressed by the solute. Heat is a form of energy especially associated with the kinetics of molecules, another indication that high potency effects are connected with the molecular activity of solvent.

Dr. Wm. Powel once observed that some of the 200th potencies in his clinic, kept over a radiator, became inert and had to be replaced with fresh potencies before they could be effectively prescribed. This corroborates Boyd's findings in a clinical way and shows that a potency pronounced inactive by the Emanometer technique is also inactive clinically. It also points out to skeptics that the factors detected by the Emanometer are the same that operate in regular homœopathic prescribing. //

its activity soon disappears — presumably after the ultra-molecular point is passed. Evidently succussion provides part at least of the energy required for the infection of sterile solvent by the molecular "set" of the solvent in the preceding potency stage. Moreover, the kind of kinetic energy conferred by succussion is of the coarse order that would reach chiefly the molecules and molecular aggregates.

The actual mechanism of such infection is still obscure, but it might be patterned after the action of autocatalysts, which are capable of duplicating themselves by absorbing from the environment in a fixed order the successive molecular subunits necessary for the creation of an identical whole. The new unit, upon completion, is released, the process continuing until the available subunits are used up.<sup>13</sup> Although autocatalysts are generally complicated bodies like the enzymes, the molecular aggregate of a liquid is conceivably labile and complicated enough (much more so than inorganic single molecules) to possess the power of reduplication. Labileness is essential (else the molecular aggregate would resist modification) and is especially characteristic since the aggregate is bound together by the weakest of cohesive agencies, by "left-overs" from the electrical forces cementing the molecular units. And a complicated structure is important in this case because of the infinitude of rearrangements it is able to assume without changes of a chemical nature.

The fact that all high dilutions of a given substance preserve its essential characteristics implies that the set given to the solvent molecular aggregates imitates in some fashion the configuration of solute molecules, just as different moulds would each press its image into different lumps of soft clay. Clay however would retain a reverse impress, whereas, to continue with the analogy, the solvent always carries a positive impress. After all, in the biological world it is a commonplace for the offspring to bear certain parent characteristics transmitted through the physico-chemical activity of the genes, and a similar behaviour is

not impossible for inorganic substances. Thus, a recreation or imitation of an original pattern (i.e., the solute pattern) appears to take place amongst the molecular aggregates of the solvent. This imitative configuration is of a spatio-temporal nature, a true mimicry in orientation on the part of the molecular aggregate, just as the original set of genes in the fertilized ovum is duplicated in every cell of the completed creature. It would be difficult to conceive how, otherwise, the solvent could reproduce the solute characteristics.

It is necessary to emphasize one very important fact brought out by Heintz in the experiments mentioned earlier. This is the rhythmical nature of potency effects — alternation of increased with decreased potency activity. In the case, of purely objective experiments the rhythm seems to differ with the technique. Thus Pfeiffer has also encountered fluctuations, but they do not coincide with Heintz's. Boyd, working with his Emanometer circuit, has demonstrated another cyclic behaviour associated with progressive changes occurring in a single potency when it is succussed a varying number of times.<sup>12</sup> Up to a certain number of succussions there is a change in activity appearing as a change in the tuning of the instrument; beyond this number the process is reversed until the original intensity is regained. The cycle can be broken by diluting further — i.e., by taking a drop of the working dilution and mixing it with fresh menstruum, whereupon a new cycle commences. The degree of fluctuation in each cycle seems to depend upon the energy of each individual succussion; a stronger or weaker succussion alters the rate of fluctuation. A separate configuration of these cycles was made from the biological side by W. M. Persson at Leningrad,<sup>14</sup> who found that in the case of specific substances there were definite alternations of effects in the activity of various enzymes. Boyd has corroborated these findings.<sup>15</sup>

Since the various cyclic effects are orderly, they reveal the operation of a progressive something in ultra-

molecular potencies. We have said that the mechanism of potency perpetuation is a change in the configuration of the solvent molecular aggregations and that this configuration, imitative of the molecular structure in the original solute, is propagated indefinitely under suitable conditions. If this imitated pattern were identical in each dilution, all dilution effects beyond the molecular point would be identical for any given series of tests utilizing the same materials. Persson in his work with enzymes would have obtained uniform instead of alternating effects. Boyd would have found no difference registered by his instrument amongst vials of the identical dilution each subjected to a different number of succussions. Pfeiffer writes that the higher the potency used in a crystallization the more delicate is the pattern and the more difficult is it to isolate the sublimated potency effect from gross influences of the environment.

How these infinitesimal potency gradations are yielded by the molecular structure of the solvent, we do not know. In part this is made possible by the complexity of molecular aggregates, permitting of many and slight rearrangements in time and space amongst its components. But the precise mechanism is obscure. We know little beyond the bare fact that a potency effect is progressive instead of random. The process of potentization involves a directional effect. And this is exactly what we should expect from clinical experience.

“These then are the facts which best explain high potencies at present. Briefly, such a potency is evidently not a dilution in the accepted sense but bears a “set” originally impressed by the solute on the molecular aggregates of solvent and transmitted from one potency stage to another, each new batch of solvent acquiring the molecular “set” of its predecessor through the energy made available by succussion. The reinfection of solvent in each potency stage entails the duplication throughout its volume of a specific molecular-aggregate pattern, perhaps after the fashion of autocatalytic duplication. So far as known, the

effect of a high potency, and hence the molecular “set” upon which it seems to depend, persist no matter how many stages of “dilution” are undertaken, provided always that some form of mechanical agitation takes place.”

We must wait to see whether further research will change the picture drawn here.

From the historical point it is interesting that Korsakoff, who was contemporaneous with Hahnemann's later years, advanced the theory that a series of high potencies owed its activity not to the continued presence of original particles but to the fact that each stage could infect the succeeding stage with a dynamic quality.<sup>16</sup> This was long before modern precise knowledge of atoms and atomic constituents, but the general theory of atoms had been already propounded by Dalton and his followers. Jaricot<sup>17</sup> and others have also come close to the potency concept described in this essay.

But, as we have seen, the labors of many men were needed to confirm Korsakoff's intuition. Pfeiffer went through his work with ice crystals and copper chloride. Langmuir discovered the sensitivity to impurities of stearic acid films. Independently, Bentley showed to what an extent snowflakes differed in the details of their form, although the basic hexagonal pattern remained the same. Bridgman uncovered the curious behavior of ice under pressure. Persson and Heintz, one from the biological and the other from the optical side, disclosed the cyclic activity of potencies. And Boyd, working with one of the most delicate of techniques, established as a physical reality aspects of high potencies which were unproved, or theoretical. From this convergence of research has emerged the concept of potencies described in this essay. For the first time we are able to rise above Hahnemann's purposely-vague phrase, “spirit-like.” We are beginning to graduate from a qualitative to a quantitative study. And the potency problem, no longer an abstraction, enters the domain of physics.

It is now time to devote our consideration to the biological aspects of potency activity. This ground will be covered in a second essay. The physical and biological commentaries should, however, not be separated in the mind. They belong together.

#### REFERENCES

1. C. von Boeninghausen : *Lesser Writings*, Boericke & Tafel, p. 238.
2. K. Kotschau : Experimental investigation of the high potency problem, *Jour. Am. Inst. Hom.*, 24 : Apr. 1931, 324.
3. Wm. E. Boyd : Electromedical research and homœopathy, *Brit. Hom. Journ.*, 20 : Oct. 1930, 304.
4. J. Alexander : *Colloid Chemistry*, 4th ed., New York, 46-51 ; *Colloid state in metals and alloys* (reprint).
5. E. Pfeiffer : *Formative Forces in Crystallization*, 1936 ; *Sensitive Crystallization Processes*, Dresden, 1936.
6. W. A. Bentley : *Snow Crystals*, New York, 1931.
7. J. Cecil Maby and T. Bedford Franklin : *The Physics of the Divining Rod*, London, 1939, esp. chap. V.
8. I. Langmuir and V. J. Schaefer : Effect of dissolved salts on insoluble monolayers, *Amer. Chem. Soc. Jour.*, 59 : Nov., 1937, 2400-14.
9. P. W. Bridgman : *Proc. Am. Aca. Arts & Sci.*, 47 : 439-560.
10. J. Alexander : *Colloid Chemistry*, 274.
11. E. Heintz : *Physikalische Wirkungen potenziierter Substanzen* (reprint).
12. See the various articles by Boyd in the *Brit. Hom. Jour.* beginning with Oct., 1922, esp. : *Pharmacopoeial difficulties in homœopathy*, 24 : Jan., 1934, 36 ; *The Boyd emanometer research and related physical phenomena* (reprint) ; *Potency variation*, 27 : Apr., 1937, 87 ; *Hahnemann in the light of homœopathic research*, *Jour. Amer. Inst. Hom.*, 28 : Mar., 1935.
13. J. Alexander : *Catalysts, catalyst-modifiers, life and the specificity of vital processes*, reprinted from *Biodynamica*, No. 54, 1939, 6-12.
14. W. M. Persson : The principles of catalysis in biochemistry and homœopathy, *Jour. Am. Inst. Hom.*, 23 : Nov., 1930, 1055-89.
15. Wm. E. Boyd : The action of microdoses of mercuric chloride on diastase, *Brit. Hom. Jour.*, 31 : Feb., 1941 ; Potency variation, *Brit. Hom. Jour.*, 27 : Apr., 1937, 87.
16. Quoted by B. Woodbury, M.D. : *Inter. Hahn. Assoc. Trans.*, 1925, 93.
17. Jaricot (abstracted by S. A. Klein) : *Jour. Am. Inst. Hom.*, 29 : Nov., 1936, 700-703.

A NEW SYNTHESIS

*J. J. ...*  
2/4/31

1. *The Birth of the Universe.*

IN order to understand the significance of life, it is necessary to go back even before the origin of life to the birth of the universe. This birth, and the subsequent story, have been reconstructed in the following way :

Once, the universe occupied but a fraction of its present volume. Since its substance was inconceivably condensed, the temperature was higher than anything possible today even at the hearts of stars (for temperature and density in these cases vary together). There were no stars. The universal stuff spread out uniform and undifferentiated. Whatever its unknown activities, it held potentially all that has since developed from it.

Then, this dense hot substance suddenly exploded, hurling the fragments of the universe radially outward. The explosion caused the material of the universe to expand ; hence the density rapidly became lower. And, following an immutable law, at once the temperature started to slide down. But the dropping temperature produced a further consequence : the material of the universe, still in the process of explosion and thinning rapidly out, began to assume the properties of a gas approximately as we understand a gas today. And in this thinning gas cores separated out. The gas clumped around the cores, leaving enlarging empty spaces between the clumps. These were the earliest stars, extremely hot and enormously big. By now the explosion had been going on for billions of years. And as the universe was actually exploding during all this activity, the distance between stars naturally increased — an expanding universe — and the temperature kept lowering and the substance of each star grew denser. All of these stars were in motion, about their axes and in relation to one another, due to kinetic energy acquired as a consequence of explosion.<sup>1</sup> And when conditions were favourable, some of these stars threw off fiery tentacles that encircled them, condensed and became planets. One of these planets,

the earth, even developed what would have been thought impossible by one observing the initial universal state of density and heat : Life. Somehow, life appeared on earth. It is there yet.

And as this life looks out toward the heavens, it perceives that the universe is still flying apart as the result of that original explosion billions of years ago. All that exists today possesses its present characteristics because of the structure of the universe, and this structure in turn goes back to forces and potentialities that were imprisoned within the hot, dense substance before the explosion. Even the life which peers out and speculates on its past and its future lay dormant in the primeval stuff.

## 2. *Purposeful Life.*

One thing is certain : life is no mere incident in geological history. The early atmosphere, for instance, had quite a different constitution from today's. It had no free oxygen, only the oxygen which had combined chemically with the minerals of the earth's surface. It probably had little free nitrogen. But it abounded in carbon monoxide and held also some prussic acid—two deadly poisons. The seas of the times readily absorbed these two poisonous substances. Yet it is in the sea that life is thought to have originated.<sup>2</sup> And it is the early dominance of plant life for hundreds of millions of years, breathing in carbon and exhaling oxygen, that gave to the atmosphere a carbon-oxygen balance capable of sustaining animal life. The composition of today's air is largely the work of life. Planets like Venus, whose atmosphere is devoid of oxygen but heavy with carbon, probably do not support any but vegetable life, if they support life at all. Such work as this, on a scale to rival the vast constructions of nature, can be no mere incident.<sup>3</sup>

The iron deposits of the Mesabi range around Lake Superior are the work of one of the oldest life forms, the autotrophic bacteria *Leptothrix*. This early life obtained its energy by oxidising iron ; other forms oxidized nitrogen,

sulphur, manganese, ammonia. For millions of years *Leptothrix* lived, perished, and sank to the bottom of the impoverished seas of the time, depositing its minute particle of iron. A huge accumulation of iron was thus built up, after the fashion of coral reefs, which represent the skeletal remains of untold billions of sedimented calcareous creatures. Eventually the bottom of the sea, bearing its burden of iron as laid down by *Leptothrix*, was heaved up by geologic convulsions. The seabed became an uplifted range high above water, the Mesabi range of today, one of the richest of known iron seams. In this manner have living organisms deeply scarred the face of the earth. Today that iron is mined, distributed, converted into structures and implements by means of which further changes are wrought on the earth's topography.<sup>4</sup>

But what of the incalculable influence of the plant kingdom, apart from its effects on the constitution of the atmosphere? Green things bind the soil, preventing erosion. Tracts of forest tend to attract clouds and provide natural reservoirs for rain.<sup>5</sup> The occurrence of rain deeply affects the weather, which is one of the most important of the agents in the erosion of both rocks and soil. Minerals are washed down to the sea by rain, and the mineral composition of the sea changes over a period of ages. The levelling of mountain ranges by the tireless effort of weather alters the equilibrium of the earth's crust, which actually floats on the denser but plastic substance of the core. This crust seeks a new equilibrium, and the result is the raising of new mountain ranges, the alteration of continental outlines and the redistribution of the seas. Plants naturally are not a primal agency in these processes, but they have played an important role in helping to determine geological topography. Although weather will determine what sort of plant growth is able to survive in any locality, the establishment of that growth helps thereafter to maintain the beneficent climatic conditions and their particular action on soil and rock.

Far from being incidental, life has actually helped to mould the physical configuration of the earth. For in the

accumulated generations of living creatures are unbelievable power and perseverance.

### 3. *The Birth of Life.*

'The life which has evolved on earth is peculiarly adjusted to its organic environment. This adjustment is an accompaniment of the somatic functions and takes place as spontaneously and unconsciously as physiological functions. It is natural for living creatures to be guided by responses whose mechanism is not obviously related to coarse, physical environment, just as the tangible phenomena of matter and radiation are related together by the properties of an invisible, "empty," but encompassing space.'

'The early results of such adjustment were the steps in the evolution of life from crude bacteria like the autotrophic *Leptothrix*. After eons of autotrophic domination, life took a step forward, and the earliest blue-green Algae scummed over the marginal waters. Further experiment led the Algae to develop chlorophyll — and, in the person of true, green Algae, appeared the beginnings of the oldest, most widespread and versatile of living creatures, the green plants.' But ages passed during which this moiling of early life was confined to the sea, while the coast stretched desolate, sterile, flaming with painted rock like today's Grand Canyon.

Then the early life differentiated itself. Part experimented with locomotion, gaining the independence conferred by motion and the ability to search after food in remote places when food was not at hand. In this manner appeared aquatic animals. Henceforth, life developed along two major lines: the vegetable, rooted and motionless, working with chlorophyll to manufacture its living substance out of sunlight, water and carbon; and the animal line, which invented organs of locomotion and sacrificed, in exchange, the gift of chlorophyll. <sup>6, 7, 8</sup>

'Animals also invented red blood, which is their substitute for chlorophyll. Nowhere is the ingeniousness of

life more evident than here. "The basic chlorophyll molecule holds a magnesium atom which controls the oxidation of foodstuffs and the accompanying release of energy. In red blood, this basic chlorophyll molecule reappears with only one change: the magnesium oxidizer is replaced by an iron oxidizer. Some animals, like the horseshoe crab, have invented blue blood, in which copper is the oxidizer instead of iron or magnesium. But the basic molecule of all bloods (green, red, blue), called hematin, is one in structure and differs only in the metal atom acting as oxidizer." Life is not only specific in its adjustments: it is resourceful, inventive, and can achieve deep changes by what appear to be small physical modifications. And in all probability the first of all bloods, chlorophyll, will also be the last to persist when the world is old and dying.'

Both plants and animals eventually invaded the dry, barren land. Soon the earth's surface teemed with countless creatures that had adapted themselves to new conditions. The constant process of adaptation resulted in a steady increase in the complexity of life forms, but the general goal of this complexity was a true economy of function. The same feats could be accomplished more easily, more smoothly. 'We know, looking backwards, how smooth, comparatively, is the operation of the human body, the pinnacle of past biological evolution along certain lines. It has lost chlorophyll, still possessed by plants; it no longer enjoys immortality, which the single-celled creatures still bear; it suffers spiritual agonies of which other creatures seem to be incapable; it is weaker than most comparable wild beasts. Yet these sacrifices have been made in order to gain advantages otherwise unattainable. Man thinks, constructs tools and changes the surface of the earth. He analyzes his position now, the story of past creation and its probabilities in the future. He moralizes. In some way, these achievements represent an economy, and increased efficiency of the energy exchanges involved in life, over the condition of early living creatures.

The progress of evolution is one aspect of the adjustment of life to its organic environment.'

#### 4. *The Adjustments of Life.*

Evolution was itself assisted by certain specific adjustments of living things ; for instance the migrations of various creatures. Everyone is familiar with the arrival of birds in the spring to our northern countryside, their noisy and joyful life throughout the summer, and their departure in the fall when the leaves are turning russet and gold — in some cases, so early in the season that the country is still warm and green and the food plentiful. These bird flights range from travel between neighbouring counties to the 11,000 mile span, performed twice yearly, of the Arctic Tern, and the 500 mile nonstop journey of the little hummingbird across the Gulf of Mexico.

No one knows the origin of the migratory instinct in birds. Generally, the flights seem related to seasonal changes that influence food abundance, comfort, and the sexual life ; but certain details are inconsistent, like the departure southwards of some species as early as July, before the climate changes or food becomes scarcer. The wayfinding of birds also remains inexplicable. Topographical signposts might assist the species which fly over the land by day — since the eyesight of birds is exceptional — but what about the species that travel by night or across hundreds of miles of ocean ?<sup>9</sup>

As remarkable as are bird migrations, the long journeys undertaken by eels to their breeding places are in some respects even more astonishing since there can be no physical milestones, no familiar topography, in the depths of the sea by which these creatures are guided. Yet the voyage of the eels is unerring along a route established through ages of repetition. For long, nothing was known about the breeding habits of eels ; only fully developed eels could be seen in the rivers of Europe and America. Where did they spawn ? What was the location of the newborn creature ? Why were spawning grounds never discovered even in the waters where the developed eels were most abundant ? At length the weird truth was discovered.

Seized by the urge to reproduce, the European eels pour out of the mouths of their rivers by the millions and swim out into the Atlantic. During the journey, their generative organs swell and reach maturity. For months the eels swim, without guide-posts except a deep sense of orientation which we cannot yet explain in terms of physiology or physics. Finally, they reach a region near the Bermudas and the northern boundaries of the Sargasso Sea. Here the spawning takes place. Billions of eggs are fertilized which develop into the eel fry. What happens to the parents after the orgy of reproduction is not known. They disappear. And the young eels, after a long period of growth, return to Europe, aided by the strong currents of the Gulf Stream. In their millions they reinvade the rivers and estuaries left by their parents. But one day they will mature ; they will become restless for the deeper waters of the Atlantic ; and they too, fired by the generative instinct, will seek the same regions near the Sargasso where they were spawned. The American eel swims to a spawning ground close to that of its European cousin, but its journey is only one fourth to one fifth as long.<sup>10</sup>

The eel, as well as the bird, is in some manner polarized to its environment. Some think the faculty in birds is related to the earth's magnetic field ; and the fact that pigeons released near powerful radio stations are confused and find it difficult to orient themselves is adduced in support. Other evidence indicates that the explanation may be less obvious. For one thing, terrestrial lines of force change their direction over short periods and criss-cross many times the longer routes of birds and eels. Migratory creatures must take their bearings on a constant rather than a shifting factor. Whatever the tropism, whether to magnetic lines of force or other directional agents, it requires a physiologic mechanism which may be the involuntary muscle fibers. It is evident that no ordinary sensory faculty is involved. The polarization no doubt arises from the deepest aspects of being. And such migrations are found amongst numerous other creatures : whales,

turtles, lemmings, certain insects, and salmon and shad, and eared seals.

In addition to this type of orientation, which regulates the food, the periods of the sexual life, and adjustments to climatic changes, there exist many other types through which animals are guided. The cat, dog and horse are frequently able to find their way back home from great distances over paths they have never taken before. A bee transported half a mile from its hive in a covered box will, upon its release, regain its hive — it must find its own hive as it would be torn to pieces by the infuriated bees of a strange colony. Man himself is occasionally gifted with a "sense of direction" to guide him where the ordinary fellow would be lost, and it is interesting that this gift occurs most commonly amongst people in intimate contact with nature, like the American Indians.

Certain of the awarenesses underlying orientation are so sensitive and developed that the activities of the creature appear to us to be highly intelligent. The intelligence displayed seems to be different from the deliberate, conscious rationalization of human beings. The social insects are the outstanding examples of this class. Fabre has immortalized the indefatigable ingenuity of the ant. More recently, however, entomologists like Marais have shown that the termite is equally ingenious.<sup>11</sup>

Each termite is subordinated to the exigencies of the whole colony, exactly as individual cells of the human body, despite their separate existence, work for the good of the whole being. The termitary is revealed as a complex organism undergoing constant maintenance and repair at the hands of the constituent "cells," the termites proper, which likewise protect the colony against invasion. And the total effort is integrated and made "conscious," as it were, by the queen termite sitting in her chamber in the depths of the termitary, which she can never leave: just as the human brain distributes its orders from the dark cavern of the skull. If the queen is destroyed, the colony is at once smitten by confusion and finally chaos; and unless another queen is soon found to take her place, the

community disintegrates. Some species of termites orient their structures with respect to the compass points, recalling the mysterious insect, the telephore, which always faces west during the mating season.

It is extraordinary that the work of the termitary is undertaken by utterly blind termites—they have no visual organs—whose instructions are issued by a queen possessed of sight but unable to make use of it from her buried, central prison. Yet in some fashion these insects are perfectly oriented to their environment and can meet the problems arising from it.

Beebe describes the extraordinary instinctive behaviour of the turtles on a lone Pacific island hundreds of miles from any other land, with a small beach on one side and the rest of the island mountainous. He went to the beach one evening when the turtles were laying their eggs. With lighted lantern, he observed one enormous mother turtle during her egg-laying session. She appeared to be entirely oblivious to him, as her front part was evidently asleep while, with her hind legs, she scooped out a deep round hole in the sand, each foot alternating with the other in a circular movement that scooped out the sand. At the same time, the walls of the hole were kept from sliding in by moisture sprayed out from inside her—and this moisture, Beebe felt certain, was not urine. In other words, her rear section was busy carrying on a function of great complexity, motivated entirely by instinct, while the other end was oblivious to everything. Beebe points out how remarkable is this behaviour in the light of the fact that no turtle can turn sufficiently to have the slightest idea of what its hind quarters look like; yet, with its rear flippers, it scoops out a perfect circular hole. And, the hole filled, the mother wandered away into the sea and the first waves of the rising tide washed the sand smooth. Another turtle had a large piece missing from one of its digging flippers; the other flipper filled in the breach by doing more than its half of the work; so that the finished hole was as smooth and circular as those of the other turtles.

This, Beebe thought, looked like more than just mechanical compensation.<sup>12</sup>

But no doubt the most extraordinary of specific orientations appear in man. Indefinitely, they manifest as the various moral, religious and esthetic perceptions. Concretely, they manifest as strange awarenesses for which man evidently does not employ his usual sensory faculties. These awarenesses have been strongly impugned ever since science assumed its present role of importance in modern thought. Telepathy, clairvoyance, foresight, psychometry, dowsing, have constantly enjoyed a repute at large which has been questioned by science. Perhaps this is due principally to the fact that until recently science has not evolved a methodology suitable to the study of these awarenesses. Hence, great credit is due to Prof. J. B. Rhine<sup>13</sup> for his long series of carefully controlled experiments with telepathy and clairvoyance, a long enough series to permit of serious statistical evaluation. He has found in his work that the chance ratio can be significantly exceeded. On the basis of this alone it would be necessary to accept these awarenesses, called by him extrasensory, as a reality. Hence to the various electrical, mechanical and chemical aspects of the human being objective science is now obliged to add another aspect, intangible, obscure, difficult to control and elicit, but nevertheless real — the extrasensory aspect. More will be said of this later. For the present it is mentioned as a faculty for subconscious orientation in man comparable to the orientations in animals already described. All life seems to share in common something of this faculty.

As yet, the mechanism of these biological phenomena eludes us. Whether it be the journey of the eels ; or the migratory flight of birds ; or the community labors of the termites under the leadership of their queen ; or the restless forebodings of our domesticated animals like the dog and the horse ; or the unerring instinct directing certain digger wasps where to sting the tarantula to paralyze it so that it may be stored away, living but immovable, as food for the wasp larvae ; or the obscure efforts at adaptation which

have developed some 10,000,000 insect species ;<sup>14</sup> — or whether it be the extrasensory faculties amongst men, we know little about the facts except that they occur and are difficult to fit into a strictly mechanistic description of creation. They do show, however, that living behaviour is not haphazard. Having developed out of the earth, life nevertheless remains a part of it. We are struck by the essential oneness of geologic and biologic development, a harmony between the two which enables living creatures to keep in touch with the inorganic world that supports them. Similarly the earth is united with the larger universe in which it hangs. The whole betrays the purposefulness of a single organism and *vice versa*.

Life is peculiarly tailored to its environment. Living creatures cover the earth like a well-fitted garment, not like a drape thrown carelessly about it. Again and again life is related to the inanimate earth by a host of instincts and unconscious awarenesses. Here is a profound mystery of nature which we must strive to clarify.

##### 5. Dowsing.

Although these biological awarenesses to environment manifest variously, they represent an integrated activity of all life : the apparent multiplicity results from the many conditions to which life must adapt itself. If we examine one of these awarenesses we are soon struck by the unity underlying them all.

A curious faculty evidently not dependent on sensory perception is Dowsing. Dowsing has been practised for centuries. Some dowsers appear to have been remarkably successful, and still are, whereas others were doubtless imposters. Early dowsers believed that the divining rod, carried in the hand over a subterranean watercourse, dipped and wobbled of its own accord to indicate the presence of water. The lack of scientific method soon surrounded the art of dowsing with mystery. Much the same bewilderment has accreted about other obscure faculties such as telepathy, clairvoyance, prophecy ; but the latter were in

general hard to assess by direct comparison with facts, whereas a good dowser could always be vindicated by digging and unearthing water. Yet the efforts of the best dowsers were not sufficient to offset the discredit smeared on the art by charlatans.

For centuries men inquired seriously : What makes the divining rod act ? With the advent of science the question was reformulated : Is there anything at all in dowsing, or does the whole thing rise out of the psyche of the dowser, with no more than a chance relation to reality ?

Recently two British scientists, J. C. Maby and T. B. Franklin, have finally solved the problem. They have established the scientific foundation of dowsing,<sup>15</sup> just as Newton laid the foundation of optics and gravitation, Dalton of the atomic theory, Darwin of evolution, Minkowski and Einstein of what has become the new non-Euclidean concepts of space and time, J. B. Rhine of telepathy, clairvoyance and other extrasensory faculties ; and so on. But the importance of this study of dowsing is enhanced by its relation to other phenomena, thus far not integrated, upon which it throws extraordinary light. Hence, it is necessary to examine the conclusions of these two Britishers, one a physiologist and the other a mathematical physicist.

Dowsing<sup>16</sup> is the art of taking in the hands a stick, preferably forked, and walking slowly over ground in search of subterranean watercourses and other objects. When the dowser passes, for instance, over water, the stick, or divining rod, is supposed to dip, gyrate, and in extreme cases leap out of the hands. Even amateurs handling the rod agree on the sensation of the rod's moving of its own accord without any conscious manipulation. Maby and Franklin made hundreds of tests with professional dowsers and with laymen who had had no previous experience, and they agreed on this point. It is important to note that these tests were "blind" — that is, the location of known subterranean water was not revealed until after the dowser had given his reaction. This of course was done to avoid suggestion. At least in the case

of expert dowsers, the results were extraordinarily accurate and far exceeding any conceivable chance figure. It was also possible in these investigations to go over the dowser's ground with special mechanical detectors sensitive to the rays responsible for the dowsing effect, and the dowser's results were amply confirmed. A great many variables entered into the work : time of day, orientation of dowser with respect to the underground object, whether, physiological state of the dowser himself. However, in general the reality of the dowsing effect was proved.

Second, Maby and Franklin found that subterranean water, as well as other objects like clay beds, actually gave off radiation possessing a characteristic field pattern.<sup>17</sup> To this field the divining rod reacted. By prolonged work with dowsers and mechanical (electrical) devices, the field patterns were determined for horizontal and vertical extension. Thus it appeared that an object of limited length with respect to width gave off radiation that surrounded it concentrically like standing waves, and the dowser approaching the object passed through alternate areas of effect and no-effect (positive and negative phases). Elongated objects such as streams or underground pipelines were followed on each side by similar alternating bands of standing waves running parallel to the length. Other field characteristics were discovered which need not be mentioned here, excepting one : Under certain conditions the alternating positive and negative bands reversed with respect to each other, the positive becoming negative, and *vice versa*. A change in the dowser's orientation also produced this shift, which is described as a polar reversal.

Thus the basic contention of dowsers was scientifically substantiated : That the presence of an invisible, underground object could be detected by the reactions of a divining rod held in the hand.

But exactly how did the reaction occur ?

In the first place, Maby and Franklin found that the dowsing reaction is not a function of the divining rod but of the dowser's muscles.<sup>16, 18</sup> As they point out, this had been correctly surmised by Kircher as long ago as 1641,

but their credit is in irrefutably proving this to be the correct explanation. Briefly: A dowser holding the rod before him brings into play certain muscles whose tension depends on the position of the grasp and on the amount of strength employed in maintaining the separation of the arms of a forked rod. This muscle tension is kept uniform by the dowser as he prospects across a field. The nature of the radiation involved in dowsing is such that it lessens muscle tonus as at least one of its physiological effects. Hence, when the dowser enters the radiation field, his muscle tonus is lowered—i.e., his muscular strength is actually weakened. His attempt to maintain the position of his arms and the rod causes him to exert more strength and results in the apparent slipping and swaying of the rod. And as his physiological response to the dowsing radiation and his efforts at adjustment are entirely subconscious, he erroneously attributes the gyrations to the rod itself, not realizing that all the rod does is make visible his own physiological reaction. This was <sup>to</sup> <sup>^</sup>amply proved by the numerous tests in which the rod was carried by mechanical means over the positive dowsing areas, but with negative results: whereas the same rod held by a good dowser invariably dipped to indicate the reaction.

Careful study disclosed that the dowsing rays were dual in character, consisting of swift corpuscles on the one hand and of genuine radiation of a Hertzian nature on the other.<sup>19</sup> The latter manifested the effects always associated with wave phenomena: interference, refraction, polarization, etc. In general the Hertzian rays were found to be the most important in dowsing. Since they possessed great penetration, they produced strong effects far away from the source; whereas the corpuscular rays, active at close quarters, had weak penetration in air (in common with most corpuscular rays excepting cosmic rays) and became negligible at relatively close distances to the source. And, finally, the weight of evidence suggested strongly that all types of dowsing radiation might be secondary emissions of material under the impact of cosmic rays. It was thus found that any body of water or

metallic object might be a powerful source of corpuscular or Hertzian rays emitted under the primary stimulation of cosmic rays,\* and that the whole subject of dowsing radiation was thus extended from its natural occurrence in the countryside, into the city, where man, building his civilization of metals, has placed innumerable potential sources of dowsing radiation.

Since the dowsing effect is a physiological reflex and since it evidently takes place whether a person is aware of it or not (like the circulation of the blood, digestion, endocrine secretion and other profound bodily functions), the question naturally arises: What is the effect on health of dowsing rays, which may exist in innumerable localities, in town or country, wherever there are subterranean watercourses, metal veins and objects, etc.? Can any correlation be made between the incidence of illness and such localities?

Here also Maby and Franklin's evidence is extremely important.<sup>20</sup> In general, they find that cancer, rheumatism, arthritis, colds, asthma, tuberculosis, certain gastric complaints are exacerbated when the patient lives over sources of dowsing rays, and that probably these diseases are awakened in cases where predisposition happens to exist. The actual physiology involved is the increased tissue ionization caused by the impact of dowsing rays. Short exposure and temporary ionization may prove stimulating rather than harmful; but prolonged exposure, as in the case of persons living over positive dowsing areas, produces sufficient ionization to result in chemical effects that precipitate disease. Comparable are the effects of high frequency radiation like X-ray, radium, ultra-violet, in which cases the intensity of tissue ionization increases with the frequency. Much evidence exists that sensitive

\* Sir Wm. Bragg has shown that metals exposed to X-radiation of mixed frequencies emit secondary radiation of a frequency characteristic for each metal; and the basis of X-rays is the ability of metals to emit secondarily under the impact of a swift electronic stream. These familiar instances are merely adduced to substantiate the theoretical explanation of dowsing rays.

persons sleep badly over streams or mineral veins, and that even the metal springs or frames of a bed may give rise to radiation fields which disturb the sleeper and, in some cases, over prolonged exposures, make him ill (since he is close enough to the source to feel not only the long-range Hertzian rays but also the corpuscular rays)! In Germany, experiments conducted with mice showed that the incidence of cancer was greatly increased when the animals were exposed either to natural dowsing fields or to fields artificially produced by a Hertzian oscillator.'

Hence the medical importance of dowsing fields cannot be over-estimated. Nor can the philosophical importance. For everyone passes through such fields constantly, and, as already explained, the fields occur unexpectedly as the result of secondary radiation of metals, which figure so prominently in our civilized life. It seems that as we walk about, our bodies are unceasingly responding, below the threshold of consciousness, to a multitude of dynamic factors. Perhaps a certain measure of such response is all in the day's work for most individuals; but when exposure and, hence, reaction are prolonged, the body may be unable to adjust itself—for instance, to repair the effects of excess tissue ionization as rapidly as they occur. And the weakest point then breaks down, the specific character of the illness perhaps depending upon the constitutional idiosyncrasy.'

The phenomena of dowsing emerge as a marvellous instance of the biological adjustments already pointed out. It is also possible that whereas man with his conscious, reasoning mind is unable to tap the reactions at their source and without circuitous techniques, animals, on the other hand, free from inhibitions, are doubtless more directly guided by reactions of this type. The migrations and other extraordinary habits of wild life may have their origin in obscure dynamic stimuli to which the animal is amenable.

We may logically assume that local geographical areas give forth a characteristic dynamic pattern which the autonomic of animals recognizes and uses as guides in

the various migrations. Larger areas may integrate into still more general dynamic patterns. So that it is suggestive to picture an army of migrating wildlife as a vast autonomic organism responding to and following the dynamic impulses arising from the earth, much as an airplane feels along the length of a radio beam. This assumption is certainly safer than to suppose birds, for instance, in their farflung flights, able to utilize for orientation the shifting patterns of the earth's magnetic fields, which streams in so many directions over different points of the earth's surface. The fact that birds sometimes fly at great altitudes would not remove them from the influence of rays of the dowsing class, which Maby and Franklin have shown to extend upwards with no apparent decrease in intensity. And we have seen how wide-spread are the sources capable of stimulating these biological reactions.

This is the picture drawn—and established as an unsuspected reality—by Maby and Franklin. Their work is a classic. It ties together many fields hitherto uncoordinated, as will be shown below.

## 6. *The Work of Abrams.*

The type of physiological reaction involved in dowsing; and so long regarded with superstition and incredulity, is evidently widespread in nature, both amongst animals and men. It has taken the ingenuity of man to exteriorize, through such devices as the divining rod, imperceptible processes going on within him. As has been seen, Maby and Franklin have securely founded the *science* of dowsing (as against the art). Another approach to physiological reflexes of the dowsing type has been made by a few physicians seeking to elucidate certain obscure dynamic body effects not immediately linked to usual electrical effects like the psycho-galvanic reflex, other variations in skin potential, and, more recently, the evidence of the electrocardiograph, and the electroencephalograph. But the medical approach tangled up with considerations of ethics, orthodoxy and charlatanism, has had a stiffer—though

briefly—struggle than the evolution of dowsing to its present accepted status. The best known medical exponent was, of course, Albert Abrams, who devised the "magic box" of still notorious odor. Nevertheless, much has happened since Abrams' experiments (which began around the outbreak of World War I) to show that, despite his mistakes and what seemed like uncontrollable commercialism, he had stumbled on profoundly significant biological and physical phenomena.

What Abrams labored to prove was that the living human body could be utilized as the detector for certain radiations emitted by biological material as well as by inorganic substances. The biological radiations of human beings tended to conform to certain patterns during health. Disease at once changed these patterns and it was by observing these departures from normal that Abrams developed a system of diagnosis independent of the usual pathological findings. Abrams maintained that specific energies were emitted by different diseases, and that the presence of the abnormal energy could be detected long before the appearance of tissue pathology or even dysfunction. He maintained also that the correction of these energy derangements removed the cause of disease, and that secondary effects such as pathology, infective agents, etc., would then disappear, since they could only thrive where the soil was propitious for them—i.e., in tissue suffering from dynamic disturbances.<sup>21</sup> Unfortunately, Abrams pushed his claims beyond the point where his technique was able to support them. The investigation of the AMA, undertaken by *The Scientific American*, failed to obtain reliable and consistent evidence from the Abrams proponents. The work was branded as fraudulent and has had to struggle ever since against this stigma.

Actually, Abrams was right in many of his observations, as Maby and Franklin justly concede;<sup>22</sup> but many of his interpretations of fact betray a runaway imagination and a loose application of the physical principles then known.

As a "detector" for the energies Abrams used a human being in good health (the "subject"); just as dowsing rays are detected by an operator holding the divining

rod. But whereas the dowser utilizes a generalized reflex which he chooses to exteriorize by means of the hands,—a convenient and controllable method,—Abrams' subject demonstrated a selective, localized reflex that could be manifested only by a specific technique. When the subject was connected (at the forehead) to different kinds of diseased tissue (i.e., to patients suffering from different diseases), certain patches of his abdomen became "dull" under percussion as against the normal more resonant, abdominal note. Each of these dull areas corresponded to a specific diseased state. Abrams soon found that a tuner could be interposed between the patient and the subject, giving sharper areas and only one area at a time, provided of course the tuner was of the variable type which could be adjusted to resonate to the periods of the different energies. As the subject was connected to the apparatus at the forehead and stood on earthed metallic plates, he was, in effect, placed in an energy current which in its passage to earth elicited the various selective abdominal reflexes; much like the response of the dowser, with his generalized reflex, to the field of dowsing rays. So that if we accept dowsing phenomena as factual, there is nothing intrinsically anomalous in the situation of Abrams' subject.

The undoing of Abrams was the very apparatus he invented. Instead of deliberately acknowledging inductance and capacity as the basis of all tuned circuit effects, he evolved the theory that his disease energies could be tuned in by means of "ohms": i.e., cancer energy would pass only through a 50 ohm coil, tuberculosis energy a 42 ohm coil, streptococcus 60 ohms, and so on. He even wound his coils noninductively, considering this ample proof that his concept was right, since he continued to get results. However, he ignored certain high frequency characteristics, perhaps because he did not appreciate the fact that his energies were of extraordinarily high frequency indeed (as also, by the way, are the dowsing Hertzian oscillations). A simple resistance in the path of a low frequency current has no appreciable tuning effect. But beyond a certain point, increase of frequency rapidly increases the inductive

effect of even a short length of straight wire. Moreover, the resistance characteristics which he stated so simply differ for high frequencies from the resistance characteristics of low frequencies or direct currents, which tend to flow through the whole cross section of the conductor, whereas high frequencies pass only along the surface ("skin effect"). And the frequencies of Abrams' disease radiations are so high that the inductive effect of his resistance coils (notwithstanding their "noninductive" winding) becomes the cardinal tuning factor of the circuit, combined with the capacity effects of the various circuit elements. Indeed, as was shown by Colson,<sup>23</sup> the resistance of the Abrams coils seriously interferes with the weak energy currents, and the same inductive-capacity values obtained with coils in which the resistance is deliberately kept to a minimum at once sharpen the reactions by increasing the amount of energy flowing in the circuit, make the whole setup more selective, and remove other fallacies inherent in the original Abrams device — the derisively called "magic box." It is no wonder that consistent results could not be obtained before serious investigators of the technique. The wonder is that despite his crudities of technique Abrams was able to discover so much that was fundamental and that has since been confirmed in other ways.

It is fair to mention at this point that perhaps the earliest scientific observation of the abdominal reflex was made by Dr. George Starr White near the end of the last century.<sup>24</sup> It is doubtless from White that Abrams obtained the clues leading to the discovery of disease energies and their detection by means of an instrumental tuner in conjunction with a subject; but Abrams was not always unequivocal in stating his indebtedness to White.

White claimed to be able to detect an aura about living creatures. The aura gave him a visual sensation of color, and the color changed according to the emotional state of the individual as well as the state of his health. Soon White noticed that the aura "streamers" (as he called them) were deflected in different directions according to whether the subject faced north or south, and east

or west. As he was experimenting at that time with vibrating air columns which he would play over his patient's body, he stumbled upon a curious phenomenon: The sound of such an air column, having as one of its closed sides the abdomen of a person, gave a different note when the subject faced north or south from the note in the east or west positions — corresponding to White's observations on the aura.

This appears to have been a basic phenomenon. It has been corroborated by many individuals in different ways. For instance, Maby and Franklin (see last section) show that the kind of dowsing effect, and the field pattern of dowsing rays, depend upon the orientation of the operator to the source of the rays and on the orientation of the latter to the magnetic flux of the earth. Moreover, Abrams<sup>25</sup> found that his subject, who was grounded, must always face west for best elicitation of the abdominal reflexes under percussion, and for this observation he was indebted to White's discovery concerning the change in note produced by orientation. The same conclusion as Abrams was reached somewhat later by a very much more scientific investigator, Wm. E. Boyd of Glasgow (to whose work reference will shortly be made). When we remember that all animal migrations — and they are widespread — depend upon some unknown faculty of orientation, it does not seem difficult to accept the orientation phenomenon of White.\* There is no reason why a reflex change in the tissues of the abdominal wall, showing under percussion as a change in note, should not occur as readily as the weakening of muscle tonus in a strong dowsing field. The full

---

\* Later, more careful determinations indicate that maximum abdominal resonance does not occur exactly at the geographical or magnetic west. In New York City the actual point is about 12 degrees counterclockwise from the magnetic west; other regions of the country have not been checked. This certainly frees the orientation reflex from dependence on magnetic factors, and is further indication that animal migrations may be unrelated to terrestrial magnetic lines of force. This problem is part of the research of the Foundation for Homœopathic Research, but much of the material is not yet ready for publication.

importance of White's discovery will become more apparent later in this essay.

Another of White's contributions is the discovery that colored light excites the abdominal reflex. Specifically, he found that patients with profound toxemias did not give the orientation reflex. However, if they were exposed to various colored lights, a color could be found which restored the reflex so long as the patient remained under exposure to it. As the occurrence of the orientation reflex was a constant phenomenon in health but disappeared during disease, he reasoned that the light restoring the reflex must have some sort of curative relation to the patient. In this he claims to have been correct, for he has evolved a color therapy in which the reflex-restoration is the indicator of the color with which to irradiate the patient therapeutically. When the patient is cured, he once again spontaneously gives the orientation reflex. These original and, it must be confessed, astute observations were taken up with modifications by Abrams, who insisted that certain disease energies, tuned in and recorded by his instrument in conjunction with a "subject," could be enhanced or dissipated by certain colors. But Abrams' use of color was in a different direction from White's, as was indeed natural, considering the difference in technique.

White also appears to have been the first to conduct along a wire body energy of the type Abrams made first famous and then notorious. But White was content merely to show that the energy was capable of conduction, even over long distances, along a length of wet cord or aluminum wire: he does not seem to have appreciated the existence of energy of varying frequency characteristics capable of analysis into its components by means of a tuned circuit. The conception of tuning and the elaboration of diagnosis based wholly on such instrumental settings belong to Abrams. They remain an amazing discovery, despite the errors and the eventual vilification poured on the man.

From these facts it is clear that living beings — at any rate, human beings — not only react to all sorts of

external stimuli like dowsing rays, certain directional magnetic fields of the earth, and perhaps other influences, but they can react specifically to some sort of biological energy associated with ill health. In fact, according to both White and Abrams and verified by ourselves, the abdominal reflex on percussion is also elicited by the presence of nearby persons. This means that every individual is constantly experiencing unconscious activities of his physiology against the environment. The concept of a biological organism as a hermetically contained unit, giving out what it does not need and taking in to meet its requirements, must be altered. Each organism is instead bathed in at least the physical effects of its milieu, just as a jellyfish, while preserving its integrity as a creature, is permeated by the currents of seawater, with which, in a sense, it is continuous. And since all objects give off radiation with a potential biological effect, radiation which in the case of dowsing rays, for instance, is able to penetrate great distances, the whole problem of migration and other biological orientations becomes clearer. These radiations are like signposts, directions scattered over the earth. And living creatures are guided by them, not consciously, but by the operation of hidden physiological activities.

#### 7. *Boyd and the Dynamis.*

Left to itself, the work of Abrams might easily have been forgotten. Whenever his exponents attempted to demonstrate the technique, they ran into inconsistencies and contradictions. The same patient, or the same blood specimen, gave different diagnoses in the hands of different operators who were unacquainted with the patient's clinical history. For this, technical crudity was the most responsible factor. A delicate effect was under detection with crude, inadequate apparatus, and no effort was apparently made to isolate the phenomena themselves from sources of interference. As has been mentioned, this led to an AMA investigation and the eventual discrediting of the whole movement in America.

However, in Great Britain the problem was approached by a man who was thoroughly grounded in physics, radio and electricity. This man was Dr. Wm. E. Boyd of Glasgow,<sup>25</sup> whose work is as much a classic as the labors of Maby and Franklin described above.\*

At once, Boyd recognized that a tuning circuit for Abrams' energies must operate by virtue of its inductance and capacity effects instead of its resistance. He constructed a variable inductance coil with continuous contact in place of the spaced taps of Abrams' tuner. Later, this circuit was refined and elaborated, becoming an instrument of precision called the Emanometer.

The instrument consisted of three sections connected in series. First, the patient's specimen was inserted in a movable trolley whose distance from a fixed receiving plate could be varied at will. A uniform opening in the specimen carriage allowed energy to radiate across an airgap to the receiving plate. The distance to which the specimen could be withdrawn from the receiving plate before the energy ceased to record gave the intensity of the energy under analysis. Drugs were inserted into a receptacle so situated that the field of drug energy components occupied the same space as the field of the specimen: in this way the two could interact. It was found that the glass vials were quite transparent to the drug energies, just as glass is transparent to visible light, hence the drugs were amply protected from contamination or deterioration, the vial being merely inserted into the apparatus. This part of the circuit measured energy strengths and allowed interference to take place between specimen and drug components. † Second, in series with the fixed plate of the airgap were two parallel circuits. One arm consisted of a variable induction coil in series with a variable condenser; the other arm consisted of a single variable condenser of

\* Due credit is given both Boyd and Abrams by these authors, who seem to recognize the close relationship of these various phenomena.

† Detuning of the circuit as a result of capacity effects resulting from changes in the distance between the airgap plates was eliminated by a special arrangement of the gap elements.

small value; and a special switching arrangement permitted these two arms to be connected in parallel after each had been separately tuned, giving a marked increase in selectivity. The inductance was calibrated in millimeters of coil length, the condenser scales covered 180 degrees, each degree being further subdivided into 60 minutes by means of a micrometer dial. It can be appreciated how discriminating was the arrangement. This part of the circuit offered one means of tuning the energies. Thence a lead connected to the forehead of the subject, who was the third and last circuit component. He functioned as detector, through the occurrence of the abdominal reflexes under percussion, and in addition as a vernier tuner to the instrumental circuit by virtue of the fact that different energies produced entirely distinct areas of abdominal dullness, thus confirming, in general, Abrams' findings in this respect. The standard of detection was thus the reading of the inductance and capacity values plus the location of the dull areas on the subject. The importance of the subject as auxiliary tuner can be estimated from the fact that the identical Emanometer setting will sometimes permit several areas—representing distinct energy components—to record on the abdomen; without the subject they could scarcely be differentiated.

A further refinement of the Emanometer was the shielding which Boyd early found to be necessary for excluding irrelevant and interfering factors. In its final form, the shielding surrounded each circuit section—airgap, tuner, and lead from tuner to subject—and the subject himself stood in a case of closely woven phosphor bronze mesh. All shielding was carefully earthed, as was the subject through standing on the metallic floor of his cage.

A strong source of interference was found to arise from handling the vials of drugs to be tested, or the patient's specimen, or insulated controls situated within the cage where the subject could be affected. Such irrelevant energies compounded with the energies under study, leading to false results. To eliminate such contamination,

Boyd found it necessary to sterilize the instrument with dry heat before use, to prepare sterile vials for the drugs and never to handle them except with sterile forceps, and to collect the specimens on sterile blotters of standardized absorption. These precautions, while increasing the difficulties of technique, greatly added to the accuracy.

The general technical procedure was this: At the circuit input Boyd placed a specimen of blood; at the output he connected a healthy individual who stood on grounded metallic plates — the "subject." Then he proceeded to observe the occurrence of the dull abdominal areas elicited on percussion. He found that when the subject faced west, his abdomen became uniformly resonant to percussion, and that the dull areas could be easily defined by contrast. Some of his areas agreed with Abrams'; but as Boyd's tuner was much more selective, the number of areas increased greatly over those originally discovered by Abrams. There were interesting relationships between certain areas and clinical states. However, Boyd's method never claimed to be diagnostic of disease, as did Abrams', but merely gave a picture of the dynamic state of the patient without necessary reference to orthodox terminology. Nevertheless, Boyd discovered that certain energies usually appeared in cases of inflammation; others were associated with infection; others with proliferation; some with respiratory conditions, digestive, nervous, genitourinary and other disturbances of organ-systems. There was enough clinical correspondence to give him a general picture of the patient's condition from the type of energy detected in the patient's blood.

The quantitative aspects of this research proved extraordinarily fascinating. A patient presenting himself for treatment gave relatively high intensities (as measured on the Emanometer\*) of the energies relevant to his condition. The whole gamut of energies could be detected in any specimen, but their intensity — their strength — was

\* It must be remembered that the units by which the energies are identified and measured are purely arbitrary and refer exclusively to the

low except in the case of energies associated with the patient's ailment. And as treatment went on and the patient progressed towards cure, the energies of abnormally high intensity diminished until eventually they reached the low level of theoretical health. With this decrease in intensity came a disappearance not only of subjective symptoms but of pathology (where the disease had not advanced so far as to make this impossible). The point of great importance was that abnormally high energies were sometimes detectable in a patient who did not yet manifest recognizable symptoms. When observed over a period of time, such persons were found to develop symptoms of a type predictable from the dynamic disturbance. This suggested that it was the dynamic derangements in the body that precipitate symptoms, functional and pathological. Abrams had made similar observations.

The picture of health and disease painted by Boyd's work looked something like this: Good health represented a certain dynamic distribution associated with the body. This dynamic state regulated normal physiology. As measured on the Emanometer, the state appeared specifically as a low intensity of many energy components detectable in blood. In some fashion not known, certain components could greatly wax in intensity. When this happened, the directive influence of the normal energy complement was changed, with attendant physiological changes, and symptoms appeared: subjective, functional, and eventually pathological. That this explanation was correct was substantiated by the fact that if the abnormal energies were reduced by medication to the theoretical normal level, health returned in all cases where the patient's vitality was not

---

Emanometer circuit. As the exact nature of the energies is not known (for instance, whether they belong to the electromagnetic spectrum), it is impossible to give them electrical evaluations. Hence, the continuous inductance coil is calibrated in millimeters of actual coil length, the condensers into 180 degrees subdividing the semicircular arc through which the plates rotate, and the airgap in centimeters measuring the separation between the fixed and movable plates.

totally depleted. Of course, the arbiter for judging normal and abnormal intensity levels was the Emanometer.\*

Boyd did not let the matter rest with the patient's diagnosis. If abnormal dynamic states preceded the physiological signs of illness, then a dynamic correction would be in order rather than a chemical or physiological. But how was this to be done? The energies detected by the subject and tuned by the Emanometer did not appear to fit anywhere within the known electromagnetic spectrum. Any idea that they might be a cryptogenic biological radiation was dissipated by the discovery that *all substances* gave off these energies, and that when different substances were placed in the Emanometer circuit together with a specimen, interference effects could be observed between the two such as are familiar to students of wave mechanics. It was also clear that on the basis of the intensity of this energy as radiated by different classes of materials, living things and finely subdivided inanimate matter — colloidal, or highly diluted — ranked first, material in bulk or in coarse dispersion ranking next with much lower intensity readings.

These findings gave Boyd his clue for remedy selection. When a specimen analysed by the Emanometer gave an abnormal picture, or spectrum, drugs were added to the circuit singly until one was found which interfered with the specimen energies. And this interference must be such that all the abnormal energies associated with the patient's illness were reduced in intensity to the ideal normal. When these conditions were fulfilled and the drug prescribed, clinical improvement followed.

In addition to the abnormally high energies, Boyd found three which behaved inversely to the rest. These

\* In what follows, the energy complements under consideration will be frequently referred to as "the dynamis," not including purely electrical effects like differences of potential, static charges, changes in tissue resistance, nerve and brain currents, etc. And the word "physiology" will be applied to the whole functioning organism as apart from the dynamis which appears to give it form.

were of high intensity in healthy individuals but became weaker during illness. The interference effect of the right drug on them was such that whereas the other energies were reduced in strength, these three were invariably increased. A drug covering the cancellation factors and not enhancing these three energies was much inferior to a drug which covered all the factors of enhancement and cancellation. Because of their characteristics, these three energies may be called "vital rates." They assume especial prominence in the selection of remedies on the Emanometer.

The final technique worked out by Boyd is interesting in the light of his conclusions regarding body energies and their distribution in health and disease. A patient's specimen was carefully examined and all abnormally intense energies noted, as well as any drop in the level of the vital energies. As the ideal blood picture should give a minimum reading of all excepting the vital energies, the next step was to find a drug which, when placed in the circuit together with the specimen, had the necessary frequency relationship to correct, by interference, all the latter's energy abnormalities. Boyd found it most practical to test the enhancing power of the drugs on one of the vital energies, all drugs enhancing being held out for retesting against the two other vital energies. He almost always found that the drug giving maximum enhancement also gave satisfactory reduction of the energies other than the "vital." For best results, however, careful measurement of reduction was essential, for Boyd also discovered that a drug which augmented an energy that should have been cancelled tended to produce, when given to the patient, an exacerbation of the relevant symptoms proportionate to the amount of augmentation.

After the patient took the medicine thus worked out by the Emanometer, his energy spectrum became radically changed. He no longer gave an abnormal picture. It was as if he now possessed the energy distribution of a healthy person. And during this period there was an abey-

ance or disappearance of symptoms and pathology. In lighter cases, one prescription often cured: the abnormal energy characteristics failed to return and the patient remained well. In more obstinate cases, after variable lapses of time, subsequent tests showed a gradual rise in the intensity of the energies originally found high but reduced by the drug, accompanied by a return of the old symptoms: the severity of relapse depending of course on the amount of tissue change still left in the body after the preceding period of repair and on the patient's vitality. Another prescription was now needed, either of the same or a different drug; and this was determined by a second test similar to the first. In all curable cases, a series of prescriptions finally neutralized the abnormal energy characteristics, all symptoms cleared up, and the patient was apparently well.\*

There is one other point of Emanometer technique which must be mentioned. In some ways it has more significance than any other phase of Boyd's approach. Whereas Abrams had found what he called a "vital rate" indicating the constructive body processes, Boyd found three. Abrams' rate (to use his own jargon) was "tuned in" by a coil having 49 ohms of resistance — a standard value for everybody's vital rate. Boyd of course had three different settings on his inductance coil, one for each of his vital energies. But whereas two of these energies always tuned in on the same position of the coil, no matter whose the specimen, the third, called the V rate, gave 11 adjacent variations, depending on the person, instead of a standard setting for all persons. That is, there were 11

\* In presenting his work to an investigating orthodox medical committee in Britain (the Horder Committee), Boyd arranged a series of blind tests capable of evaluation on a statistical basis. In this manner accidental success ratios could be compared with actual successes. The most rigorous of these trials, repeated at an interval of a few months, gave a 33,000,000 to 1 ratio in favour of the reality of the phenomena—sufficient to corroborate any purely orthodox experiment. Controls were carefully kept by the investigating committee.<sup>26</sup>

fundamental types of V energies, each with a slightly different tuning characteristic giving 11 closely spaced settings of the coil. Hence, each patient had to be grouped by determining which was his type of V energy.

The result of this was unexpected. To cause certain specific interference effects with a specimen's energies, the period of a drug's energies must be almost, although not quite, identical with the period of the specimen's. Boyd has shown that this slight variation exists. This approximation of drug energy values to specimen's is such that the drug V energy registers at the same coil setting as the specimen's — drug and patient, that is, must belong to the same group. Still otherwise expressed: maximum sensitivity exists to a substance belonging to the same V classification as the patient.\*

Let us consider what is implied in Boyd's findings.  
The average human being is continually adjusting his organism (unconsciously, of course) to outside influences. Some of these influences are relatively gross: minerals dissolved in the water he drinks, mineral deficiencies in his food, physical factors like temperature and humidity, particles suspended in the atmosphere which he breathes into his lungs. In addition, we have found that a human organism responds to obscure influences like dowsing fields, to effects from countless sources of radiation with different frequency characteristics, all apparently capable of eliciting various autonomic reflexes. Most of these condi-

\* Some interesting relations between these groups have been observed.<sup>27</sup> In health, a person's group tends to remain constant. Chronic disease may move him out of his group, but usually into a group of a well-defined series. Groups 5, 8, 11; 1, 6, 10; 2 and 7, appear to constitute three series. In acute illness, however, the patient may change from one group to any of the others without seeming to follow a pattern. Pregnancy affects the group of the mother, and this change appears to be governed by the sex of the unborn child. Also, a boy's group is very often that of the mother's; a daughter's takes after her father's. Thus it will be seen that the V energy of Boyd's, giving the group, must represent a deep and fundamental aspect of the integrated creature.

tions we may regard as more or less normal : the organism, having evolved in their midst, is prepared to absorb them without suffering. In fact, such agents, by repeatedly stimulating the various parts of the organism, may be necessary for optimum development, for exercising and maintaining the tone of manifold body states. There are few if any totally useless functions in nature, and these reflexes are functions serving a purpose of their own. Conceivably, the isolation of a human body for long periods from such influences would dull the responses, which would end by becoming atrophied or by causing, through their cessation, diminished or excessive functions elsewhere."

'The lesson to be learnt' from Boyd, as he himself recognizes, is that certain energies may derange the subtle dynamic balance of the healthy organism without necessary reference to a predisposition. Body energies (as shown by the Emanometer) are susceptible to interference effects, in which process their ideal distribution is disturbed. Such a modification however entails special physical relations between the periods of the body energies and the periods of the interfering agents. For one wave train to interfere with another, both must be of the same general family or type. They must also be nearly or absolutely identical in frequency, depending on the effect taking place ; for this determines the phase relationship and whether the result will be an augmentation or a reduction in strength of the components. More generally expressed, in order for body energies to be affected through direct interaction with energies in the environment, a specific relationship is required. Unrelated energies may arouse a general reflex but will probably not destroy the balance of body energies. It is just another working of the familiar principle of resonance. Disparity will not cause interference : syntony will.'

With such facts in mind, "specific sensitivities become more intelligible. What injures one man leaves another unaffected: whether it be pollens carried in the air, articles of food, damp locations in which to live, and even the per-

sons with whom one associates ; for all of these have dynamic properties demonstrable on the Emanometer. The response of any one person depends not only on his temperament, his heredity, his constitution ; it depends, in the deepest sense, on the kind of dynamic complements which appear to direct and maintain his somatic whole. If agents with which he comes in contact or into whose sphere of influence he moves have the necessary specific relationship, his dynamis is deranged : the normally low intensity energies are intensified. If the source remains, this chronic dynamic alteration, exerting a constant abnormal influence, eventually results in symptoms and disease. We know little concerning how prolonged such influences must be in order to cause permanent dynamic changes in the body. But once the dynamis becomes abnormal, the tissue and organic systems which it directs tend also to become abnormal. It is readily seen how these facts underly and surround the whole fields of anaphylaxis, allergy, immunity!" "The same facts invade psychology. When is an apparently free thought really induced by subconscious responses to specific agents ? How much are we indeed free agents ? Is not our existence much more continuous with the inorganic environment than we had proof of before such researches as Boyd's ?"

Another conclusion is of considerable interest in the light of orthodox medicine's materialistic approach to health and disease. The body has been regarded as a complex unit in which something may go wrong, usually from materialistic causes (dietary deficiencies ; lowered resistance from such gross causes as insufficient rest ; wholesale bacterial invasion, as in syphilis ; conditions following injuries, from which the body fails completely to recover ; etc.). "But if the reality of Boyd's work is acknowledged, it is evident that all physiological disease is preceded by a dynamic alteration whose nature (let us say, whose frequency pattern, as established by the Emanometer) determines the kind of functional and tissue changes

to follow. The physical body is attended by formative agencies which are integrated into the pattern of the individual: and this pattern is closely followed by the soma. When the formative agencies depart from their normal, the soma tends to follow their new directive influence. In cases where the dynamic alteration is observed before the occurrence of physiological effects, it has been found that a correction of the dynamis will prevent the subsequent appearance of symptoms and pathology."

“ Thus, the energies detected by the Emanometer are directive and integrative: they leash together the heterogeneity of body activities and determine the body's direction, whether it will travel along the path of health or of disease. And the soma emerges as the consequence of prior agencies. It is not itself a primary phenomenon; it is not a self-contained mechanistic unit. It is the physical phase of a completer reality and as such possesses no more autonomy than any partial phase of nature. ”

“ And the so-called “vitalistic” thinkers, who refused to perceive in living things only physico-chemical processes, are in part vindicated. The accuracy of the vitalistic intuition is especially evident when we remember that these energies are not even electrical, as electricity is conventionally understood. Either they are non-electrical or they represent an aspect of electrical behavior totally different from any known before.\* ”

“ All the biological phenomena so far discussed are interrelated, and together they constitute the whole organ-

\* G. Stromberg, from purely logical considerations, has also concluded that underlying all biological phenomena is an individual formative agency which has not only the power of directing somatic development and maintaining somatic configuration during life but has also the gift of immortality. For Stromberg, space is inhabited by these formative agencies, which collectively give shape and character to the universe: to inanimate as well as animate material. But so far as can be determined from Stromberg's references, he was compelled to assume many of the points experimentally obtained by Boyd and others and described in this essay.<sup>28</sup>

ism. “ In the case of man, the role of physiological coordinator is assumed by the autonomic nervous system. This system manifests the reflexes, of which the percussion effect is one only. Essentially, the change in note is produced by an alteration in muscle tonus under the influence of energy from a “specimen” of human secretion or from a drug. *The autonomic appears to be influenced as a whole, and it proceeds to elicit not only the muscle reflex but many others such as various changes in the circulation, dilation of the pupil of the eye, a slight alteration of the color of the iris, a number of sensations associated with taste and touch, and so forth.*’ The reflexes most easily observed are the muscle effect under percussion, the pupil effect, and detectable differences in the pulse quality and rhythm and in the heartbeat as shown by the fluoroscope.”

Another method of eliciting the muscle reflex has been worked out by dowzers with their divining rods, which act as magnifiers of minute muscle movements occurring when the diviner crosses an area saturated with dowsing rays. Perhaps in general the dowsing technique is not so well suited to the extremely delicate energies of specimens and drugs, although preliminary experiments in this direction by the Foundation for Homœopathic Research have yielded interesting results. Moreover, the dowsing reflex is generalized, whereas at least the abdominal reflexes of Boyd and Abrams are specific to energies of varying resonance characteristics. The autonomic appears to be the chief physiological inciter of these effects in its response to the various energies. And the whole problem of dowsing is thus closely related to the work of Boyd and Abrams, the chief difference being apparently one of degree rather than of kind.

Researches by the Foundation for Homœopathic Research have shown that reflexes in response to specific stimuli may be observed without the use of a mechanical tuner. This approach is useful in determining sensitivity to drugs or other agents. The response is general in nature instead of being localized like the abdominal reflex.

As the abdomen reacts in patches, a better area for eliciting the general reflex is just above the lung apex. If this region is steadily percussed and drugs (in glass vials) are brought up to the patient one at a time, certain drugs will cause a noticeable change in the percussion note, but at varying distances, according to the patient's sensitivity. The greater the distance between drug and patient at which the effect takes place the greater the sensitivity. Since, as has been determined clinically, the sensitivity of the patient is roughly proportional to the curative value of the drug, the drug which causes the reflex at the greatest distance is most closely related to the case—i.e., is most curative. A good drug will be effective at supervising distance — up to 200 feet, as far as has been tried.\* Little is known which will account either for the specificity of the patient's reaction to this delicate stimulus or for the ability of the drug energy to traverse distances which much coarser and intenser energies cannot bridge.

Other reflexes mentioned earlier, such as the dilation of the eye-pupil or changes in the pulse rhythm and amplitude, also occur in proximity to specific drugs. All are generalized responses similar to that shown by percussing the lung apex, but they can be elicited only when the separation of patient and drug does not exceed a few feet — two or three for most satisfactory observation. Here the therapeutic criterion is not distance but the degree to which the reflex takes place and the constancy with which it recurs on repeated trials.<sup>29</sup> It is interesting to note that the various reflexes tried separately will usually indicate the same drug, showing the unity and coordination of the body's response.

Although organisms possessing an autonomic nervous organization are coordinated by it, some organisms of a

\* It is a curious fact, but one which has been confirmed in many tests, that a drug held in the hand (say by an assistant) will cause the reflex in a susceptible patient at a much greater distance than the same drug carried away at the end of a pole made of dielectric material. Contact with a human being seems to enhance the carrying-power of the drug energies. The reason for this is not known.

simpler kind possessing no nervous structures at all are nevertheless able to function as a unit. This suggests that protoplasm itself has a responsive faculty and that the response may be constructive for the organism as a whole. The researches of W. M. Persson at Leningrad involved the stimulation and inhibition of enzyme activity by dilute substances, including dilutions well past the point where solute molecules theoretically disappear.<sup>30</sup> (This point is in the neighbourhood of the  $10^{-20}$  dilution.) Whether enzymes live is a moot question; if they do, they are certainly amongst the simplest of living creatures. For our purpose, they may be considered living material.

Persson found that specific drugs activated certain enzymes in a regular fashion, depending on the degree of dilution, and that the dilutions which activated were separated by dilutions which inhibited the enzymes in a sort of sinusoidal alternation. Thus the velocity of starch inversion was stimulated by corrosive sublimate in decimal dilutions  $10^{-15}$ ,  $10^{-25}$ ,  $10^{-45}$ ,  $10^{-65}$ ,  $10^{-95}$ ,  $10^{-110}$ , with maximum enhancement at  $10^{-65}$ ; whereas depression resulted from the sublimate in dilutions  $10^{-6}$ ,  $10^{-20}$ ,  $10^{-35}$ ,  $10^{-55}$ ,  $10^{-85}$ ,  $10^{-105}$ . It will be recalled that all dilutions above the 20th decimal ( $10^{-20}$ ) represent the holdover of the drug dynamis with none of the original molecules surviving the process of dilution. Hence, the enzymes responded as a whole to the same kind of influence which can correct the dynamis of a sick person.

If the extreme simplicity of enzyme structure (as compared with the simplest true cell) is able to react as a unit organism, there is, presumptively, a further physiological factor in the response of a human being than the mere stimulation and reaction of the autonomic nervous system. The dynamis underlies all physiology. It functions directly in the original, fertilized ovum before cell differentiation (including nerve formation), has taken place. No doubt the very structure of protoplasm, its activity, its tropisms, are fashioned and maintained by the immanent dynamis. And the kind of drug reaction discussed in this essay is probably the profoundest action of physiology, in-

volving not only the sensitive nerves but the whole mass of body material down to the smallest protoplasmic drop. This total response, apart from organic systems, is the true, the deepest life activity from the physiological viewpoint.\*

But the energies are themselves interlaced with physiology. Indeed, the physiological total is not an autonomous organism deriving its characteristics from its physico-chemical nature. Instead, the physiological total appears to be hung on an invisible framework of unknown energies. This dynamic framework, according to its pattern, delineates the physiological characteristic.† The dynamis is the most fundamental of all the factors yet found associated with living beings. When it adheres to a theoretically normal pattern, the physiological functioning is also normal, and the organism is said to be healthy. When the dynamis is disturbed and remains so, sooner or later the physiology adjusts itself to the new influence, symptoms develop, and the organism is said to be ill. Even the autonomic nervous system, despite its preeminence as physiological coordinator, is as amenable to the dynamis as the rest of the soma. Still, we do not yet know what is the exact role of the dynamis in biology. We do not know its physical characteristics. We cannot explain why such a dynamis is associated not only with living creatures but also with inanimate material such as drugs, including drugs composed

---

\* Wm. E. Boyd of Glasgow repeated Persson's experiments with comparable results. Boyd however prepared his microdoses with scrupulous care, using a separate vial for each dilution, to ensure getting effects in the higher dilutions from the pure drug dynamis in the absence of solute molecules. The last published account<sup>31</sup> described effects of dilutions from  $10^{-6}$  to  $10^{-14}$ , obviously not yet in the ultramolecular region. His work continues.

† The work of Baron von Reichenbach is doubtless worthy of much deeper study by modern scientists than it has received. Reichenbach's concept of Od as a sort of etheric envelope surrounding and influencing the physical body of living beings is reminiscent of the energies found by the Emanometer. But Reichenbach's approach was through psychic, mediumistic and other subjective methods, whereas an instrument like the Emanometer gives objective data.

of inorganic minerals. These manifold aspects of life must be thoughtfully remembered.

Moreover, it must be constantly borne in mind that the dynamis, the physiology, the changes these have resulted in the slow evolution of living things, are not separate unrelated aspects of terrestrial history but are closely dependent on one another. The whole effort of evolution is an adjustment by life to express itself in harmony with its inorganic environment; the resultant physiology and dynamic qualities are part of that evolution, have grown out of biological adaptations, and owe much of their present character to the inorganic world in which they developed. Life is not a random breath blown over the face of the earth, to disappear without a trace in a few millenia. Life is the very breath of the earth, of the Universe. It is part of them, a small part measured physically, an extraordinarily wonderful part on the basis of its peculiar qualities. This unitary concept must underlie any serious attempt to understand the meaning of creation.

#### 8. *The Dynamis and Parapsychology.*

If everyone were familiar with the foregoing evidence, the investigations of J. B. Rhine in the realm of parapsychology would meet with less prejudiced opposition. Just as the occurrence of migratory and gregarious habits in the animal world, the existence of deep and specific instincts, the phenomena of dowsing, and the discoveries of White, Abrams and Boyd disclose one aspect of biological adjustment to its milieu through purely physiological effects, so also another approach reveals the existence of a link which transcends the relative grossness of physiology. And the pioneer in this approach today is J. B. Rhine.<sup>32</sup>

His place in the history of science will probably be that of having first investigated telepathy and clairvoyance with scientific methods. Knowing that the occurrence of equally probable events is capable of statistical evaluation, he worked out a technique in which the results could be weighed against a chance ratio. He had arbitrary symbols drawn on five cards. One person, the "sender,"

shuffled the pack, then picked up one card at a time while a "recipient," protected from visual clues, called out the card. Over a long series of tests it is clear that accidental right calls would occur one fifth of the time ; just as the average number of heads or tails over many tosses of a coin would be one half of the total number of tosses. However, Rhine soon found that certain experimental subjects gave correct calls far in excess of the chance ratio. A variation of this purely telepathic approach attempted to involve only a clairvoyant faculty. An operator shuffled the deck, then placed the cards face down without examining them, while the recipient called out the order of the cards from top to bottom or *vice versa*. This eliminated any telepathic faculty because no one knew the order of the cards. It was observed that a recipient good at the telepathy work gave an equally good score with the clairvoyant tests. Hence, these two extrasensory faculties were tentatively linked together ; both appeared to be functions of an unknown awareness working independently of the senses, from which all clues were carefully shielded. In practice, Rhine used 25 cards in a deck in which each symbol was repeated five times. Some of his subjects consistently scored much higher than the chance figure.

Further work was undertaken to see whether increased distance between sender\* and recipient had any effect on the scores. Here again a good score between a couple at close quarters tended to remain unchanged even in cases where the separation was increased to over a thousand miles, the action of the subjects being suitably synchronized by electrical means. There was, apparently, some sort of interaction between sender and recipient which was unaffected by distance. It was an anomalous situation in that the usual weakening effects of space on action-at-a-distance did not hold true.

This anomaly will be clearer by recollecting the beha-

\* In the telepathic experiments, of course, the sender was an operator who looked at each card ; in the clairvoyant work, the unseen but shuffled deck must be regarded as sender.

viour of radiations in general. A radiation source may be considered to emit an infinite series of expanding concentric shells. A sphere of twice a given diameter possesses four times the area and will, accordingly, be illuminated at a given arc of its periphery by one fourth the photon swarm that illuminates the same arc at the periphery of the inner sphere. Hence, the law that radiation varies in intensity inversely as the square of the distance : at twice the distance, intensity is reduced one fourth ; at three times the distance, one ninth, etc. This law governs electromagnetic radiations and mechanical wave phenomena like sound and water waves. So far as is known, the only agents capable of action-at-a-distance are undulatory in character.\*

Whatever the exchange involved in extrasensory perception tests, they simulate the long distance effects of radiation. Hence, one would expect that if a given score prevailed between a sender and recipient separated by 50 feet, there would be a drop in successful calls when the distance was increased several hundred times, due to the attenuating effect of space. This evidently does not take place, and is in keeping with the age-old tradition of psychic dabblers, who have declared such phenomena to violate both space and time limitations.

And we may well ask at this point : Can phenomena violate space and time, which have been regarded as the bedrocks of our universe, and still remain a part of that universe ? If we are guided by experimental evidence rather than by prejudice or opinion, we must reply that telepathic and clairvoyant effects, as proved by Rhine, are surely perceived in our universe, regardless of where they actually take place ; and behave as if they could circumvent the usual limitations of time and space by which physical agents are bound. The transmission of a telepathic impulse emerges as something quite different from a wave effect between two persons. It appears in fact as a short-

\* Although, as modern physics has discovered, light is able to perform work through its ultimate constitution into particles, (the photons), its movement results from the organization of the photons into waves. By virtue of its wave aspects, light travels ; by virtue of its particles, it works.

circuiting of the material and physical substance of the universe ; so that events ordinarily separated in space and time may communicate with each other. And, if we find it difficult to suppose such a short-circuiting possible *within* the universe, there is always the more reasonable alternative that it occurs, not outside the universe, but outside of its time-space aspects: i.e., around them.\*)

Here appears still another facet of life. (In addition to the dynamic and physiological components, a living being possesses also an extrasensory aspect which differs from the physical characteristics in its ability to circumvent them as well as the external physical world.) "We might picture the physiology as the kernel of the complex living system, surrounded and permeated by the dynamis which extends beyond it, both of these aspects being in turn encompassed by a flexible, immaterial envelope with the ability to swell out at will throughout the physical world uninhibited by the usual physical restrictions. This last is of course the extrasensory being, whatever its ultimate nature."

\* The British aeronautical engineer, J. W. Dunne, has recently published a view of the universe in which time is not regarded as a series of instants beginning in the past and extending into the present and to the future, like an infinite necklace: instead he pictures the necklace as thrown in a heap, so that all the beads (instants of time) really touch together, and any concept of a longitudinal necklace strung from beginning to end would depend entirely on the point of view. That is, if one could only travel from bead to bead along the string while the necklace lay heaped up, one would get the idea of *sequence* (past, present, future) ; whereas by taking a bird's eye view one realizes that the beads are really piled together in space, making it difficult to select any one bead as *prior* or *subsequent*. And, Dunne continues, in dreams one is freed from the usual time concepts so that the individual is able to roam back and forth in time. Actually, he claims that if one is trained to remember all his dreams, he will find that those not purely random can be divided into two groups : reminiscent dreams, and prophetic dreams, about equally divided in number. This suggests to him his theory of what we might call the simultaneity of all time, a theory which he has named *serialism*. Such a concept is necessary to account for extrasensory phenomena ; and, as we shall see in the following section, the existence of an ultimate region encompassing, and free from, time-space limitations, is a mathematical necessity in modern physics.

Under certain conditions, some sort of extrasensory faculty may be employed to cure disease — so-called faith healing. This at once relates the extrasensory being to the dynamis and the physiology : they may react on one another to produce deep changes in the living creature. Whether a patient were cured by faith or by a drug selected according to the Emanometer technique, in either case one would expect to find a righted dynamic pattern *after* cure as measured by the Emanometer ; for, regardless of the means of healing, the result would always be the same, both as to the corrected dynamis and the corrected physiology. "But how is the extrasensory being related to the rest of the organism ? Is it more fundamental even than the dynamis, which itself underlies the relatively gross physiology ? Are the dynamic and extrasensory states sharply differentiated or do they represent different aspects of a completer reality ? And where does this complex unite with the physical world ? "

"We do not yet know, but the researches of contemporary physics are suggestive." Let us review them briefly.

## 9. Physics and Creation.

The effort to interrelate phenomena as diverse as those discussed in this essay is accompanied by real difficulties. To summarize : There are the purely physical factors of geological evolution and the various physical phenomena possible as a consequence under present earthly conditions. These have given rise to various types of radiations to which living things have developed a sensitivity — bringing in the biological aspects. And the study of biological matter, apart from its response to radiation, has intellectually dichotomised the natural sciences, making quite impossible until recently any satisfactory synthesis that would allocate convincingly the roles of inanimate material and of living beings. Biology is complicated by psychological, parapsychological and autonomic aspects which are hardly to be circumscribed within somatic limits. Whereas most purely physical systems are the arithmetical sum of their parts,

s/ "biological systems function as if something in addition to the physical constituents assumed the directorship: they appear to be *more* than the mere sum of their parts.<sup>34</sup> The last point is emphasized by occasional instances of parapsychology or extrasensory perception (telepathy, foresight, clairvoyance, etc), which not only transcend the physical boundaries of the organism but indeed appear to violate the space-time limitations of the physical universe. Clairvoyance and foresight often contradict the concept of causality by perceiving (psychically) events not yet worked into the apparent pattern of existence."

Hence, it must be asked whether the materialistic universe is really self-contained or whether it is not a complex set of attributes belonging to an ulterior reality. This question is a corollary of the fact that time and space may be circumvented under special conditions and by special agents. The question is also suggested by the failure of physical methods to account for ultimate beginnings or ultimate ends. We observe phenomena which have all the appearance of emerging out of a generating, unperceived matrix.

The identical problem was formulated several years ago by the physical mathematicians. They were prompted by the breakdown of the mechanistic atomic model proposed by Bohr and for so long useful in helping to visualize atomic behaviour. When spectral lines were repeatedly split into several components by placing the light source in a magnetic field, it became clear that the electronic orbits of the Bohr model were no longer suitable to account for the observed facts. Indeed, these orbits were inferential and represented an atom in a state which was never capable of direct observation — a state of repose; it was only when an electron jumped from an outer to an inner orbit that it emitted radiation and was capable of observation. Hence, in 1925, Heisenberg proposed that all purely inferential descriptions be omitted from physics, which should confine itself to observable events. In atomic physics, the observables were the frequency of emitted radiations and the

energy level in the atomic structure. Schroedinger came to a similar conclusion from another direction. He resolved material particles into wave systems and dispersed them in a perfectly transparent medium, the wave velocity increasing with the wave frequency. Waves of two frequencies could exist together, and the velocity of the wave group differed from the velocity of one component frequency, as in the familiar case of water waves. Thus, a material particle emerged as a wave group, a storm centre, and what we call the energy was related to the frequency of the waves composing the storm. When these indescribably rapid oscillations — far in excess of any electromagnetic frequency — came together in certain relationships they produced a "beat." And this beat, released into space, manifested itself to us as radiation. Born, Jordan, de Broglie and Dirac extended these purely mathematical concepts, which were quite incapable of visualisation in terms of a mechanical model (like the Bohr atom) but which certainly fitted all the observable facts. And the diffraction experiments of Davisson, Kunsman, Germer, and G. P. Thomson showed eventually that the electron was not, indeed, a massy finite particle but could be experimentally coaxed to display wave characteristics.<sup>35, 36, 37, 38, 39</sup>

The consequence of these studies is of great importance to our theme. The electron had long been regarded as a basic building-block of nature, an ultimate particle. It was suddenly broken down into a tangle of waves. Later, the proton, of opposite electrical charge to the electron, likewise betrayed evidences of a wave composition. What had been considered ultimate particles were themselves constituted of ulterior units, and these units were not just smaller particles but were actually wave systems of great complexity and of velocity much greater than light's. The atom's situation is much like that of Dean Swift's flea:

"So, Nat'ralists observe, a Flea  
Hath smaller Fleas that on him prey,  
And these have smaller Fleas to bite 'em,  
And so proceed *ad infinitum*."

The concepts of radiation also suffered a fundamental

change. Whereas the speed of light had been nailed down as the highest conceivable speed, and whereas light had been regarded as a thing quite apart from matter, the new ideas related the frequency and energy of light to the ultimate ocean of matrix pulsations out of which all physical units appeared to be generated. 'It was thus necessary for the science of physics, so long mechanistic, to abandon as primary phenomena all the observable events and to consider them the consequences of a matrix from which they were continuously extruded.'

So long as matter and radiation were viewed as ultimates, it was natural to suppose that all phenomena were expressible in their terms by a being acquainted with every factor involved ; and this complete knowledge was expected eventually through constant refinements in experimental technique. 'The random behaviour of electrons, for instance, was an appearance dependent on our ignorance of all the factors influencing them. But in the pursuit of atomic and other microcosmic phenomena it was soon found that increasing accuracy was only possible up to a certain point, beyond which lay a penumbra of increasing uncertainty (to paraphrase Bridgman<sup>40</sup>). And this penumbra was not the result of our ignorance or of technical errors and crudities but was inherent in the phenomena themselves.'

For instance, as Bridgman points out,<sup>41</sup> it is possible to measure quite exactly the length of any object composed of countless billion molecules — an object, that is, in the familiar scale to which we are accustomed. If, now, the accuracy of measurement is pushed to decreasing fractions of an inch, the tolerable error eventually approaches the atomic dimensions of the measured object ; and as even the most rigid bodies do not possess sharp boundaries but terminate in thinning atomic clouds of constantly changing densities and breadth (the result of the kinetic motion of atoms), it becomes impossible to decide the exact point at which the object actually ends. The same limitation applies to the rule itself, if it be material. Measurements of this extreme accuracy hence resolve themselves into the opposition of a flowing standard against a flowing object under mensura-

tion, and the final result is an approximation determined by averaging out the atomic clouds at each pair of ends. And since the exactness with which large objects can be measured depends on the exactness of measurement of the very small, the effort at unequivocal determinacy is at once frustrated by an inherent quality of nature. The principle of indeterminacy (uncertainty) was first propounded by Heisenberg. It is one of the most important contributions to modern physics.

Again : randomness may be expressed as a relationship between the physical constituents of the universe ; this relationship is extracted out of random elements by statistical calculations. The workings of chance arrange themselves into definite patterns only when the chance events are extremely numerous ; there appears to be no pattern of individual behaviour. But this lack of pattern is not solely a semblance arising from our incomplete knowledge of causes. Even if all the contributing factors to an event were known, they might still fail in determining the cause. The knowledge of causes is not sufficient to an understanding of chance. Chance, indeed, and the grouping of random elements into conceivable patterns express the secondary character of physical units arising from a primary region. Chance is an appearance amongst physical units : it is not capable of directly explaining anything except in terms of a remoter reality which it partially represents. Thus, chance is related to the principle of indeterminacy. Both are inherent in nature ; both tend to limit the closeness of our approach to physical units ; yet both paradoxically contradict themselves by indicating an aggregate pattern which is only evident by a contemplation of many individual cases.

The tentative picture of the universe drawn by mathematical physics is very curious and in sharp contrast to the mechanical model elaborated by the physics of the nineteenth century. A universal medium is postulated called variously the matrix, subether, substratum, and, by Schroedinger, designated in his equations by the Greek symbol  $\psi$ , psi. This medium is filled with waves of inconceivable fre-

quency and velocity, beside which the shortest electromagnetic oscillations are sluggish and coarse. The matrix waves may be visualized as rapidly pulsating throughout their medium. And in their myriad oscillations they pile up here and there in storm centers of many components, hence of great complexity. A storm center is a region where the components by interference have piled up their crests and deepened their troughs, producing total amplitudes far above the normal for the original matrix waves. From each storm center the waves spread out throughout space with increasing velocity and diminishing amplitude: so that it may be said that no strict boundary exists for a given storm. Both the dimensions and position of a storm are governed by the chance relation of the matrix waves building them up. And the frequency of the original waves plus their manner of interfering determine the undulatory characteristics of a storm. We perceive — indeed, we are composed of—the reinforced wave sums of which the storm centers are made. We do not actually see the piled-up waves but receive a secondhand impression of their workings. This impression is interpreted by our senses as that experience which we call “matter”. Indeed, the storm is nothing but one of the so-called ultimate particles of matter, an electron, a proton, and so on, each kind resulting from different combinations of the matrix waves. But the matrix waves are themselves far removed from sensory detection. They are so rapid and fine structured that no material instrument would serve as a detector. The whole rippling matrix continually regurgitates the physical universe: and we see only that which is already extruded, never the mechanics by which the regurgitation is accomplished. Thus, the physical world of which we are conscious and which represents for us all that is tangible, fixed and lasting, turns out to be only a gossamer substance without solidity or real extension in time, a breath blown out by the mother matrix which itself, like the termite queen, remains forever hidden.<sup>1</sup>

<sup>1</sup>This reference to the termites is not irrelevant. Somehow it is necessary to relate to the physical world all

of the inexplicable biological phenomena described in this essay: Such facts as the memory of a species by which it preserves its integrity over generations; and the similar memory of an individual organism by which it maintains its individuality over a lifetime of taking in food, excreting wastes, rebuilding its every cell over and over without becoming a different creature; such facts as the purposiveness of evolution following the biological impulse to adapt, to develop greater economy and smoothness of operation; such facts as the various instinctive orientations of living beings to the inorganic milieu that helped to form them, the various migrations, the specific skills through which insects maintain a social order, the directional faculty of most animals, unknown modes of communication between animals, and the other keen communions which warn and direct living things; such facts as telepathy in man, and clairvoyance, and foresight, and intuition, and the host of autonomic reflexes which reveal agents in nature too delicate to be detected by purely instrumental means. Some of these can be superficially explained in a materialistic way: observers may conclude, on wholly insufficient evidence, that bird migrations relate to the magnetic lines of force of the earth. Other phenomena are frankly puzzling, especially to the materialistic mind, for instance, telepathy; and the mechanical viewpoint, in dealing with such phenomena, takes refuge in declaring them impossible. Yet telepathy appears to be a fact, and its most outstanding feature is its emancipation from the restrictions of time and space under which materialistic phenomena labour.”

What do we mean by emancipation from time and space? How can basic qualities be freed from themselves without having more fundamental regions in which to move? If the material universe were the ultimate, the self-contained unit of older physics, it would whisper its final analysis of itself: eventually all the facts would be collected; nothing new would be left to discover. And so nineteenth century physicists imagined. The enigma of creation for them was enclosed in a cubicle of space permeated by an absolute time and sown with the massy cor-

puscles of matter. But the enigma lies all beyond these appearances. It is the vast regions in which time and space are circumvented that hold the real answer : the regions which appear, in the mathematical discussions of Schrodinger, Dirac and others, as the matrix, the subether, the substratum — Schrodinger's mathematical  $\psi$ , psi.

And of all manifest creation, biological creatures appear to bear the special gift of unconscious orientation within this matrix. It is unnecessary to consider further instances than the extrasensory awareness unearthed by Prof. Rhine in his laborious and prodigious tests. We have already mentioned the physical significance of his distance experiments, of the fact that the intervention of a thousand miles of space between the sender and recipient of a telepathic "message" made no apparent difference in the accuracy of the score. It is good to recall that so eminent a mind as Dr. Alexis Carrel expressed his conviction that another category of parapsychology, faith-healings such as those at Lourdes, cannot be dismissed now that they are corroborated by a medical board established at the shrine for the purpose of analysing the cases. What struck Carrel especially was not the mere fact that a profound act of faith could set in motion the healing powers of the body : he was most impressed by the observation that the normal physiological repairs were extraordinarily accelerated. A gravely ill patient with much pathology became cured abruptly ; it was a matter of hours, instead of weeks, for the tissues to repair themselves, and the sense of well-being in the patient was instantaneous and lasted throughout the whole brief but complete convalescence.<sup>42</sup> We do not know how the body achieves such miracles ; but it is obvious that ordinary physical stimuli will not spur recuperation to such lengths.

What is the relation between extrasensory faculties, the physiology, the dynamis ? — between them and the physical world ? Is the dynamis a direct messenger from the matrix, or is it a sort of intermediary between the matrix and perceptible phenomena ? Or may these questions be meaningless from the point of view of nature ?

Have living beings an unknown channel of communication with the matrix, the mother matrix in which exist the force-patterns about which the forms of the physical universe are grouped ? Is para-psychology a revelation of this remote realm too fine-structured for perception by the senses ? And do biological organisms, because of their relative degrees of consciousness, provide so many shuttered windows, briefly thrown open, into this profound region of the matrix eternally pulsating and forming, reabsorbing and reforming the visible universe ? Does real consciousness exist as an orientation within the matrix, and is our orientation in the physical world a deception arising from coarse senses whose messages are loud-mouthed, drowning out the more subtle whispers from the matrix ? Is it the reality of the matrix which makes of biological organisms a total exceeding the sum of the parts ? Are the intuitive faculties of the mind, as distinguished from the intellectual, the intrusion of the matrix into cognition ? Surely, if the matrix is the origin of creation, if it maintains the cinema of time and space, if it encompasses time and space so that neither is an ultimate but only an attribute of reality, then a glimpse into the matrix is an extrasensory revelation. Such a glimpse suddenly reveals the depth of things in any direction, past or present, to any extent in space. And such a glimpse seriously shakes the time-space illusion in which we have been educated by our senses.

#### 10. *Summary.*

The universe is more wonderful than we can imagine. Once upon a time, it did not exist as we know it today. Unknown forces set in motion the processes through which have arisen the present boundaries of space, pregnant with millions of galaxies and billions of suns. Each sun is independent, flaming silently in its corner of the universe ; yet the shape and properties of the whole universe are determined by the total of suns. Suns and interstellar dust are composed of atoms, which in turn are built up of

smaller units. And in between the particles of what we call matter runs a flood of radiation : energy poured out of each sun, reabsorbed by matter, reradiated, and thus bandied back and forth within the transparent regions of space. Matter and radiation interact. Each has characteristics of the other — wave as well as particle characteristics. Logic and facts induce us to believe that this physical system (which we call Universe) is the reflection of a profounder, unperceived reality. This fundament, this matrix, generates all perceptible phenomena, gives them form and characteristics, reabsorbs them, and then pushes them forth again. In themselves, perceptible phenomena have no ultimate meaning.

And on one of the bodies of space appeared Life. We on earth are the descendants of primitive living creatures. We strain the material world through our substance, retaining the elements necessary for existence and letting the others pass outwards. But throughout the physical flux that maintains us we preserve our consciousness and our individuality. We possess the memory of our own activities. We possess the unwitting memory of our species, so that each generation reproduces the past, sometimes with a subtle change which we call mutations. And we jealously preserve the memory of life itself — the quality by which we are separated from a lifeless environment.

Yet, living beings are themselves composed of matter, of atoms, electrons, protons, which bud out of the mother matrix. The matrix waves, silent, rapid, too subtle for our sense, vibrate together to form the material of living creatures as well as of lifeless things. In the matrix lie all the patterns of creation. That is why organic development on earth is not random but parallels inorganic history. Evolution is not only the adaptations of life : it is an expression of the matrix, which generates concurrently and harmoniously the physical world and its indwelling life.

And because life is self-conscious and perceptive, it catches glimpses behind the curtain separating the physical stage from the invisible matrix. It is aware of strange

contradictions and inexplicable events which have the false appearance of autonomy, whereas they are the produce of the mother matrix. Life, because of consciousness, sometimes escapes into the timeless, boundless matrix. Then it suddenly beholds creation stripped of fiction. It perceives that there is no beginning or end ; no past, present or future ; no immutable laws of physics which fetter the soma and its resident life.

Such revelations of the matrix are at the basis of all miracles. They probably underlie extrasensory phenomena. They enable living creatures to circumvent physical limitations. They may somehow be related to the unknown energies found in living creatures and in minerals. And, for all their rarity and briefness, these revelations constitute our only glimpses of reality. All other appearances are illusions.

#### 11. *Medical Aspects.*

It will be seen that life is maintained and directed by a unified effort on the part of each organism. This effort may be composed of a great many separate activities, but together they have a single purpose — the well-being of the individual ; and, ultimately, the well-being of the species and of all living creatures. Not only does life respond to the relatively gross and obvious stimuli of the physical world, but it also responds to agents so delicate that no means of studying them exist today except through biological reactions. The plane on which all these intangible effects take place in life involves the very depths of being. They occur below the level of consciousness. They saturate every aspect of life, the physical, the psychological, the dynamic. And by reacting to the manifold agents of the physical world, these effects impart to life the essential information by which life subconsciously adjusts itself to the environment and to situations. These effects represent, indeed, the profoundest sort of wisdom ; for they

directly touch reality, regardless of whether the organism possesses or lacks intelligence. By means of these responses occur the various migrations, the untold adaptations of life, the hunches, intuitions, prophecies, the miraculous healings of which little is known except that they happen.

But medicine has neglected this phase of life. It has overlooked the fact that life, in its unconscious efforts, holds the most powerful weapon for the struggle to live successfully. Instead of studying these obscure reactions and seeking to apply them to the art of cure, medicine has instead seized the obvious effects, the chemical, physical, electrical and pathological aspects of life. Unfortunately, these are all end-products or else they are secondary to more ultimate phenomena. The true art of healing should be based not on the coarse activities associated with life but on the underlying, motivating life agencies themselves. These are essentially dynamic and intangible to present scientific instruments although they are doubtless susceptible of eventual mechanical detection.

In this essay we have reviewed present knowledge concerning the dynamics of life and the deep physiological reactions which are the physical expressions of living beings. The art of the dowser, the occurrence of the abdominal and other reflexes, the enhanced and inhibited activity of enzymes, the rapid healing resulting from faith-cure, are physiological effects. Prior to these are the energies detected by such instruments as the Emanometer, the obscure dynamic factors stimulating the faith-cure, the unknown exchanges involved in telepathy and clairvoyance, the unexplained faculties resulting in the ability to foretell the future. In some fashion, all these intangible aspects are linked together. As they constitute our closest linkage with reality, they should be studied by physicians seeking to find the surest therapy. When properly used, these methods cure promptly, safely and lastingly. But much remains to be discovered.

The material in this essay gives the basis on which the therapy of tomorrow will be built.

## THINGS TO DO.

### 1. *Retrospect.*

We have now covered, in the previous two essays, ground which can be considered basic in the field. In the first section we recorded the fact, together with the proofs, that in a series of dilutions in the ratio of one to a hundred, up to the 30th or higher, the effect of the solute on the solvent continued long after the disappearance of the last solute molecule somewhere in the neighbourhood of the 10th centesimal potency ( $1 \times 10^{-20}$ ). We related such high dilutions to phenomena already observed in physics and deduced from these relations the probable physics of high potency activity.

In the second section, there was discussed the factor of the general response of living things to environment: the response which enables birds and fishes, through an inherent awareness, to find the locations favourable for propagation; and which enables the millions of insect species so to adjust themselves to external conditions that their various methods of life can go on smoothly, including two life stages (the larval and the adult) so totally different in aspect that to the unlearned they would appear to be unrelated to each other. This same autonomic factor in all life forms, including our own, maintains somatic integrity in normal situations and is responsible for the repair of injuries, whether from mechanical and chemical factors or from the aggressive activities of bacterial life forms.

We strove to integrate the biological world with the immediate physical environment of the earth and then with the remoter, but not less important, physical environment of the universe as a whole, and this integration we tried to build from factual rather than theoretical considerations. We showed that the evolution of life was not so much a struggle with, as an adaptation to, the inorganic environment, and that the two must be considered together as a cooperating system in which life modified the environment and *vice versa*. We indicated the conclusions reached by modern physics that

perceptible events are secondary issues from a fundamental matrix of high frequency oscillations of a type undetectable by physical instruments, and we tried to link this concept with what we already know concerning life, living functions, and the physical universe. We left open, furthermore, the door into the vast unexplored region of the extrasensory, where space-time restrictions are transcended, and suggested that perhaps clairvoyance and allied faculties were excursions by living beings within the matrix itself.

In this section we shall show how the autonomic activities of the body can be utilised for finding drugs or other substances that stimulate the natural resistance of the body in a specific manner. Homoeopathy gives us a hint of how to go about it because the "strange, peculiar and unusual symptoms" that Hahneman stated as the only ones to be used for selecting a curative drug are all symptoms related to the reactions in a patient that represent his specific autonomic response toward recovery. It is only that response which brings about cure.

Much of the experimental background of the previous essays is specialised and technical, but certain basic experiments are so simple that they can be repeated by any interested person. They are, incidentally, the phenomena earliest observed in connection with this work; so they will carry a historical as well as a practical interest.

Perhaps it is prudent to say that by the simplicity of the experiments we refer to the fact that no special equipment is necessary, only the senses of the observer. In practice, the observation of these effects requires keen perception, patience, and the recognition of the fact that any experience taking place across the threshold of consciousness will present, at any single trial, a blurred picture which can be brought to a focus only by repeated trials. The observations we are about to describe, despite their simplicity, are on the borderline of deliberate perception and will, therefore, present certain difficulties to the experimenter accustomed to clearcut results. But by trying several times the experimenter will find it possible to repeat his results quite

consistently; so that the probability of accidental successes can be statistically ruled out. Such statistical computations can be used as a good check on the reliability of results. Another check, which can be applied later, is the clinical.

## 2. *Tissue Tonus.*

You have probably had the experience of tapping a wall with the knuckles or a felted hammer and hearing the tapping note becoming dull over a buried beam. You may have had the same experience tapping a tabletop—the note is resonant all over the center of the table but becomes dull as you approach the edges, which are less free to vibrate because they are attached to side-pieces, moulding, legs, etc. Very light tapping with a felted object shows that the pitch remains about the same for the resonant and dull areas—that is, the fundamental note is unaltered. Heavier tapping, however, by eliciting more of the harmonics, gives the impression that the resonant areas produce a note lower in pitch than the dull areas. Make this little demonstration for yourself and be satisfied that you agree with us.

The idea of applying this technique of tapping to the human body in diagnosis came to an Austrian physician in the eighteenth century. As a boy, Auenbrugger had watched his father, an inn proprietor, determine the level of wine in casks by tapping the walls of the cask. Above the wine level the note was low; below the wine level, it was high. Why could not the method be used to locate collections of fluid in naturally resonant cavities like the lungs? Auenbrugger tried, succeeded, and published his results in 1761. Ever since then, *percussion* has remained one of the reliable bedside tools of the physician.

But percussion is ordinarily used to elicit densities *within* a cavity. It can also detect, if it is done lightly, variations in the surface tenseness of, say, the abdominal wall. Tenseness gives a duller sound to percussion than does relaxation, because the tenses tissue is less free to vibrate.

The latter type of interference with normal vibration is technically called "damping." The loud pedal on pianos

works by lifting from the strings felt cushions which ordinarily fall back on the strings immediately after the note has been struck, and these cushions are known as "dampers." Without them, all the notes struck would continue to sound together, resulting in an intolerable harmonic omelette! A note which is damped suffers no change of pitch provided the damping influence is not heavy enough to alter appreciably the tension of the vibrating object; but because the same amount of energy is now required to keep the object vibrating against an obstacle (the damping medium), the amplitude of the fundamental is decreased, some of the harmonics are reduced and others may be altogether obliterated. When damping takes place, the result to the ear is most accurately expressed as a change in quality, but there may also be the illusion of a change in pitch.

In percussing over cavities like the lungs or a part of the intestines distended with gas, or in tapping the side of a partly filled barrel, another factor must be considered: the existence of an air column with its own natural period. In such cases, actual changes in pitch take place according to the amount of fluid contained in the cavity, since the pitch is directly related to the length of the enclosed air column. However, as this factor is of negligible importance to the type of percussion in which we are interested, we need do no more than mention it in passing.

Tonus is a universal characteristic of living things. Both White and Abrams (see previous essay) have shown us how to utilise this factor for diagnosis and for selecting curative measures. Through a finer technique, Wm. E. Boyd of Glasgow adapted this approach to homoeopathy. Boyd's instrument, the Emanometer, offers the most scientific utilisation of the autonomic approach.

In section 5 of the previous essay we saw that dowsing is possible because of a reflex weakening of the muscles of the dowser when he passes through a dowsing field. The muscular reflex is doubtless general, as shown by certain sensitives who react to a dowsing field by a feeling of fatigue or heaviness, the result of a decrease in the muscle tonus.

We saw also that a great many other agents exist which are capable of influencing muscle tonus: for instance, the presence of other persons; of plants; of drugs, especially potentiated drugs; and also of specimens of secretions from human beings in electrical circuit with the person demonstrating the reaction (the "subject"). All these phenomena resemble one another in that an individual's muscle tonus is reflexly changed by the presence of energy of various types.

Such muscle effects can be objectivised by kinesthetic methods: that is, by forcing the subject to perform work requiring uniform effort. The change in tonus then manifests to the subject as a corresponding change in the effort he must apply to that work. This is the method of dowsing, where the operator separates the forks of the dowsing rod. Another method seeks directly to show variations in the tenseness of muscle tissue, and the simplest of these techniques involves percussion, where the quality of the note is related to the degree of tenseness present in the tissue under percussion.

All such changes in muscle tonus, being reflex, have their origin in a stimulation of the autonomic nervous system. If we remember that the autonomic seems to be a kind of physiologic coordinator and superintendent, not only maintaining the routine of the body but controlling its reaction to abnormal conditions like disease, we realise that by approaching the autonomic in the right way its great powers may be deliberately used to the advantage of its possessor. In fact, we showed in the previous essay a number of techniques developed to help the autonomic guide the body back to health in cases of illness. We now propose to describe two or three of these methods in sufficient detail for any interested investigator to try. These techniques, as their ultimate goal, will enable anyone to find a patient's simillimum by means of the patient's own reactions. Having already laid the physical and biological grounds, let us consider the percussion technique as applied to the abdomen and to the lung apex.

For best results, percussion should be performed with a sharp wrist movement similar to the staccato attack on the piano. The pleximeter finger (usually the middle finger)

is pressed firmly against the area to be percussed, and the strokes fall continuously on the terminal joint of the finger. The percussing finger should be permitted to rebound the moment after it has struck; otherwise, it will damp the note and the effect, which is itself a damping, will not be apparent. Good practice for developing the percussion technique is to let the hand hang limp from the wrist, and then to shake the whole forearm, letting the hand flounder from side to side—to be applied, of course, to the percussing, not the pleximeter, hand.

You are now ready to take a subject for experiment. Stand him facing North. Percuss the upper chest at the exact point where the note is between flatness and resonance. While you percuss continuously, have the subject pivot on his heel towards the West, turning slowly. It is best if you follow him around rather than just reach towards him, as by keeping the same position relative to him you will be less apt to vary the percussion as a result of his movement. Notice that when he faces approximately West there is a slight change in the quality of the note. If he continues to turn beyond West the note goes back to its original quality, but as soon as he returns to the West position the changed note recurs.

This experiment should be performed a number of times. To test yourself, blindfold both the subject and yourself. Confuse yourselves by turning yourselves around several times. Then try to find West by detecting the change in note.

Although a third person can hear the effect quite clearly from the opposite side of the room, it must be remembered that the continuous change in position between him and the rotating subject would make it very difficult for him to be sure of the effect.

You should also be cautioned against the fact that the walls of the room reflect sound waves and that the ear might be in the exact position to pick them up and mistake them for a change in note when the subject happens to be facing West. This test is properly made on an open field or a

housetop where there are no neighbouring reflecting surfaces. Here also the effect will be found to take place, showing that it has no relation to the confined space of a room.

A variation of this experiment can be made on the bared abdomen of the subject. The subject should stand (not facing West) on a sheet of non-magnetic metal which is grounded, or grounded wires should be wrapped about his ankles. If you now percuss lightly over his whole abdomen while he faces away from West, you will observe several dull areas, with resonant areas in between, or perhaps the whole abdomen may be uniformly dull. The subject then faces West, with his hands hanging at the sides. Percussion over the abdomen now reveals uniform resonance: the dull areas have disappeared. You will remember, from the preceding article, that this is the position in which both Abrams and Boyd stationed their subjects when working with tuned circuits. Since the abdominal effects are a dulling of the note, if the whole abdomen is resonant to begin with the dull areas can be much more easily distinguished.

A few persons seem wholly incapable of hearing this change in note. Although some persons have difficulty at first, most appear suddenly to sense what to look for, after which detection of the effect comes fairly easy. But a few never succeed in overcoming the initial difficulty, and the reason for this is not always obvious as some of these persons have more than ordinarily good ears. One would think musicians especially qualified as detectors. However, an initial difficulty experienced by musicians is that they listen for a variation in pitch instead of a difference in tonal quality, and the effect eludes them. Once they understand what to look for they are often more skilful at detecting the effect than the average person.

The best general recommendation is not to concentrate heavily—to hear, rather than to listen. Excessive concentration tends to bewilder, and one wonders whether the change in note was really heard or imagined. Relax, and accept what comes. A semi-detached attitude of mind is good, as Boyd recommends. And do not be discouraged by the fragility of the effect. Any critical adjustment depending on

sensory perception is tedious and has a relatively large tolerable error. You probably know how difficult it can be to focus the camera image on a groundglass, or to secure the point of best reception on a radio set tuning in a station with a broad condenser spread. The percussion effect is much fainter than any of these, and correspondingly difficult.

Having assured yourself that you detect the effect accurately, try the following interesting test : Percuss the subject near the lung apex, as described above. Then direct a friend to approach slowly from a distance of twelve or fifteen feet. The latter must approach *slowly* or the effect may be lost. When he is two or three feet from the subject being percussed, there is a distinct change of note. Repeat the test, and the change will occur when the subject and your friend are at the same distance apart as in the first test. Now substitute another friend for the first, and he will probably cause the change in note at a slightly different distance. Occasionally the effect takes place with the two persons as far apart as ten feet, as happened once between a man and woman. We do not know what actually takes place in this effect, but evidently some sort of radiant interchange excites a reflex in the subject, and the reflex is manifested by percussion; no physical contact occurs between the subject and what we may here call the agent. We are reminded of the aura with which metaphysicists have long surrounded every human being. Whatever the nature of this radiant envelope or the claims that have been made for it in the past, we may be sure that it is a physical phenomenon which some day will be explained and understood. Evidence of a negative nature would indicate that this envelope is quite different from any possible electrostatic field surrounding the living body. Let us ask, before turning to another topic, whether the effect-at-a-distance between two persons is responsible for the involuntary attraction or antipathy we so often feel for persons we meet for the first time. And let us also wonder how many other agents excite reflexes within us, with physiological consequences of which we know nothing and which we describe in terms of "free will," "volition" and the like. But here we can do little more than speculate.

You are now ready to apply the percussion technique to its most practical use—the selection of an appropriate medicine for a patient. And bear in mind that you are using the patient's own reactions; that it is the patient who selects the remedy through the wisdom of his autonomic, and that such a selection is more accurate than any you could make with all the customary resources of knowledge. The key is in knowing the language of the patient—in knowing how to interpret certain of his reactions.

Once more, the technique is percussion at the lung apex. You will need an assistant to stand ten or fifteen feet away and handle the remedies. Just as in the "aura" experiment there was a radiant interchange between the subject and the person approaching him, so here there is an interchange between a radiant, or energetic, factor in the patient and a similar factor emanated by drugs. The drug energies, as we explained in the previous essay, pass readily through glass and cork, as light shines through glass; so the drugs are left in their vials. You will find that the patient at first responds to several drugs from the group tested ; if these are then retested, most of them produce no further effect, and of the remaining few that do, one always produces a stronger and more persistent reaction than the others.

Percuss continuously, as already described, with the patient seated facing West. Your assistant picks up a single drug vial and takes about two seconds to lift it over his head as high as he can reach. You will notice two things : the moment he touches the vial, the percussion note becomes dull. As a matter of fact, if he reaches slowly for the vial, the patient's note becomes dull when the assistant's hand is a few inches away from the vial. The assistant then raises the vial, and at different heights for the various remedies the note becomes resonant again. All drugs producing this double effect of dullness and then resonance should be discarded. A few drugs however, once they have produced dullness, continue to maintain it no matter how high over his head the assistant raises the vial. These drugs should be set aside for retesting. When the original group of drugs has been gone through, all those maintaining dullness

are tested once more. The second time only a few will cause the reaction.

These few are then differentiated in the following manner. The assistant, holding one vial at a time between his fingers, and being careful not to close his hand around the vial,\* walks back from his position, increasing the distance between himself and the patient. At a certain distance you will observe that the note becomes resonant. This is referred to as the distance at which that drug "holds," and different drugs "hold" at widely varying distances. All the drugs maintaining dullness at close range are checked for their distance ratings. The drug holding at the greatest distance is the best of the group tested, and in order to be a simillimum this distance should be at least 75 to 100 feet, and more. Indoors it is virtually impossible to draw this far away from the patient in a straight line, but fortunately the energies in question — emanated by the drug and by the patient — appear to go easily through brick, stone or plaster partitions. Hence, the interposition of walls need not disconcert you. The point is to get as far from the patient as possible.

In view of the imponderable nature of a high potency this phenomenon is one of the most remarkable observed, as the patient's dull note has been maintained by the right drug in potencies over the 1000th centesimal at a distance of 200 feet. For practical purposes, the distance may be much reduced by grounding the assistant by means of a flexible lead, or by attaching the drugvial to the end of a stick three or four feet long, as the effect of the assistant in contact with the drug seems to be to increase the carrying power of the latter.

The explanation of these effects is not known with certainty. However, it is possible that the assistant who handles the drugs acts as a variable condenser, the condensing effect diminishing as he raises his arm over his

\* Because living tissues tend to block the radiation of drug energies. The assistant should carry the vials in such a way that his body will not be interposed between drug and patient.

head in much the same way as a variable air condenser diminishes in capacity as the plates are opened. When the assistant picks up a drug his condenser system works at maximum efficiency and the patient reacts by a steady dullness of the percussion note, which disappears as the assistant raises his arm and reduces his effectiveness as a condenser. Then the carrying power of the drug is insufficient to bridge the distance to the patient, and the latter ceases to respond, as shown by a return of the note to resonance. However, a good drug will hold the patient even when the assistant's condenser effect is at minimum — i.e., when the latter holds the drug high over his head. Such drugs must be tested for the distance at which they hold. Although this explanation is hardly more than presumptive,\* it helps to rationalise the phenomena and make them intellectually acceptable.

One of the authors well remembers his first test with this technique. A friend was subject to annual hay fever towards the end of August, and for two years the attacks were aborted by a single dose of gelsemium each time. The symptom picture was classically gelsemium. However, the third year the symptoms returned identical, but gelsemium failed to help, and symptomatically no other drug seemed indicated. Because of the good past response to gelsemium, which is in the sixth group of Boyd's classification, the Group 6 remedies were tested on the patient by the technique just described. *Cocculus* held better than any other drug, and one dose in the 200th not only cleared up the hay fever in 48 hours but put the patient in better health than he had enjoyed for several months. This shows what can be done by a beginner with the reflexes if he is patient, attentive, and confident in his observations. It shows also the usefulness of the Boyd classification as a

\* In the case of an electrical condenser, variations of capacity alter its resonance characteristics — i.e., place it in resonance with waves of different frequencies whereas the person holding a drug does not appear to act in the capacity of a tuner but merely as a builder-up of the whole effect. So that the analogy with a condenser here given must be very tentatively accepted.

general indication of the drug group from which to select the appropriate remedy for a patient whose classification is known.\*

### 3. *Other Reflexes.*

Another of the easy reactions to observe is that of the pupils. The primary purpose of the pupils appears to be to regulate the amount of light that reaches the retina. They are responsive also to the emotions, contracting in anger, dilating in fear, and are probably, excepting in sleep, constantly in some state of change. They dilate from pleasure and, appropriately, they will dilate in the presence of a curative remedy. The poets have recognised the responsiveness of the pupils by the expression : "The eyes are the mirror of the soul."

Here are the rules that must be followed in utilizing the pupil reflex : The patient should sit in a room that is not too light and face the dark side of the room. It is better that he face west. His hands should rest easily on his thighs, with the feet slightly separated. The operator should sit in front of him, holding a shaded hand-light. The operator can be also the one to handle the remedies, but it is better to have an assistant. When ready, the patient should be directed to gaze toward a far corner of the room, with relaxed attention so that his eyes will be focussed for distance. Now, the operator, holding the lamp not higher than his waist, suddenly turns it upward so that the light shines into the patient's eyes. The pupils will immediately contract and then, in a second or two, will dilate slightly and come to rest. At this instant, the assistant should in a single quick movement bring the remedy close to the patient. It is better for the assistant to be behind the patient, otherwise the patient's attention to the movement will cause a reflex of the pupils and they will dilate. If the operator is working alone, he will observe

\* See section 7 of the preceding essay for a full discussion of the Boyd classification and its significance.

that the patient's pupils will dilate when the first two or three remedies are brought close to him. If that occurs, these will have to be retested later. Once this technique is under way, the pupils will react only to certain remedies. These must be noted, and after the whole series has been tested they should be retested a few times. On a retest, certain ones will gradually drop out, but the one that is nearest to the simillimum will cause the reaction for a large number of repetitions. When using this technique, a large enough number of remedies should be used to ensure at least two or three remedies that are related to the patient's condition. One who knows his homoeopathic materia medica can select a comparatively small group. If the exact simillimum is in that group, the effect will be very definite and persistent.

The heart responds to the nearness of a curative remedy, and its response is easily detected if the remedy be a simillimum. The effect can be observed with the fluoroscope, but of course one could never use the fluoroscope for testing because irreparable damage would result from the long exposure to the x-ray that would be necessary. The pulse, as would be expected, will show the effect. The position of the patient is the same as for the pupil-test. The physician feels the pulse, preferably at the wrist. The assistant should be located behind the patient, with the remedies to be tested scattered handily on a table. When all is ready, he picks up one of the vials and immediately, with a quick swing, approaches it within a few inches of the patient. The vial can be held there for a few seconds, then replaced on the table. The physician observes the pulse and also counts it, having previously ascertained what is the normal pulse at the time. The heart will respond to the remedy to which the patient is sensitive, usually by a sudden change in the first pulsation followed by a hesitation and then a slightly different rhythm. If the heart frequency during the control period is found to be too rapid, the remedy will cause it to slow down a few beats ; if the frequency is too slow, it will be increased.

The variations may be four, six, or eight beats to the minute. With practice, one gradually learns quickly to observe these variations. You will note that this technique requires a physician's skill or at least some one who is familiar with pulse-taking, while the pupil-reactions can be observed by anyone.

Another method for utilising the reactions, is the effect which occurs in the skin. Here again it is better for the patient to be facing west. His abdomen should be bared. The operator strokes the abdomen with a dielectric-rod, such as glass, rubber, bakelite, etc. The assistant can be close by with the remedies to be tested. These can be selected by means of the repertory, or one can use a large number indiscriminately, but the smaller the number tested at one time, the more definite are the reactions all the way through. The operator very lightly strokes the abdomen in various areas around the navel. The assistant now picks up a remedy and brings it close to the body. If the remedy is a good one or closely related to the patient, you will observe that the rod causes a "clinging" sensation as it is stroked over the skin. On the start, a single area should be used, such as one immediately below the navel or at one side of it. If the remedy is in any way related to the patient, the rod will feel as though it was slightly retarded. In order to observe this best, it must be held horizontally by one end and the other end should be gently stroked downward. All remedies that cause this first reaction should then be tested in various other areas of the abdomen. The best remedy will cause the largest number of areas to respond. In this way, the group is gradually whittled down until there will be a comparatively small group to retest over the areas. The remedy that appears best can be rechecked on the pupils. If it is good, it will cause marked dilatation. In other words, the remedy that is a similar is capable of producing a large variety of reactions which take place all at the same time. This unitary response is what we should expect from a mechanism that integrates physiological activity.

#### 4. Conclusion.

To the average physician, the reflexes provide a way out for those difficult cases not reached by intuitive prescribing. The outstanding instance of this is, to our knowledge, a pupil test made on Dr Stearns at a time when he had been given up as lost by the best Homœopathic prescribers in America. He suffered from myocardial disease, and, with two brief intermissions, his course was steadily downwards. He was unable to walk more than a few steps without suffering much pain. He decided to apply the pupil reflex to his own case. Two laymen, after preliminary training, observed the effects. Each day 100 drugs were tested; all those producing the reflex were set aside and added to the next day's batch until a total of 1200 drugs had been tested over a period of 12 days. On the 13th day, all drugs that had worked their way to this point were retested and compared. Morphine acetate came through best and was taken by Dr Stearns. Improvement was slow but proceeded uninterruptedly from that time. The two remedies later prescribed, *Ruta* and *Rhus tox.*, had all figured high in the original test.

But perhaps the most significant point to be made in connection with this test is the fact that it was conducted entirely by two laymen. One manipulated the vials; both watched the pupils for the reaction. What laymen could do in this instance can surely be duplicated by physicians.

Again, that master of homœopathy, the late Dr C. M. Boger, once cited to us an experience of his. One of his patients had failed to respond to his best efforts. He decided to use the pulse reflex as his guide. He went through the arduous process day after day, testing as many remedies as time permitted. The remedy which gave the best reaction had no proving, and we have forgotten what it was, but it started the patient on the road back. Later, the symptom picture cleared so that a remedy could be selected according to the old intuitive method, and the patient made a full recovery.

Dr Samuel P. Sobel of New York, knowing nothing of the various reflex responses to drugs already known, rediscovered them by independent research and discovered many new reactions. His interest was aroused by a test made on himself by Dr Stearns. In this instance, Dr Stearns utilised the rod technique described above. The drug giving the largest number of abdominal reactions was Rhus tox. 30. Dr Sobel was suffering from facial paralysis as a consequence of influenza of the meningeal type. For several years he had been afflicted in addition with rectal fistula. Immediately after taking the Rhus tox., Sobel felt a tingling in the paralysed parts. He improved steadily; the paralysis disappeared; and after a few months the fistula healed. No wonder that this experience stimulated his interest. This is the type of interest that is needed in the work, and which we hope to arouse by this series of essays.

The reflexes represent the closest approach to the patient. Another approach is the symptomatology, which is likewise an expression of autonomic reaction. But the symptoms are frequently clouded in their transmission into speech — the expressions of the patient can be deceiving, and intuitive prescribing is largely limited to what the patient conveys to the doctor. The reflexes need no translation; they need only be observed. Where, by the old method, a drug is clearly indicated by symptoms, all of the reflexes will be found to react on test. Where the indications are obscure, a drug can nevertheless be found which will stimulate the reflexes.

In the previous essay we showed how exact was Boyd's Emanometer in measuring the dynamis of the patient and balancing it against the dynamis of the appropriate drug. Carefully made tests on the Emanometer indicate the same remedy that is indicated by the reflexes. This shows that both techniques are directed at the same mechanism.

We have had two interesting confirmations of this recently. The first case was an overweight myocardial patient. One remedy was worked out on the Emanometer and another by an entirely different technique. Then on

the patient's pulse were tested five potencies of each of these drugs and four potencies of a third drug not related to the case. The vials were individually wrapped in tissue-paper marked from 1 to 14, and the pulse test was performed without anyone being aware of the order in which the vials were manipulated. The patient sat relaxed in an easy-chair. The operator counted the pulse for 30 seconds out of each minute as a control; then the remedy was brought up to the patient and the count noted for the balance of the minute. In this case, the pulse was faster than normal, and certain vials slowed it down. At the end of the test, these were unwrapped and found to be the five potencies of Anacardium orient., the remedy worked out on the Emanometer. The potencies of the two other drugs produced negligible or no effects. On a retest, the 50m of Anac. slowed the pulse most. This remedy was then given, with good clinical response. Remember that the right drug tends always to normalise any abnormality of the pulse.

A similar test, also utilising the pulse effect, was made a week later on another patient whose remedy as worked out on the Emanometer was Cadmium valerianate. The pulse showed maximum reaction to this drug as against a drug chosen by another, less exact method.

Of course, tests like these take much time. The pulse tests consumed an average of an hour apiece and the Emanometer tests two hours apiece. We mention this not to discourage but to orient those who wish to do research in this field. We wish them to know about the difficulties to be encountered. Even if in the beginning you get only an occasional positive result, let that spur you on to perfecting the technique. Remember that inconsistencies are usually due to errors in applying the technique rather than to inherent deficiencies in the technique itself. Our purpose is not to establish a new system of medicine but to open up an approach that leads to exact prescribing in accord with Hippocrates' dictum: Try to help your patients. At least, do them no harm.

A potency is, in one sense, a mimicry of the original crude drug. However, the process of dilution has intro-

duced certain changes ; so that the activity of a potency and of crude material are *not identical* — they are only *similar*. In a previous essay we showed evidence suggesting that the activity of a potency beyond the point where solute molecules have been washed out is due to the transmission of a large-scale molecular pattern or "set" from one stage of dilution to another, and that potency activity is associated with this "set." Such a molecular patterning appears to involve three-dimensional mimicry of certain molecular characteristics of the solute crude substance.

This ability to mimic something else reappears with much versatility in living things, and our experiments with the reflexes point out certain mimicries that were unknown. It is not astonishing to find that such mimicry as takes place in a potentised drug, which is really dead material, should also take place with greater ease, detail, and fullness in living things, which are the most labile of material systems.

Indeed, the mosaic of dull areas on, say, the Emanometer subject's abdomen is the representation of the patient's pathology and, in addition, a real duplication of dull areas that may be found on the patient himself. Thus one living being mimics another when both are in the correct relationship to each other. But a living being also imitates a drug, under certain conditions ! Boyd has shown (section 7 of previous essay) that when a specific drug is taken by a patient, his saliva may continue to show the presence of that drug for months, and that it is possible for the patient, by drinking exclusively from a standard glass which does not get a chance to dry out, to dose himself over and over by coming repeatedly in contact with his own saliva as deposited on the glass. This may sound fanciful to an allopath or to a homœopath with allopathic leanings ; but the masters of homœopathy have always known that there are things about the activity of their potencies which are different from the usual. In the last case mentioned, the patient's body is, in a sense, converted into a potency of the drug taken ; and the mechanics of this process may resemble that of an actual potentised drug.

But biological mimicry goes even further. Perhaps in the sense to which we now refer, "mimicry" becomes too restricted in meaning. We should say, then, that living creatures show an astonishing adjustment to one another and to the inorganic world, and that this adjustment frequently reveals itself as an effort at actual physical imitation on the part of living things. The subject, in experiments involving the reflexes, is imitative in a literal sense. But what about a bird migration ? Here the imitation is largely figurative, without ever losing a fundamental reality. For when you see a cloud of birds swarming southwards, or when geese flap by in their V-formation seeking for warmer climates, remember that those creatures are adjusting themselves to agencies arising from the earth. These agencies stretch over the earth in definite patterns, just as the lines of force of a magnet spread out between the north and south poles. And the migrating birds follow the patterns of these agencies. Here is the effort of a small creature to conform to an influence that covers hundreds of miles. The bird cannot expand its body ; but it can fly. It soars into the air, filled with the thrilling call of warm lands, rich in food. It is joined by thousands of its kind. Together, they strike out southwards, not knowing that they are following a terrestrial influence from which they can never be free. In their flight from north to south, they follow the direction of this influence. Their flight is a tracing of that direction. So are all migratory travels, whether they take place in air, sea, or on land. The living creature in seeking to adjust itself to a complex of inorganic influences performs a sort of mimicry of that influence by means of which the influence, otherwise invisible, is pointed out. In this sense, at least, we find scientific justification for the old philosophical contention that the macrocosm can be contained in the microcosm.

The reflexes are only the first step in applying autonomic functions to therapeutic purposes. Instead of arbitrarily interfering with defence processes by chemical means, such as are used by chemotherapists, we are stimulating the same body forces normally involved in the maintenance

of health and in the reactions against disease. There are authentic cases for almost every disease of spontaneous cure. Hence, the body is potentially capable of curing itself, although the right stimulus is often absent and unknown. The potentised drug specific to a patient mobilises his curative reactions, and the reflexes afford only one means of observing drug specificity. Doubtless, there are other means. Better techniques will be discovered, techniques easier to control, directer in their relation to the physiological mechanism, and less susceptible of error. Towards this goal all physicians and investigators should labor. Never forget that however useful to you at present is a knowledge of the reflexes, that knowledge is but a stepping stone to higher therapeutic levels.

Let us caution you once more that all of the reflex responses to drugs are delicate and elusive. Inconsistencies will appear to crop up, but they are not inconsistencies at all. A living thing is not like an inanimate apparatus. It is constantly varying in its responses to external conditions. If the effect is to be produced at all, just the right person and just the right drug must be brought together. Moreover, the ability of the operator to concentrate uniformly throughout a test is limited because of fatigue. Usually the impaired attention due to fatigue is present before the operator is conscious of fatigue, but if you notice that results begin to be inconsistent, at once suspect fatigue in yourself or in the patient's reflexes.

As soon as you have satisfactorily detected the effect you will feel like a person who has studied a foreign language for a while and who suddenly finds himself able to understand conversations that had no meaning for him before. That fugitive, difficult change in note will become a very real effect, something that you can manipulate at will. And if you relate the effect to the autonomic of the patient, to the response mechanism which gives us the symptomatology of illness and underlies all body efforts at cure, you will realise how wonderful is this new tool.

All of the effects here described revolve about an energy of unknown nature. That energy is emanated by

drugs and by living creatures. In some ways, it represents the *patterning* or *formative* factor underlying the physical configuration. By its ability to influence living reflexes, the energy manifests to our senses. It can be tuned in by the proper circuit, but in addition to that circuit a living reflex is needed to detect the energy. No direct detector has yet been devised, although the most delicate electrical instruments of all types have been applied to the problem. The goal of all present research is a mechanical detector of those energies, a detector which will operate without the need for human intervention. When this goal is realised, the energies will be subjugated in much the same manner as are wireless waves today. But we are still far from that stage. Much research remains to be done; many minds must be interested to approach the phenomena from different angles. In addition to consuming time, such research consumes money. And in the long run, that institution will advance furthest which has the best heads and the soundest financial backing. Some day a person with vision will turn over an endowment to research in this field. That event will constitute an opportunity for the endower and for the group receiving the endowment. It will bring closer the goal which seems so far today — the mechanical detection of drug and body energies.

#### REFERENCES

1. Gamow, G. : *The Birth and Death of the Sun*, 1940, chap. XII.
2. Free, E. E. : in *Forum*, quoted by Ivor Griffith in *The Scientific Monthly*, April, 1941, 294.
3. Peattie, D. C. : *Flowering Earth*, 1939, chap. VI.
4. Peattie, *loc. cit.*, chap. VI.
5. Pfeiffer, E. : *Biodynamic Farming and Gardening*, 1938; 98.
6. Seward, A. C. : *Plant Life Through the Ages*, 1933, chap. VII.
7. Peattie, *loc. cit.*, chaps. VII-IX.
8. Chamberlin, R. T. : *The Origin and Early Stages of the Earth*, and H. H. Newman, *The Nature and Origin of Life* (in *The Nature of the World and of Man*, 1926).
9. Aymar, G. C. : *Bird Flight*, 1935. Brief text, excellent pictorially.
10. Roule Louis : *Fishes*, 1933, chaps. XV-XVII.

11. Marais, Eugene : *The Soul of the White Ant*, 1937.
12. Beebe, Wm. : *Zaca Venture*, 1938, chap. XII.
13. Rhine, J. B. : *Extra-Sensory Perception*, 1935, the various issues of *The Journal of Parapsychology* ; J. B. Rhine, *Extra-Sensory Perception* ; A Review, *The Scientific Monthly*, Nov., 1940, 450.
14. Teale, E. W. : *Grassroot Jungle*, 1940, 3.
15. Maby, J. Cecil and T. Bedford Franklin : *The Physics of the Divining Rod*, 1939.
16. Maby and Franklin, *loc. cit.*, chap. I.
17. *Ibid.*, chaps. IV, V, XIV.
18. *Ibid.*, chaps. III, VII, IX.
19. *Ibid.*, chaps. IV, V.
20. *Ibid.*, chap. VIII.
21. Abrams, Albert : *New Concepts in Diagnosis and Treatment*, 1916, *passim*.
22. *Ibid.*, pp. 80-85.
23. Colson, Thomas : *Journ. Electronic Med.*, May, 1940, 3-10 ; Nov., 1940, 11-17 ; July, 1939, 11-15 ; etc.
24. White, George Starr : *A Lecture Course to Physicians*, 1918, Lectures I and II.
25. Boyd Wm. E. : *Recent Research on the Relation of Certain Electro-Physical Phenomena to Homoeopathy : With Special Reference to the Work of Dr. Abrams, of San Francisco* (1922, reprint) ; *The Relationship of Certain Electro-Physical Phenomena to Homoeopathy (Second Report), with Special Reference to the Emanometer* (1923, reprint) ; *The Boyd Emanometer Research and the Related Physical Phenomena* (1925, reprint) ; *The Emanometer Research and Homoeopathy* (1928, reprint) ; *The Emanometer and Disease* (1933, reprint). All articles originally appeared in *The British Homoeopathic Journal*, excepting the 1928 paper, which was read before the International Homoeopathic Congress in London, 1927.
26. Horder, Sir Thomas and others : *A Preliminary Communication Concerning the Electronic Reactions of Abrams with Special Reference to the Emanometer Technique of Boyd*, 1925.
27. McCrae, Wm. Ritchie : Potency Activity—Especially in Relation to Chronic Conditions, *Brit. Hom. Journ.*, XXVI, April, 1926, 107.
28. Stromberg, G. : *The Soul of the Universe*, 1940, chaps. VI, VIII, IX.
29. Stearns, G. B. : Body-Reflexes as a Means of Selecting A Remedy, *Hom. Rec.*, XLVII, Nov., 1932, 781 ; G. B. Stearns and Edgar D. Evia, *The Approach to Reality*, *Hom. Rec.*, part I, LV, Nov., 1940, 3 ; part II, LVI, March, 1941, 99 ; part III, LVI, May, 1941, 195 ; see especially parts II and III.
30. Persson, W. M. : The Principle of Catalysis in Biochemistry and Homoeopathy, *Journ. Am. Inst. Hom.* XXIII, Nov., 1930, 1055-89.
31. Boyd, Wm. E. : The Action of Microdoses of Mercuric Chloride on Diastase, *Brit. Hom. Journ.*, XXXI, Feb., 1941, 5-28.
32. Rhine, J. B. : *Extra-Sensory Perception*, 1935 ; especially chaps. I-III, IX, X, XIII, XV.
33. Dunne, J. W. : *The New Immortality*, 1939 ; *An Experiment With Time*.
34. Smuts, J. C. : *Holism and Evolution*, 1926, chaps. I, V.
35. Dampier-Whetham, W. C. D. : *A History of Science*, 1930, 412-16.
36. Gray, G. W. : *New World Picture*, 1936, chap. XV.
37. Schroedinger, E. : *Collected Papers on Wave Mechanics*, 1929.
38. de Broglie, L. and L. Brillouin : *Selected Papers on Wave Mechanics*, 1929.
39. de Broglie, L. : *Matter and Light, The New Physics*, 1939, chaps. IV, V.
40. Bridgman, P. W. : *The Logic of Modern Physics*, 1927, chap. II.
41. Bridgman, *loc. cit.*, chap. I.
42. Carrel, Alexis : *Man, the Unknown*, 1935 ; 147-50.

## INDEX

Abrams, Albert	iii, 39-45, 49, 52, 80, 83	Colson, Thomas	42
Alexander, J.	6, 13	Crystal patterns	5, 6
American Medical Association (AMA)	40	Copper chloride—	8, 10, 14
Arthritis	37	Frost—	7, 8
Asthma	37	Snowflake—	9, 10
Auenbrugger, Leopold	79	Stearic acid	11
Beebe, Wm.	31, 32	Dalton, John	19, 34
Bentley, W. A.	9, 19	Darwin, Charles Robert	34
Boenninghausen, Clemens von	3	Davisson, Clinton Joseph	67
Boger, C. M.	91	de Broglie, L.	67
Bohr, Niels Henrik David	66	Dirac, Paul Adrian Maurice	67
Born, Max	67	Dunne, J. W.	64
Boyd, Wm. E.	iii, 4, 15, 17-19, 45-61, 80, 83, 94	Einstein, Albert	34
Bragg, Sir Wm.	37	Evia, Edgar D.	iii
Bridgman, P. W.	12, 19, 68	Fabre, Jean Henri Casimir	30
Cancer	37, 38	Faith healing Spontaneous—	65, 72, 76, 96
Carrel, Alexis	72	Foundation for Homoeopathic Research	iii, 4, 43, 57
Colds	37	Franklin, T. Bedford	34, 35, 37, 39, 40, 43
Colour therapy	44	Gastric complaints	37

Gutman, William	iii	Powel, Wm.	15
Hahnemann, Samuel	3, 78	Reichenbach, Baron von	60
Hahnemann Hospital, Philadelphia	8	Rheumatism	37
Heintz, E.	14, 15, 17, 19	Rhine, J. B.	32, 34, 61-63, 72
Heisenberg, Werner Karl	66, 69	Schroedinger, E.	67, 69
Hippocrates	93	<i>Scientific American</i>	40
Horder Committee	52	Sobel, Samuel P.	92
Jordan, Marie Ennemonde Camille	67	<i>Sol</i>	13
<i>Journal of the American Institute of Homoeopathy</i>	iii	Stearns, Guy Beckley	iii, 92
Korsakoff	19	Stromberg, G.	56
Langmuir, I.	11, 19	Succussion	15-17
<i>Luna</i>	13	Swan, Samuel	13
Maby, J. Cecil	34, 35, 37, 39, 40, 43	Swift, Dean	67
Newton, Sir Isaac	34	Thomson, G. P.	67
Persson, W. M.	17-19, 59	Tuberculosis	37
Pfeiffer, E.	7, 8, 10, 11, 17-19	Ultramolecular potency	5, 9-19, 77, 93, 94
		White, George Starr	42-45, 80

