If identifications are found in humans, they represent only a survival of primitive reactions and mis-evaluations, or cases of underdevelopment or regression, which are pathological for humans.

Many of our daily identifications are harmless, but in principle may, and often do, lead to disastrous consequences. Here I give three examples of identification, one by a psychiatric hospital patient, another by a "normal" student of mine, and a third by a group of natives in the Belgian Congo.

When I was studying psychiatry in St. Elizabeths Hospital, a doctor was showing me a catatonic patient who was standing rigid in a corner. For years he had not spoken and did not seem to understand when spoken to. He happened to have been born and spent part of his life in Lithuania, where the people had been trained for several generations by the czar to hate the Poles. The doctor, without that historical knowledge, introduced me to the catatonic by saying, "I want you to meet one of your compatriots, also a Pole." The patient was immediately at my throat, choking me, and it took two guards to tear him away.

Another example is of a young woman who was a student in my seminar some years ago. She held a responsible position, but in her whole orientation she was pathologically fearful to the point of having daydreams of murdering her father because he did not defend her against her mother, who had beaten her and nagged her. During her childhood her brother, who was a number of years older and the favorite of their mother, patronized her, and she hated him for this attitude.

In this particular interview I was especially pleased with her progress and so I was speaking to her smilingly. Suddenly she jumped at me and began to choke me. This lasted only about five seconds. Then it turned out that she identified my smile with the patronizing attitude of her brother, and so she was choking "her brother," but it happened to be my neck.

There is another incident I want to tell you about that will indicate the problems we have to deal with (35, p. 52). We have all seen a box of Aunt Jemima Pancake Flour, with the picture of "Aunt Jemima" on the front. Dr. William Bridges of the New York Zoological Society has told this story about it: A United States planter in the Belgian Congo had some 250 natives working for him. One day the local chieftain called him and said he understood that the planter was eating natives, and that if he did not stop, the chief would order his men to stop work. The planter protested that he did not eat natives and called his cook as a witness. But the cook insisted that

he did indeed eat natives, though he refused to say whether they were fried, boiled, stewed, or what not. Some weeks later the mystery was cleared up when the planter was visited by a friend from the Sudan who had had a similar experience. Between them they figured out the answer. Both had received shipments of canned goods from the United States. The cans usually bore labels with pictures of the contents, such as cherries, tomatoes, peaches, etc. So when the cooks saw labels with the picture of "Aunt Jemima," they believed that an Aunt Jemima must be inside!

A structure of language perpetuating identification reactions keeps us on the level of primitive or prescientific types of evaluations, stressing similarities and neglecting (not consciously) differences. Thus, we do not "see" differences, and react *as if* two objects, persons, or happenings were "the same." Obviously this is not "proper evaluation" in accordance with our knowledge of 1950.

In analyzing the Aristotelian codifications, we have to deal also with two-valued, "either-or" types of orientation. Practically all humans, the most primitive peoples not excluded, who never heard of Greek philosophers, have some sort of "either-or" types of orientations. It becomes obvious that our relations to the world outside and inside our skins often happen to be, *on the gross level,* two-valued. For instance, we deal with day *or* night, land *or* water, etc. On the living level we have life *or* death, our heart beats *or* not, we breathe *or* suffocate, are hot *or* cold, etc. Similar relations occur on higher levels. Thus we have induction *or* deduction, materialism *or* idealism, capitalism *or* communism, Democrat *or* Republican, etc. And so on endlessly on all levels.

In living life many issues are not so sharp; therefore, a system which posits the general sharpness of "either-or" and so objectifies "kind" ("properties," "qualities," etc.), is too distorted and unduly limited. It must be revised and made more flexible in terms of "degrees." The new orientation requires a physico-mathematical "way of thinking." Thus if, through our unconscious assumptions, inferences, etc., we evaluate the event, the submicroscopic process level, *as if it were the same as* the gross macroscopic object which we perceive before us, we remain in our two-valued rut of "thinking." On the macroscopic level, if there are two apples side by side, for example, we perceive that they may "touch" *or* "not touch" (see Figure 36). This language does not apply to the submicroscopic process level, where the problem of "touch" or "not touch" becomes a problem of degree. There are continual interactions between the two on submicroscopic levels which we cannot "perceive." In accordance with the assumptions of science[1950], we must visualize a *proc-*

ess.[14] It follows that this is the way we should "think" about an apple, or a human being, *or a theory.*

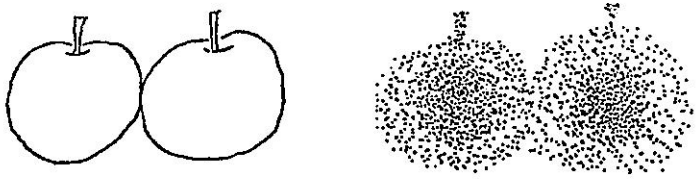


FIG. 36.—Macroscopic view and submicroscopic process level of two apples, side by side.

There is no "perception" without interpolation and interpretation (21, pp. xxviii ff.). We cannot stop it. But we can visualize the latest achievements of mathematical physics and other sciences and read these into the silent un-speakable processes going on around us and in us.

The Aristotelian language structure also perpetuated what I call "elementalism," or splitting verbally what cannot be split empirically, such as the term *mind* by itself and the terms *body, space, time,* etc., by themselves. It was only a few years ago (1908) that the outstanding mathematician Minkowski said in his epoch-making address entitled "Space and Time," delivered at the 80th Assembly of German Natural Scientists and Physicians at Cologne, "The views of space and time which I wish to lay before you have sprung from the soil of experimental physics, and therein lies their strength. They are radical. Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality" (32, p. 75).

This "union" of what used to be considered distinct separate entities had to be accompanied by a change in the structure of the language, in this particular case by the formulation of Minkowski's new four-dimensional geometry of "space-time," in which "space" and "time" were permanently united by a simple grammatical hyphen, thus making the general theory of relativity possible.

The old elementalistic structure of language built for us a fictitious, anthropomorphic, animistic world not much different from that of the primitives. Modern science makes imperative a language structure which is non-elementalistic and does not split artificially what cannot be split empirically. Otherwise, we remain handicapped by neuro-evaluational blockages, lack of creativeness, lack of understanding, and lack of broad perspectives, etc., and disturbed by inconsistencies, paradoxes, etc.

[14] For the significance of the date in small figures, see pages 191-92.

The points I have touched upon here: namely, the subject-predicate type of structure, the "is" of identity, two-valued "either-or" orientations, and elementalism, are perhaps the main features of the Aristotelian language structure that molded our "perceptions" and hindered the scientific investigations which at this date have so greatly, in many instances, freed us from the older limitations and allowed us to "see the world anew." The "discovery of the obvious" is well known to be the most difficult, simply because the old habits of "thinking" have blocked our capacity to "see the old anew" (Leibnitz).

Non-Aristotelian Language Systems.—As usually happens with humans, when we come to an impasse and find that revisions and new approaches are necessary, we do something about it. In this case, with the tremendous advances in science, a structure of language which did not falsify modern discoveries became imperative. As I do not know of any other non-Aristotelian system at this date, I must ask the reader's indulgence that I will have to speak rather exclusively about my own formulations. Many others have made applications, but here I will deal mostly with the theoretical side.

The new system is called "non-Aristotelian" since it includes the prevailing systems of evaluation as special cases within a more general system. Historically the Aristotelian system influenced the Euclidean system, and both underlie the consequent Newtonian system. The first non-Aristotelian revision parallels and is interdependent with non-Euclidean and non-Newtonian developments in modern mathematics and mathematical physics. To satisfy the need to unify exact sciences and general human orientations was one of the main aims of the non-Aristotelian revision, historically the latest, because of its much greater complexities (21, esp. p. 97).

The non-Aristotelian system grew out of the new evaluation in 1921 of human beings as a time-binding class of life (18). This evaluation is based on a *functional* rather than zoölogical or mythological approach and considers "man" as "an organism-as-a-whole-in-an-environment." Here the reactions of humans are not split verbally and elementalistically into separate "body," "mind," "emotions," "intellect," or different "senses," etc., by themselves, which affects the problems of "perception" when considered from a non-elementalistic point of view. With a time-binding consciousness, our criteria of values, and so behavior, are based on the study of human potentialities, not on statistical averages on the level of *homo*

homini lupus drawn from primitive and/or un-sane evaluational reactions which are on record (23).

Common sense and ordinary observations make clear that the average so-called "normal" person is so extremely complex as to practically evade a nonsegmented, non-elementalistic analysis. In order to make such an analysis, it became necessary to investigate the main available forms of human reactions, such as mathematics, mathematical foundations, many branches of sciences, history, history of cultures, anthropology, philosophy, psychology, "logic," comparative religions, etc. It was found essential to concentrate on the study of two extremes of human psycho-logical reactions: (*a*) reactions at their best, because of their exceptional predictability, validity, and lasting constructiveness in the time-binding process, as in mathematics, the foundations of mathematics, mathematical physics, exact sciences, etc., which are manifestations of some of the deepest human psycho-logical reactions; and (*b*) reactions at their worst, as exemplified by psychiatric cases. In these investigations it became obvious that physico-mathematical methods have application to our daily life on all levels, linking science, and particularly the exact sciences, with problems of sanity in the sense of adjustment to "facts" and "reality."

In fact it was found that, to change the linguistic structure of our prevailing Aristotelian system, methods had to be taken bodily from mathematics. Thus, the structure of our language was changed through the use of extensional devices without changing the language itself. This will be explained briefly a little later.

When the premises of this new approach had been formulated, I found unexpectedly that they turned out to be a denial of the old "laws of thought" and the foundation for a non-Aristotelian system, the *modus operandi* of which I have named "General Semantics." The premises are very simple and may be stated by means of an analogy:

1. A map *is not* the territory. (Words *are not* the things they represent.)
2. A map covers *not all* the territory. (Words cannot cover all they represent.)
3. A map is self-reflexive. (In language we can speak *about* language.)

We notice that the old prescientific assumptions violate the first two premises and disregard the third (20, pp. 750 ff.; 24).

The third premise turns out to be an application to everyday life of the extremely important work of Bertrand Russell, who attempted to solve self-contradictions in the foundations of mathematics by his

theory of mathematical or logical types. In this connection the term *self-reflexive* was introduced by Josiah Royce. The theory of mathematical types made me aware of new kinds of linguistic perplexities to which practically no one, except a very few mathematicians, had paid attention before. The realization and analysis of such difficulties led me to the discovery that the principles of different orders of abstractions, multi-ordinality of terms, $\frac{\text{over}}{\text{under}}$defined terms, second-order reactions ("thinking" about "thinking," doubt of doubt, fear of fear, etc.), thalamo-cortical interaction, the circularity of human knowledge, etc., may be considered as generalizing the theory of mathematical types.[15]

The degrees to which we are "conscious of abstracting," which includes, among others, the above, becomes a key problem in the way we evaluate and therefore to a large extent may affect the way in which we "perceive." If we can devise methods to increase our "consciousness of abstracting," this would eventually free us from the archaic, prescientific, and/or Aristotelian limitations inherent in the older language structures. The following structural expedients to achieve this I call the *extensional devices,* and the application of them automatically brings about an orientation in conformity with the latest scientific assumptions.

Extensional Devices. 1. *Indexes,* as in $x_1, x_2, x_3 \ldots x_n$; chair_1, chair_2, $\text{chair}_3 \ldots \text{chair}_n$; Smith_1, Smith_2, $\text{Smith}_3 \ldots \text{Smith}_n$, etc. The role of the indexes is to produce indefinitely many *proper names* for the endless array of unique individuals or situations with which we have to deal in life. Thus, we have changed a *generic* name into a *proper* name. If this indexing becomes habitual, as an integral part of our evaluating processes, the psycho-logical effect is very marked. We become aware that most of our "thinking" in daily life as well as in science is hypothetical in character, and the moment-to-moment consciousness of this makes us cautious in our generalizations, something which cannot be easily conveyed within the Aristotelian struc-

---

[15] In this connection see the following from Korzybski's paper on *Time-binding: The General Theory* (1926): "In my independent inquiry I came across difficulties and had to solve them or quit. My solution is given in the G. T. [General Theory] and the A. [Anthropometer or Structural Differential]. It is found that this theory covers the theory of mathematical types invented by Russell. . . . I knew about the theory of types long before. . . . I could not *accept* the theory of types because it is not general enough and does not fit in my system; as far as my work is concerned I had to dismiss it. Scientific method led automatically to a solution of my difficulties; and perhaps no one was more surprised and happy than myself when I found that the G. T. covers the theory of types" (22, second paper, p. 7).

See also *Science and Sanity,* p. 429: "The author was pleasantly surprised to find that after his $\bar{A}$-system was formulated, this . . . *non-el* [non-elementalistic] theory covers the theory of mathematical types and generalizes it" (21). C. S.

ture of language. A generic term (such as "chair") deals with classes and stresses similarities to the partial exclusion or neglect or disregard of differences. The use of the indexes brings to consciousness the individual differences, and thus leads to more appropriate evaluation, and so eventually "perception," in a given instance. The harmful identifications which result from the older language structures are often prevented or eliminated, and they may become supplanted by more flexible evaluations, based on a maximum probability orientation.

2. *Chain-indexes,* as in chair_{1_1} (in a dry attic), chair_{1_2} (in a damp cellar) . . . chair_{1_n}; Smith_{1_1} (under normal conditions) or, say (on the ground), Smith_{1_2} (under extreme starvation conditions) or, say (in a plane at extreme altitudes). Smith_1's reactions are entirely different in many ways under the different conditions.

The role of the chain-indexes is to provide a technique for the introduction of environmental factors, conditions, situations, etc. On the human level, these would include psycho-logical, socio-cultural, etc., factors.

In a world where a given "cause" has or may have a multiplicity of "effects," each "effect" becomes or may become a "cause," and so on indefinitely. As we know from psychiatry, for instance, a single happening to an individual in childhood may start a chain-reaction series, and color and twist his psycho-logical or even psycho-somatic responses for the rest of his life. Chain-indexes also convey the general mechanisms of chain-reactions, which operate not only in atomic fission, but everywhere in this world. We are particularly interested here that this includes organic processes, human interrelations, and also the processes of time-binding, as expressed in the "spiral theory" of our time-binding energy (18, 1st ed., pp. 232 ff.).

Chain-indexes (indexing an index indefinitely) are not new in mathematics. They have been used automatically, but to the best of my knowledge a general pattern was not formulated for their application in everyday life. For an example of their use in a scientific problem, see "On the Use of Chain-indexing to Describe and Analyze the Complexities of a Research Problem in Bio-chemistry" by Mortimer B. Lipsett (30).

To recapitulate, for better or worse, we are living in a world of processes, and so "cause-effect" chain-reactions, and we need to have linguistic means for ourselves and others to manage our evaluations in such a world. Perhaps the formulation of a linguistic chain-index pattern will help this.

3. *Dates,* as in $\text{Smith}_{1^{1920}}$, $\text{Smith}_{1^{1940}}$, $\text{Smith}_{1^{1950}}$ . . . $\text{Smith}_{1^{t}}$. The use of dates places us in a physico-mathematical, four-dimen-

sional (at least) space-time world of motion and change, of growth, decay, transformation, etc., yet the representations of the *processes* can be *arrested* at any given point by linguistic means for purposes of analysis, clarity, communication, etc. This gives us techniques to handle dynamic actualities by static means.

Thus, it probably would make a good deal of difference whether a given automobile is a 1930 or a 1950 model, if we are interested in buying one. We are not as a rule similarly conscious of "dating" our theories, creeds, etc., however, although it is "well known" to what extent dates affect science, theories, books, different customs and cultures, people and all life included.

As another example, if we read the *Communist Manifesto* by Karl Marx and Friedrich Engels (31) we find the word "modern" on many pages. It is easy to evaluate the "modern" as "1950," which apparently many readers do. My suggestion is that when we find that word we put on the margin by hand the date "1848." With that dating, many arguments become antiquated, and so obsolete, because we are living in the world of 1950, which is entirely different.

4. *Etc.* The use of "etc." as a part of our evaluating processes leads to awareness of the indefinitely many factors in a process which can *never* be *fully* known or perceived, facilitates flexibility, and gives a greater degree of conditionality in our semantic reactions. This device trains us away from dogmatism, absolutism, etc. We are reminded of the second premise (the map does *not* cover *all* the territory) and indirectly of the first premise (the map *is not* the territory).

Incidentally, in the "etc." we find the key to the solution of mathematical "infinity," with important psycho-logical implications (21, chap. xiv).

5. *Quotes,* as in "body," "mind," "emotion," "intellect," etc., forewarn us that elementalistic or metaphysical terms are not to be trusted, and that speculations based on them are misleading or dangerous.

6. *Hyphens.* The use of hyphens links linguistically the actual empirical complex inter-relatedness in this world. There are most important structural implications involving the hyphen which represent recent advances in sciences and other branches of knowledge.

For example, the hyphen (*a*) in *space-time* revolutionized physics, transformed our whole world-outlook, and became the foundation of non-Newtonian systems; (*b*) in *psycho-biological* marks sharply the difference between animals and much more complex humans (in my interpretation of it). This differentiation is also on the basis of the present non-Aristotelian system, where "man" as a "time-

binder" is not merely biological, but psycho-biological. The hyphen (*c*) in *psycho-somatic* is slowly transforming medical understanding, practice, etc.; (*d*) in *socio-cultural* indicates the need for a new applied anthropology, human ecology, etc.; (*e*) in *neuro-linguistic* and *neuro-semantic* links our verbal, evaluational reactions with our neuro-physiological processes; (*f*) in *organism-as-a-whole-in-an-environment*$_n$ indicates that not even an "organism-as-a-whole" can exist without an environment, and is a fiction when considered in "absolute isolation."

In regard to "psycho-biological" and "psycho-somatic," the original workers have missed the importance of the hyphen and its implications and used the terms as one word. This becomes a linguistic misrepresentation, and these pioneers did not realize that they were hiding an extreme human complexity behind an apparent simplicity of a single term. They did this on the unjustified, mistaken assumption that one word implies unity; in the meantime, it is misleading to the public because it conceals the inter-acting complexities.

Theoretical and Practical Implications. The simplicity of the extensional devices is misleading, and a mere "intellectual understanding" of them, without incorporating them into our living evaluational processes, has no effect whatsoever. A recanalization and retraining of our usual methods of evaluation is required, and this is what is often very difficult for adults, although comparatively easy for children. The revised structure of language, as explained briefly here, has *neuro-physiological effects,* as it necessitates "thinking" in terms of "facts," or *visualizing processes, before* making generalizations. This procedure results in a slight neurological delay of reaction, facilitating thalamo-cortical integration, etc.

The old Aristotelian language structure, with its subject-predicate form, elementalism, etc., hindered rather than induced such desirable neuro-physiological functioning. It led instead to verbal speculations divorced from actualities, inducing eventually "split personalities" and other pathological reactions.

We may recall the pertinent statement by the outstanding mathematician, Hermann Weyl, who wrote in his "The Mathematical Way of Thinking": "Indeed, the first difficulty the man in the street encounters when he is taught to think mathematically is that he must learn to look things much more squarely in the face; his belief in words must be shattered; he must learn to think more concretely" (47).

Healthy normal persons naturally evaluate to some degree in accordance with the extensional methods and with some "natural

order of evaluation," etc., without being aware of it. The structural formulation of these issues, however, and the corresponding revision of our old language structure, make possible their analysis and teachability, which is of paramount importance in our human process of time-binding.

There are many indications so far that the use of the extensional devices and even a partial "consciousness of abstracting" have potentialities for our general human endeavor to understand ourselves and others. The extent of the revision required if we are to follow through from the premises as previously stated is not yet generally realized. Our old habits of evaluation, ingrained for centuries if not millenniums, must first be re-evaluated and brought up to date in accordance with modern knowledge.

In what way does a non-Aristotelian form of representation bring about a change in evaluating processes and effect deep psycho-logical changes? We have seen how the structure of a language often determines the way we look at the world, other persons, and ourselves. My experiences, and the experiences of many others, confirm that we can and do evaluate stimuli differently as the result of the application of the non-Aristotelian extensional methods.

In practically all fields of human endeavor there are indications that new, more flexible, etc., attitudes can be brought about, with resulting influences on the interrelationships of the given individual with himself and others. A majority of these are in the field of education, but they include fields as diverse as psycho-somatic medicine, psychiatry, psychotherapy, law, economics, business, architecture, art, etc., political economy, politics, social anthropology, reading difficulties, etc.

The non-Aristotelian principles have been utilized in the United States Senate Naval Committee in connection with extremely important national problems such as "Establishing a Research Board for National Security" (45, p. 6), "A Scientific Evaluation of the Proposal that the War and Navy Departments be Merged into a Single Department of National Defense" (46), "Training of Officers for the Naval Service" (42, pp. 55-57). To the best of my knowledge today even on some ships in active duty the personnel are trained in some principles of general semantics (see also 33, esp. chap. i).

One of the main characteristics of the differences in orientation is that the Aristotelian language form fosters evaluating "by definition" (or "intension"), whereas the non-Aristotelian or physico-mathematical orientation involves evaluating "by extension," taking into consideration the actual "facts" in the particular situation confronting us.

For example, some older physicians still attempt to cure "a disease" and not the actual patient in front of them whose psychosomatic malfunctioning and manifestations, observed or inferred from the patient's behavior or record, involve a multiplicity of individual factors not covered by any possible definition of "a disease." Fortunately, today the majority of physicians try to cure the patient, not "a disease."

In his paper on "The Problem of Stuttering" Professor Wendell Johnson (13) speaks of the significance of the diagnosis of a child as "a stutterer":

> Having *called* the child a "stutterer" (or the equivalent), they react less and less to the child and more and more to what they have called him. In spite of quite overwhelming evidence to the contrary, they assume that the child either cannot speak or has not learned. So they proceed to "help" him speak. . . . And when, "in spite of all their help" he "stutters worse than ever," they worry more and more. . . . There has been and still is a great deal of controversy among speech pathologists as to the most probable cause of stuttering. . . . But no one outside of general semantics has ever suggested that *the diagnosis* of stuttering was a cause of it, probably because no one outside of general semantics has appeared to realize the degree to which two persons talking about "stuttering" could be at variance in what they were talking about, and could be influencing what they were talking about. The uncertainty principle which expresses the effect of the observer on what he observes can be extended to include the effect of the speaker on what he names (pp. 189-93).[16]

Changes in *attitudes,* in our ways of evaluating, involve intimately "perceptual processes" at different levels. Making us *conscious* of our *unconscious assumptions* is essential; it is involved in all psychotherapy and should be a part of education in general. In this connection the extremely important and relevant work of Dr. Adelbert Ames, Jr., at the Hanover Institute and Princeton University, etc., is very useful in bringing about such consciousness. For example, Dr. J. S. A. Bois (4), consulting psychologist in Montreal and past president of the Canadian Psychological Association, in his report on "Executive Training and General Semantics" writes of his class in a basic training course in the non-Aristotelian methodology to seven key men of an industrial organization:

> I proceeded to disequilibrate their self-assurance by demonstrating that our sensory perceptions are not reliable. . . . We ended by accepting the fact that

---

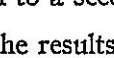
[16] By permission of M. Kendig, editor, *Papers from the Second American Congress on General Semantics* (Lakeville, Conn.: Institute of General Semantics, 1943), and of the author.

the world which each one of us perceives is not an "objective" world of happenings, but a "subjective" world of *happenings-meanings.*

They were quite ready to accept these new views, but I felt that it was necessary to make them conscious of the fact that it is not sufficient to "understand" certain principles and to accept them "intellectually." It is imperative to change our habitual methods of thinking, and this is not so easy as it seems. To bring this last point home, I explained to them the senary number notation system, and gave them some homework on it: making a multiplication table, long additions, subtractions, multiplications and divisions. The following day they were conscious that it is annoying, irritating, and not so easy to pass from one method of thinking to another. They realized that keeping accounts in the senary system would mean a revolution in the office and the factory, would demand new gears in the calculating machines, etc., etc. I felt the stage was set for the main part of the course. . . . It is impossible to evaluate quantitatively the success or failure of such a course. The fact that the top group wanted it to be given to their immediate subordinates is already an indication that they found it helpful.[17]

Bois reported further that the men made their own evaluations in terms of increased efficiency, better "emotional" control and maturity, better techniques of communication among themselves and with their subordinates, etc.

Observations made of a formalized group procedure at Northwestern University by Liston Tatum suggest that when people are forced to follow the "natural order of evaluation" (evaluating by facts first, then making generalizations) they talk to each other differently (43).

The effect of language on our visual evaluations is shown in a study reported by L. Carmichael, H. P. Hogan, and A. A. Walter (5, pp. 74-82) entitled "An Experimental Study of the Effect of Language on the Reproduction of Visually Perceived Form." It was investigated whether the reproduction of visual forms was affected when a set of twelve figures was presented with a name assigned to each figure. The subjects were to reproduce the figures as accurately as possible after the series was over. The same visual figure was presented to all subjects, but one list of names was given to the figures when they were presented to one group of subjects, and the other list of names accompanied the figures given to a second group. For example: kidney bean  canoe. The results indicated that "the present experiment tends to confirm the observations of previous experimenters in this field, and to show that, to some extent at least, the reproduction of forms may be determined by the nature of words

[17] By permission of J. S. A. Bois.

presented orally to subjects at the time that they are first perceiving specific visual forms."

Professor Irving Lee has been trying out the above procedures on students in his classes in general semantics at Northwestern University and reports (in a personal communication to me) that so far his students do *not* react as the subjects in the above experiment did, but that his students "drew the pictures far less influenced by the labels applied."

Of his teaching of non-Aristotelian methodology to policemen, Lee has written a preliminary report of a three-year pilot study with 140 policemen, from patrolmen to captains, enrolled in the Traffic Police Administration Course in the Northwestern University Traffic Institute (27). From the reports of the instructors and interviews and information from a cross-section of the students after completion of the course, Lee writes, the results indicate that the policemen saw themselves and their work in the school in quite different light after advice on the extensionalizing processes.

Psychologists and others may be interested in the following personal communication giving preliminary data which indicate new fields of investigation in criminology, personality development, etc. Dr. Douglas M. Kelley, professor of criminology at the University of California at Berkeley, has recently written me:

> At present I am concerned with the introduction of general semantics into two areas—interrogation and personality development. The first field is covered in a course which I give for 3 units, Detection of Deception, which consists to begin with of a half semester of straight general semantics, beginning with a discussion on the futility of words in communication and carrying right through to the various devices. The latter half of the course is concerned with the emotional relation of words as demonstrated by various types of lie detectors, and with report writing, where again the problems of multi-ordinality, etc., are dealt with at great length. A survey of all the existent literature indicates a complete lack of information in this area, and this approach purely based on your work reports an entirely new notion and opens up interrogative techniques and vistas hitherto unknown. It is my opinion from talking with a number of police officers that this approach will yield one of the most valuable results achieved from application of general semantics. In addition, I am teaching the same material to the Berkeley police force.
>
> In my course on the Psychiatric Aspects of Criminology, a large amount of discussion is included, based upon your work, as a method of indicating how and why people behave like human beings, and what possibly can be done about it. The students are all most favorably inclined toward the general semantics orientation, and I expect within a year or so to have a real program developed.[18]

[18] By permission of Douglas M. Kelley, M.D.

During the Second World War Kelley [19] employed the basic principles of non-Aristotelian methodology with over seven thousand cases in the European Theater of Operations, reported on in his article "The Use of General Semantics and Korzybskian Principles as an Extensional Method of Group Psychotherapy in Traumatic Neuroses" (15). The principles were applied (as individual therapies and as group therapies) at every treatment level from the forward area to the rear-most echelon, in front line aid stations, in exhaustion centers, and in general hospitals. "That they were employed with success is demonstrated by the fact that psychiatric evacuations from the European Theater were held to a minimum," Dr. Kelley states (16, pp. vi-vii). "[The] other techniques are, of course, of value but these two simple devices [indexing and dating] proved remarkably potent in this type of neurotic reaction" (15, p. 7).

An example of the effect of indexing and dating, the main devices by which the structure of our language is made similar in structure to the world, may be seen by the reactions of a veteran from the Pacific Theater of War. This veteran was a student of Professor Elwood Murray at the University of Denver. I quote from the veteran's report:

> An example of pure identification comes out in the veteran's dislike for rice. His first view of the enemy dead was that of a Jap soldier which was in the process of deterioration. The bag of rice the soldier had been carrying was torn open and grains of rice were scattered over the body mixed in with maggots. When the veteran, to this day, sees rice, the above described scene is vivid and he imagines grains of rice moving in his dish. To overcome this, he has eaten rice several times trying to remember the rice before him is not the same as that on the body. Though the food is not relished, he has succeeded in overcoming the vomiting reflex at the sight of rice (19, p. 262).

These mechanisms of evaluating or "perceiving" *similarities* and neglecting, or not being fully aware of, the differences are potentially present in every one of us, but usually not in such extreme degrees. This involves the lack of differentiation between the silent and verbal levels and nonawareness of our processes of abstracting. The different orders of abstractions are identified, an inference is evaluated *as if* it were a description, a description *as if* it were the nonverbal "object" our nervous system constructed, and an "object" *as if* it were the nonverbal, submicroscopic, dynamic process.

In our non-Aristotelian work we deal very little, if at all, with "perceptions" as such. As our attitudes, however, are bound to be

[19] During the war Dr. Kelley was Chief Consultant in Clinical Psychology and Assistant Consultant in Psychiatry to the European Theater of Operations; also Chief Psychiatrist in charge of the prisoners at Nuremberg.

involved with our "perceptions," it would appear that the investigation of the structure of language becomes relevant indeed.

A great deal of work has been and is being done in struggling with the problem of prejudices. Analyses show that the mechanisms of prejudices involve identifications of verbal with nonverbal levels. That is, an individual or group is evaluated by the label and not by the extensional facts (26, pp. 17-28; 28). In a discussion of mechanisms of prejudice and a report on his teaching of general semantics to approximately six hundred people where he stressed the confusion of observation and inferential statements, the response to labels as if they labeled more than aspects, etc., Lee reports one of his findings as follows:

> Teachers reported greatly reduced tension when students came to apply what they heard to differences of opinion in the class discussions. The questions "Could they be called anything else?" "Is that an inference?" "Is that what could be observed?" put to a member making a sharp statement created a kind of game atmosphere. An example typical of many occurred in one discussion concerned with what people say about Negroes. Two of the participants most vocal in their assertions that "Negroes won't take advantage of education even if made available" were brought to scrutinize those assertions without the antagonism that results in the usual pro and con debating (28, p. 32).

It is of particular interest to consider the methods of the magicians, who have highly developed their art and even science for purposes of entertainment. Their methods of magic, however, have a deep underlying psychology of deception, self-deception, and misdirection. They have their own literature, so important for psychology, psychiatry, and daily life.

I quote from the paper by Dr. Douglas Kelley[20] entitled "The Psycho-logical Basis of Misdirection: An Extensional Non-aristotelian Method for Prevention of Self-deception" (14, pp. 53-60):

> While the artist in conjuring never hypnotizes his audience, not even in India, he accomplishes much the same results by his ability to create illusions by giving a wrong direction to their expectations and assumptions. By this means he can make his public fail to see what is in front of their very eyes, or believe that they see what is not there (p. 53). . . . A general though unconscious belief in the three aristotelian "laws of thought" plays a part of major importance in the success of such misdirection, since there is a general tendency to react in terms of those "laws."

---

[20] By permission of M. Kendig, editor, *Papers from the Second American Congress on General Semantics* (Lakeville, Conn.: Institute of General Semantics, 1943), and of the author.

For instance, Dr. Kelley explains,

> If a hat is faked with a false bottom, it may be shown to be apparently empty by the camouflaged lining in the bottom. If it is then tossed about in a reckless fashion, it simulates an empty hat since nothing drops out. Since, according to the two-valued "law of the excluded middle," an existent thing has certain "properties" or does not have them, and since most people following this law expect to see objects if they are present in a hat and expect them to fall out when it is inverted, they are easily fooled by the misdirection employed and consequently are unable to predict the appearance of the rabbit which is eventually drawn forth by the conjurer (p. 57).

Magicians find that children are much more difficult to deceive than adults, as the structural implications of our language have not yet to such an extent put their limitations on the ability of children to "perceive."

The Circularity of Human Knowledge

The electronic or electro-colloidal processes are operating on submicroscopic levels. From the indefinitely many characteristics of these processes, our nervous system abstracts and integrates a comparatively few, which we may call the gross or macroscopic levels, or the "objective" levels, all of them not verbal. The microscopic levels must be considered as instrumentally aided "sense data" and I will not deal with them here. Then, abstracting further, first on the labeling or descriptive levels, we pass to the inferential levels, and we can try to convey to the other fellow our "feeling about feeling," "thinking about thinking," etc., which actually happen on the silent levels. Finally, we come to the point where we need to speak about speaking.

Scientifically it is known that the submicroscopic levels are not "perceptible" or "perceptual." We do not and cannot "perceive" the "electron," but we observe actually the results of the eventual "electronic processes." That is, we observe the "effects" and assume the "causes." In other words, as explained before, our submicroscopic knowledge is hypothetical in character. The world behaves *as if* its mechanisms were such as our highest abstractions lead us to believe, and we will continue to invent theories *with their appropriate terminologies* to account for the intrinsic mechanisms of the world we live in, ourselves included. We read into nature our own latest highest abstractions, thus completing the inherent circularity of human knowledge, without which our understanding of nature is impossible.

Because of what was explained in the first part of this chapter (pages 172-74), and aided by the extensional methods and devices,

we must come to the conclusion that inferential knowledge is often much more reliable *at a date, after cross-verification,* than the original "sense data," with which historically we had to start and which have been found to be wanting.

In scientizing, the inferential data must converge. If they do not, we usually have to revise our theories. It is well known that when a new factor is discovered our older generalizations have to be revised for the sake of the integration of our knowledge (21, pp. xxviii ff.).[21]

Our inferences, as abstractions on other levels than the "sense data," may also be on lower or higher orders of abstractions. The structure of our recent knowledge is such that we read into, or project onto, the silent, submicroscopic process levels the highest abstractions yet made by man, our hypotheses, inferences, etc.

Thus, all our fundamental deeper knowledge must be, and can never be anything but, hypothetical, as what we see, hear, feel, speak about, or infer, is never *it,* but only our human abstractions *about* "it." What kind of linguistic form our inferential knowledge is cast in thus becomes of utmost importance. As Edward Sapir has put it, "We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation" (41, p. 245).

This circular process of our nervous systems in inter-action with the environments turns out to be a "feedback system," a most happy term which has been introduced lately and which exactly depicts the situation. According to Lawrence Frank (10):

> We are shifting our focus of interest from static entities to dynamic processes and the order of events as seen in a context or field where there are interreactions and circular processes in operation. . . . The concept of teleological mechanisms, however it may be expressed in different terms, may be viewed as an attempt to escape from these older mechanistic formulations that now appear inadequate, and to provide new and more fruitful conceptions and more effective methodologies for studying self-regulating processes, self-orienting systems and organisms, and self-directing personalities. . . . Thus, the terms *feedback, servomechanisms, circular systems,* and *circular processes* may be viewed as different but equivalent expressions of much the same basic conception (10, pp. 190, 191).[22]

The mechanisms of "feedback" have been brought to their culmination in humans, and the process of time-binding itself may be considered as an unprecedented, unique organic spiraling of feedbacks.

---

[21] See (21, pp. xxviii ff.).

[22] By permission of *Annals of the New York Academy of Sciences* and the author.

In the exponential "spiral theory" given in my *Manhood of Humanity* (18, pp. 232 ff.), our time-binding capacity is obviously based on feedback mechanisms, chain-reactions, etc., without which humans as humans could not exist. The new understanding of humans as a time-binding class of life, free from the older crippling mythological or zoölogical assumptions, is one of the pivotal points toward a new evaluation of the unique role of humans in this world. It encourages or sponsors better understanding of ourselves, not only in relation to the world at large, but also toward ourselves.

I believe it is essential to begin with an entirely new functional formulation, with the implications which this involves for the study of "man" as "an organism-as-a-whole-in-an-environment," including our neuro-semantic and neuro-linguistic environments as environment.

In closing, I can find no more fitting summary than to quote the passages given below, which so beautifully and profoundly express the foundation of human knowledge.

It was Cassius J. Keyser who said:

> . . . for it is obvious, once the fact is pointed out, that the character of human history, the character of human conduct, and the character of all our human institutions depend both upon what man *is* and in equal or greater measure upon what we humans *think* man is (17, p. 424).[23]

This inescapable characteristic of human living has been formulated differently, but just as aptly, by Dr. Alexis Carrel:

> To progress again, man must remake himself. And he cannot remake himself without suffering. For he is both the marble and the sculptor (6, p. 274).

Arthur S. Eddington expresses himself in different words:

> And yet, in regard to the nature of things, this knowledge is only an empty shell—a form of symbols. It is knowledge of structural form, and not knowledge of content. All through the physical world runs that unknown content, which must surely be the stuff of our consciousness. Here is a hint of aspects deep within the world of physics, and yet unattainable by the methods of physics. And, moreover, we have found that where science has progressed the farthest, the mind has but regained from nature that which the mind has put into nature.
>
> We have found a strange foot-print on the shores of the unknown. We have devised profound theories, one after another, to account for its origin. At last, we have succeeded in reconstructing the creature that made the foot-print. And Lo! it is our own (9, p. 200).[24]

---

[23] By permission of Mrs. C. J. Keyser.
[24] By permission of Cambridge University Press.

BIBLIOGRAPHY

1. ALEXANDER, J. Successive levels of material structure. In J. Alexander (ed.), *Colloid chemistry.* New York: Reinhold Publishing Corp., 1944. Vol. V.
2. ALEXANDER, J. *Life: its nature and origin.* New York: Reinhold Publishing Corp., 1948.
3. BOAS, F. Introduction. In Smithsonian Institute, U. S. Bureau of American Ethnology, *Handbook of American Indian Languages.* Part I. Washington, D.C.: U. S. Government Printing Office, 1911.
4. BOIS, J. S. A. Executive training and general semantics. Lakeville, Conn.: Institute of General Semantics, 1949. (Mimeographed.)
5. CARMICHAEL, L., HOGAN, H. P., & WALTER, A. A. An experimental study of the effect of language on the reproduction of visually perceived form. *J. exp. Psychol.,* 1932, 15, 73-86.
6. CARREL, A. *Man the unknown.* New York: Harper & Bros., 1935.
7. CASSIRER, E. *An essay on man.* New Haven, Conn.: Yale University Press, 1944.
8. DE MORGAN, A. *Formal logic or the calculus of inference, necessary and probable.* London: The Open Court Co., 1926.
9. EDDINGTON, A. S. *Space time and gravitation: an outline of the general relativity theory.* Cambridge: Cambridge University Press, 1920.
10. FRANK, L. K. Foreword. In L. K. Frank, G. E. Hutchinson, W. K. Livingston, W. S. McCulloch, & N. Wiener, Teleological mechanisms. *Ann. N. Y. Acad. Sc.,* 1948, 50, 189-96.
11. HADAMARD, J. S. *An essay on the psychology of invention in the mathematical field.* Princeton, N. J.: Princeton University Press, 1945.
12. JEVONS, W. S. *The elements of logic.* New York: American Book Co., 1883.
13. JOHNSON, W. The problem of stuttering from the point of view of general semantics. In M. Kendig (ed.), *Papers 2d Amer. Cong. General Semantics.* Lakeville, Conn.: Institute of General Semantics, 1943.
14. KELLEY, D. M. Mechanisms of magic and self-deception: the psycho-logical basis of misdirection; an extensional non-aristotelian method for prevention of self-deception. In M. Kendig (ed.), *Papers 2d Amer. Cong. General Semantics.* Lakeville, Conn.: Institute of General Semantics, 1943.
15. KELLEY, D. M. The use of general semantics and Korzybskian principles as an extensional method of group psychotherapy in traumatic neuroses. Lakeville, Conn.: Institute of General Semantics, 1948. (Mimeographed.)
16. KELLEY, D. M. Report in Preface. In A. Korzybski, *Science and sanity: an introduction to non-aristotelian systems and general semantics* (3d ed.). Lakeville, Conn.: International Non-aristotelian Library Publishing Co., 1948.
17. KEYSER, C. J. *Mathematical philosophy: a study of fate and freedom.* New York: E. P. Dutton & Co., Inc., 1922.
18. KORZYBSKI, A. *Manhood of humanity: The science and art of human engineering* (1st ed.). New York: E. P. Dutton & Co., Inc., 1921. Same (2d ed.). Lakeville, Conn.: International Non-aristotelian Library Publishing Co., 1950.
19. KORZYBSKI, A. A veteran's re-adjustment and extensional methods. *Etc.: A Review of General Semantics,* 1946, 3, 254-64.
20. KORZYBSKI, A. A non-aristotelian system and its necessity for rigour in mathematics and physics. In *Science and sanity: an introduction to non-aristotelian systems and general semantics* (3d ed.) by the same author. (Supplement III, first edition of *Science and Sanity,* 1933.) Lakeville, Conn.: International Non-aristotelian Library Publishing Co., 1948. Supplement III, pp. 747-61.
21. KORZYBSKI, A. *Science and sanity: an introduction to non-aristotelian systems and general semantics* (1st ed., 1933; 2d ed., 1941; 3d ed., 1948). Lakeville, Conn.: International Non-aristotelian Library Publishing Co.

22. KORZYBSKI, A. *Time-binding: the general theory, Two Papers: 1924-1926.* Lakeville, Conn.: Institute of General Semantics, 1949.
23. KORZYBSKI, A. What I believe. In *Manhood of humanity* (2d ed.) by the same author. Lakeville, Conn.: Institute of General Semantics, 1950.
24. KORZYBSKI, A., & KENDIG, M. Foreword. In *A theory of meaning analyzed: Critique of I. A. Richards' Theory of Language* by Thomas C. Pollock, and J. Gordon Spaulding, Elementalism: the effect of an implicit postulate of identity on I. A. Richards' *Theory of poetic value.* Gen. Semantics Monogr. No. III. Lakeville, Conn.: Institute of General Semantics, 1942.
25. LEE, DOROTHY. Being and value in a primitive culture. *J. Philos.*, 1949, 13, 401-15.
26. LEE, I. J. A mechanism of conflict and prejudice. In M. Kendig (ed.), *Papers 2d Amer. Cong. General Semantics.* Lakeville, Conn.: Institute of General Semantics, 1943.
27. LEE, I. J. The assumptions of the arrogant. *Education,* 1950, 70, 509-11.
28. LEE, I. J. *How do you talk about people?* ("Freedom Pamphlets.") New York: American Education Fellowship, 1950.
29. LÉVY-BRUHL, L. *Primitive mentality.* New York: The Macmillan Co., 1923.
30. LIPSETT, M. On the use of chain-indexing to describe and analyze the complexities of a research problem in bio-chemistry. *General Semantics Bull.,* 1949-50, 1 & 2, pp. 8, 9.
31. MARX, K., & ENGELS, F. *Manifesto of the communist party.* Translated by S. MOORE. New York: International Publishers Co., Inc., 1932.
32. MINKOWSKI, H. Space and time. In H. A. Lorentz, A. Einstein, H. Minkowski, and H. Weyl, *The principle of relativity: A collection of original memoirs on the special and general theory of relativity.* New York: Dodd, Mead & Co., Inc., 1923.
33. Naval Leadership. Annapolis, Md.: U. S. Naval Institute, 1949.
34. POINCARÉ, H. Mathematical creation. *Sci. American,* 1948, 179: 2, 54-57.
35. *Reader's Digest,* March, 1947.
36. RUSSELL, B. *Principles of mathematics.* Cambridge: Cambridge University Press, 1903.
37. RUSSELL, B. *Our knowledge of the external world as a field for scientific method in philosophy.* La Salle, Ill.: The Open Court Publishing Co., 1915.
38. RUSSELL, B. *Introduction to mathematical philosophy* (2d ed.). New York: The Macmillan Co., 1920.
39. RUSSELL, B. *The analysis of matter.* New York: Harcourt, Brace & Co., Inc., 1927.
40. SAPIR, E. Conceptual categories in primitive languages. *Science,* 1931, 74, 578.
41. SAPIR, E. As quoted in I. J. Lee, *The language of wisdom and folly.* New York: Harper & Bros., 1949.
42. SAUNDERS, J. A. Memorandum: the new science of general semantics. In *Training of officers for the naval service: hearings before the Committee on Naval Affairs, U. S. Senate,* on S. 2304. June 13 and 14, 1946.
43. TATUM, G. L. *Preliminary investigation of a procedure for conditioning for discussion.* Unpublished master's thesis, School of Speech, Northwestern University, Evanston, Ill., 1948.
44. THOMPSON, L. In quest of an heuristic approach to the study of mankind. *Phil. Sci.,* 1946, 13, 53-66.
45. U. S. Senate Calendar No. 549, Report No. 551, July 28, 1945. *Establishing a research board for national security,* submitted by Senator Byrd.
46. U. S. SENATE COMMITTEE ON NAVAL AFFAIRS. *A scientific evaluation of the proposal that the War and Navy Departments be merged into a single Department of National Defense, March 13, 1946.* Washington, D. C.: U. S. Government Printing Office, 1946.
47. WEYL, H. The mathematical way of thinking. *Science,* 1940, 92, 437-46. (See

also H. Weyl in *Studies in the history of science.* Philadelphia: University of Pennsylvania Press, 1941.)

48. WHITEHEAD, A. N. *The principle of relativity with applications to physical science.* Cambridge: Cambridge University Press, 1922.
49. WHITEHEAD, A. N. *Process and reality.* New York: The Macmillan Co., 1929.
50. WHORF, B. L. Languages and logic. *The Technology Review* (Mass. Inst. of Technology), 1941, 43, No. 6. Also in M. Kendig (ed.), *Papers 2d Amer. Cong. General Semantics.* Lakeville, Conn.: Institute of General Semantics, 1943.
51. WITTGENSTEIN, L. *Tractatus logico-philosophicus.* New York: Harcourt, Brace & Co., Inc., 1922.

ADDITIONAL READINGS

CANTRIL, H., AMES, A., JR., HASTORF, A. H., & ITTELSON, W. H. Psychology and scientific research. *Science,* 1949, 110, 461-64, 491-97, 517-22.

CASSIRER, E. *Substance and function and Einstein's theory of relativity.* Translated by W. C. SWABEY and MARIE C. SWABEY. La Salle, Ill.: The Open Court Publishing Co., 1923.

FARRINGTON, B. *Greek science: its meaning for us (Thales to Aristotle).* Harmondsworth, England: Penguin Books, 1944.

FRANK, P. *Einstein: his life and times.* New York: Alfred A. Knopf, Inc., 1947.

FRANK, P. *Modern science and its philosophy.* Cambridge, Mass.: Harvard University Press, 1949.

GEORGE, W. H. *The scientist in action: a scientific study of his methods.* New York: Emerson Books, Inc., 1938.

HALL, R. A., JR. *Leave your language alone!* Ithaca, N. Y.: Linguistica, 1950.

KEYSER, C. J. *The human worth of rigorous thinking.* New York: Columbia University Press, 1925.

KEYSER, C. J. *Mathematics as a culture clue; and other essays.* New York: Scripta Mathematica, Yeshiva University, 1947.

LEE, I. J. *The language of wisdom and folly.* New York: Harper & Bros., 1949.

LÉVY-BRUHL, L. *How natives think.* Translated by LILIAN A. CLARE. New York: Alfred A. Knopf, Inc., 1923.

MEYERS, R. The nervous system and general semantics. III. Perceptual response and the neurology of abstraction. *Etc.: A Review of General Semantics,* 1949, 6, 169-96.

WIENER, N. *Cybernetics.* New York: John Wiley & Sons, Inc., 1948.