

MAKING "THINGS" AND EXPLAINING THINGS

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We reify. We string some words together and then claim that the string stands for something "real." We believe things to exist where our senses bring us no direct evidence that anything does in fact exist. But even when we have direct sensory evidence, as when our fingers touch a flower, how much can that evidence tell us about thingness? How much thingness is due to the nature of the universe out there, and how much to the nature of our perceptions?

I am going to claim, if only to coax you into helping me think about the limits of thingness, that no "things" exist in the universe in the sense that our minds prefer to conceive things, but that we inherit neural nets which strive at every level to put thingness upon what they perceive. I claim that one of the functions of every level of perceptual control is to weave a perception (and conception, at the higher levels) of thingness from the perceptions arriving from the lower levels.

What is the usefulness of making this claim? First, if we find more evidence that all control levels actually do necessarily make "things," we will make better hypotheses and investigations of the phenomena that I claim result from the thing-making function--phenomena that are now considered by most scholars to be different in kind. Examples are the gestalts of Gestalt psychology, conceptual "chunking," reifying, stereotypy, the Zeigarnik effect, achievement motivation, cognitive dissonance, and the urge to explain things. Conceiving a way of connecting things we previously thought disparate, as I am doing here, is a typical thing we do to "explain" or "understand" the world we perceive. We replace a catalog of kinds of events or phenomena with a function or process that we think tells "how things work." I'll return to this question of "so what?" at the end of the paper.

I am not saying that we are incapable of conceiving or dealing with a continuous flow. The fact that I can write about discreteness and thingness means that I can also conceive of non-discreteness and non-thingness. I am saying that we make a thingness of the continuous flow even while we are beholding it; we conceive a flowingness, a thing. I am saying that we often perceive both the continuity and the discontinuity, but at least at the level of language (program) and above, we often dispense

with an awareness of continuity, while we always retain the conception of separate thingness. We can get along without being aware of the unbounded gradations of sounds coming from another person's chest, but we cannot get along well without being able to tell that one word has ceased and another has started. Though our sensory organs respond to continuous energies and our neural nets respond to continuous inputs, and though we have conceptions in our memories of continuities, we also always, I believe, put into memory a great many conceptions (internal standards) of our experience in chunks, in episodes, and as things.

Levels

It seems to me that wanting experience to have shape, so to speak, to be a "thing," to have closure, to be separable from the rest of experience, to have a beginning and an ending--it seems to me that this need (if you'll excuse the word) occurs at all levels of perception, though I can't imagine how it acts at the level of intensity or sensation. Maybe, indeed, it does not occur with intensities. So I turn to configurations.

Gestalts

With **configurations**, we achieve the perception of forms: distances, lines, edges, sizes, objects, phonemes, some simple syllables. I think the Gestalt phenomenon of closure occurs at this level: the broken circle is remembered as complete. Indeed, the bulk of phenomena I can remember from the work of the Gestalt psychologists are examples of perceiving "things": figure-and-ground; grouping by proximity, similarity, closure, continuity, or simultaneous movement; and the constancies of shape, size, color, and location.

At the start of the previous paragraph, I used the word "achieve" purposely, because I think that we achieve a goal or purpose in some sense when we recognize the boundary or end of a visual shape; of a sound, a motion of object or self, or an event started and stopped; of a category encircled; of a program completed; and when we perceive a principle vindicated or comprehended or a system concept illustrated or validated. When we do any of those things, I think we perceive ourselves having come to the far side, so to speak, of a thing, whether it be a river, a task at a desk, or a concept drawn into our understanding. The emotion accompanying the achievement is minuscule or unnoticed at the lower levels, but can be dramatic and thrilling at the higher levels, as when we achieve the construction of a cathedral or the demonstration of a scientific hypothesis. I'll return to achievement below.

With **transitions**, we have the perception of change and motion. Here I perceive, for example, that my machete is moving

and swinging as I slash my way through the underbrush. The fact is that my arm moves continuously, not stopping and starting again after each slash. My arm swings from one side to the other and back in a sort of figure-8. It goes faster during the cutting part of the stroke, but it moves continuously and smoothly. Nevertheless, my perception, experience, understanding, is that I have made slashes or strokes. I am willing to say at some point that one slash has ended and I am getting into position for the next. I wouldn't have to think about it that way. Does the propeller on a ship or airplane think it has completed one revolution and is ready for the next? But I do conceive an end to a slash and think of my work as a series of slashes, a series of "things", perhaps a series of program-cycles or events.

Flicker Fusion

The level of transitions enables us to put a new meaning on the level of configurations. At a sufficient speed of action, the inference of thingness at the level of transitions enables flicker-fusion to occur. We see the sequence of still pictures on the screen as if we were seeing images actually in motion. I don't suppose evolution had motion pictures in mind, but it is certainly useful to see a bird flying among the leaves of a forest rather than seeing merely some momentary flickers in the forest.

At one range of speed, we experience flicker-fusion, see birds flying in the forest, and see the tiger creeping from bush to thicket to bush. At a slower range--when the pauses between the tiger's movements become longer--we begin to wonder whether it is the same tiger. When a too-long time has stretched since our last glimpse of the tiger, we conclude that the tiger is no longer there. (We suppose the tiger is somewhere, but not within the part of the world that we need keep under surveillance.) The episode of the tiger has come to an end. We put closure to the series of sightings. It is useful to be able to turn our vigilance elsewhere.

You may say that we don't need a function of closure-seeking to stop looking for the tiger. The landscape, you may say, has come to match our internal standard for a safe landscape: one with no tiger in it. Or maybe one that has not had a tiger in it for the last thirteen minutes. And you may say that the point at which we stop looking for the tiger depends not solely on the frequency of tiger-sightings, but also on the urgency of other goals. If we have other urgent things to do, we may turn our attention to them (and away from possible tigers) sooner than we would to less urgent things.

Organizing Our Memories

I agree with what you are saying (even if you are not saying it). Seeking closure on the tiger-sightings is not what, in the forest, moves goal-seeking in another direction. But I think closure and the other forms of thinging are always at work in organizing our memories, short and long. After we have turned our attention to other things (whatever the time since the last sighting), I think our memory will tell us that we saw or have seen a tiger, not that we are seeing a tiger. I think our memory will say that an episode of seeing a tiger has happened and has ended. If the tiger appears now, I think we will not say that the tiger is continuing to appear, but that the tiger has appeared again--that a new episode is beginning.

When I see the tiger, the tiger is part of my immediate world and my immediate experience: "I am seeing a tiger." When the tiger disappears behind a bush, I am as convinced of its being there as I was when I actually saw it. "I am watching a tiger," I say, even though I cannot actually see it. The tiger is a property of my current experience; its movements are part of the many disturbances with which I am coping. When the tiger seems no longer to be nearby, when I cease watching for it, I think of it less as part of my current experience and more as part of the potentialities of this forest. I am beginning to put the tiger and myself into more categories that are separate than I did earlier. When I am out of the forest and at home, I will not think of the tiger as part of my present experience; it will be one of many events that have ended. I am not likely to say, "I am watching out for that tiger following me around out there." I will be thinking of the tiger more as a property of that forest out there and less as a property of my current experience. I am more likely to say, "There is a tiger in that forest."

When you put things into a sack, you often jounce or joggle the sack to settle the objects down against one another so that they will take less space and won't change position while you are carrying the sack slung over your back. Think of thinging as being like that. As we go along in our experiences, we joggle our memories of what is in fact continuous experience into chunks, episodes, and "things." Somehow, over the course of evolution, I guess joggling things down like that was useful in using memories to get ready for new experience.

It is useful, it seems to me, for humans to see that the clan has achieved a safe crossing of the river for all its members and that their attention can be turned to the next leg of the journey. It is useful, in keeping track of the members of the clan, not to have to keep running back to the river to see whether you have left anybody there. If you don't just now see Albert, you can look behind the nearby bushes instead of going back to the river. It is useful to put the river crossing into the category of "things accomplished."

It is useful, it seems to me, to have perceptions of perceptions of perceptions--to have the levels built upon levels that Powers postulates. And looking down from each level, it is useful to perceive experience not only as continuing seamlessly, but at the same time as coming to us as instances of configuration, as objects, things, events, categories, classes, episodes, closures, achievements, all with beginnings and endings.

When our explanations do not seem right to us, I think we try to move from lower levels to higher. We try to move from configurations (for example, from finding boundaries) to transitions and events (for example, to directions of movement and happenings). We try to move from events and categories, which have their own locations in time, to organizing those locations into sequences and programs. We go from seeing how events are ordered to seeking preferences and priorities among all or a great many programs that we find worth preserving (to principles) and to seeking necessary and invariant features that make entire arrays and fields of changing orders of experience comprehensible and reliable (to system concepts).

An **event** is to space-time as an object or a form is to space. **Relationships** can make events into a dynamic organization. When a troop of horse going by is preceded by a calliope and followed by a wagon bearing a caged lion, we perceive a dynamic organization that we call a circus parade (if it matches sufficiently well the pictures we have in our heads labeled "circus parade"). We see the calliope, horse-troop, and lion not merely as items of traffic in the street, but as an event encompassing those items. Using our relationship-abilities, we put a beginning and ending on the event. If there are more circus troops and wagons coming past us the next day, we do not say that we are seeing a long, two-day parade. Instead, we use the relationship between (a) gaps within days and (b) the gap between days to perceive two events and to say there were two parades. We do not say that a feature of our lives is the continuous watching of parading--admitting, naturally, that the gaps between wagons vary a great deal from season to season. Instead, we say that we see a parade from time to time.

[In the writings of Powers that I have, I can find the "event" described only on page 140 of the 1973 book, though it is not set forth there as one of the hierarchical levels. Where can I find a description by Powers of what the level of event might look like?]

Some things are harder for us to make into things. People who live in a locality where there is almost always some wind, when they leave their houses, remark the degree of the wind, rather than saying that "a wind" has sprung up or has departed. A sailor perceives varying degrees of a ship's rolling, not very often caring to distinguish one roll from another. If we lived at a slower rate of perceiving, we might

perceive a rates of parading rather than discrete parades. [Maybe this is not a familiar example for younger people or people who have lived in large cities all their lives. Do circuses parade any more?]

Naming and Reifying

For those of us sensitive to language or logic, I suppose that making **categories** is the most easily visible reifying we do. The circus parade is not a part of insensate reality. There is surely something out there from which we take our perception of horses and wagons, but the paradingness is our own invention. We distinguish trees from bushes and those from grasses. We make categories of plants versus animals. Of stone, frame, and grass houses. Of dark-skinned and light-skinned people. Of males and females. And so on. Those are examples of categories fairly close to sensory experience. We make other categories very far from sensory experience: god, democracy, socialism, personality, intelligence, excellence, and romance. Other categories seem to me to lie in between: valor, femininity, persistence, and corporation. Many people have asked, about every one of those terms and a thousand others, "But what is it really?" The question reifies. The question implies that there is some arrangement in the reality beyond our senses that corresponds to a category we have put a name on. The question seems to imply that God or Nature has packaged reality in things and has categorized them, and that it is reasonable for us to ask whether we have guessed the right category when we say "bush," "corporation," or "socialism." But it is not reasonable.

Korzybski (1948) liked to point to experience that was close to direct sensing and without words as being the kind of experience we had the best chance of agreeing about. He called that kind of experience "extensional." The kind of experience that looks only at the symbols without regard to the non-language experience they might connect to--he called that kind of experience "intensional." Korzybski, long dead, is still ahead of his time.

We seem to have a compulsion to put names (categories) on things. You might say, as some have, that the reason we see things as things is that our language is built that way. But why did the language take that sort of form? Why are all languages (as far as I know) chock full of nouns implying "things" with boundaries, with beginnings-and-endings?

We seem even to think there is a propriety or morality in categorizing things. My spouse looks in a drawer of mine and asks me why I keep that thing in there. Do I answer, "I don't know"? Do I say that I tossed it in there long ago, I don't know why, and now that's where I always look for it? Not often. I hunt for a "reason," and the reason usually consists of a

category. "Well, it's about the same size as the other things." Or, "It's something I wear in hot weather." Or, "It's a present someone gave me."

We invent categories when there is no conceivable need. We say, "She is the kind of person who does so-and-so," when the only fact we have is our one observation that today she did so-and-so. We saw her this once do so-and-so, and instead of reporting simply that she did that, we invent a "kind of person" into which to categorize her.

Stereotypy

The stereotype is a fateful kind of category. We see that some persons who have dark skins are also uneducated, and some who have light skins are educated, and conclude that "blacks tend to be uneducated." We then simplify to "blacks are uneducated" and to "this black person is uneducated."

A great deal of social science proceeds in the same manner as stereotypy. We find a larger portion of people who are X among people who are Y and a smaller proportion of X among people who are not-Y. We then conclude that Xs "tend" to be Y or to do Y. And school counselors advise students who score below 87 on the Murgatroyd Aptitude Test not to plan to become pharmacists.

What would the perception of continuity be like at the level of categories? Would it be experiencing a myriad of categories without ever perceiving any of them to fall into a sequence? My imagination, I fear, is failing me.

We do, it seems to me, like to put categories not only into larger categories, but also into orders or **sequences**. It helps us to know not only that certain food-plants can be found near the camp, but also that if we set out toward the east, we will encounter them in a remembered order. If we can set a criterion order for actions often repeated, like buttoning a shirt, we can do those things without conscious attention.

And of course when we became able to put numbers on ordered things, we released scientific capabilities beyond describing.

Now we come to **programs**, and the fruit of the tree of knowledge is truly plucked. Programs provide frames into which sequences can be inserted. Goals can be pursued through the several paths offered by the program. Tasks can be organized. Routines can be described. Symbols that arose at the level of categories can now be made into signs. Images, maps, and language take on sophisticated relationships to other things. The relationships, categories, sequences, and programs among the

images, maps, and words become as complex and subtle as those we weave among our perceptions that are more directly connected to reality, maybe more so. Accordingly, it becomes very easy to mistake those conceptions in our heads for tangible realities. To make that mistake, we have only to fail to ask how we might touch or see the thing we think we are talking about.

Programs and tasks, as perceptions, make bundles of experience over periods of time generally longer than the periods bundled at lower levels. Programs and tasks enable us to say, "I have got that done, and that, and that." Somehow those perceptual bundles feel better than saying, "I am doing all this stuff." We try to persuade one another that the true joys of life are to be found in the doing and on the journey, not in actually reaching the goal, but we seem to leave one another mostly unconvinced.

Note:

We have now passed the level (I do not know whether we passed it at categories, sequences, or programs) at which I can imagine the continuity that underlies the delimiting "thing." I will no longer try to describe experiences of continuities.

Zeigarnik

Just as the closure effect appeared at the level of configurations, so at the level of programs the Zeigarnik effect appears. Using the words of control theory instead of Mme. Zeigarnik's words, a task uncompleted signals an internal standard unmet. When people have worked at several tasks but have completed only some of them, and we ask them to tell us what tasks they worked at, they will usually remember a larger proportion of the unfinished tasks than the finished ones. And if we give them the choice of starting a new task or going back to complete an uncompleted one, they will usually choose to finish an uncompleted one.

You would expect those effects only when people care about the tasks. You would expect a Zeigarnik effect, that is, (a) when people have internal standards or goals for the tasks themselves rather than for pleasing someone or for avoiding threat, (b) if those standards are acting, are not pushed aside by some competing or higher internal standard, at the times the people are asked to remember or are given a choice of task, and (c) if the people actually perceive one or more tasks as uncompleted (a person may judge a task completed that we think is not). When the effect fails to show, presumably at least one of those conditions is not met. Though several studies on the Zeigarnik effect were carried out in the 1930s and 40s, no one, as far as I know, has ever carried out an experiment in which

care was taken to maintain those three conditions. It is only on theoretical grounds, I admit, that I am supposing the effect will always hold in proper experimentation.

Health

Doing tasks has a lot to do, of course, with doing jobs. And since doing a job takes so much of our time, the stresses we get on the job have an effect on our health. In a study of 268 people over 15 years, Palmore (1969) found job satisfaction to be more highly correlated with longevity than any of the other variables he studied:

When the six strongest independent variables (work satisfaction, happiness rating, physical functioning, tobacco use, performance IQ, and leisure activities) are [analyzed], work satisfaction is the best overall predictor of the Longevity Quotient ... (p. 249).

That is not to say that all of us who are happy in our jobs will live to be a hundred. It is only to say that work satisfaction has more to do with longevity than a lot of things a lot of people think have a lot to do with it. But that is saying a good deal.

Satisfaction at work, in turn, has been shown dozens of times to have a lot to do with the kind of task we do. We hate small and repetitive tasks of a few seconds each. We like work a lot more when we are given programs spanning at least a fair fraction of an hour and are allowed to choose our own subroutines. It is still more fun if a program runs several hours or days. We like best of all to be given principles and system concepts and to be allowed to build our own programs.

Why should that be? I do not feel annoyed that it takes only about a second to lift a fork to my mouth and that I do that dozens of times during a meal. When I go for a walk, I do not complain that each step takes half a second or less and that I must repeat my stepping several thousand times before I get home again. I do not complain that I must copy off some hundreds of citations to literature when I am writing a book. Why, then, are jobs with minute tasks so burdensome?

I do not feel annoyed about lifting the fork, because that lifting is not what I am doing; it is not my "task." What I am doing is eating a meal. Similarly, I am not stepping again and again, but going for a walk. I am not copying citations, but writing a book. The feature of the tiny task given me as an employee--the feature that makes the difference is the fact that the tininess is assigned and that I am prohibited from taking on the larger task. It is not the mere brevity of the act or the mere repetition of it that wears me down. It is, I think, the

requirement of the boss that I stop myself from trying to fit those acts into a larger program or principle. It is the requirement that it be mine not to reason why, but mine merely to do those petty, picayune portions of someone else's program.

We are not built to be capable of accepting that requirement. When the boss demands that we repeat and repeat a brief sequence, we function at the level of programs to find or make a program into which we can insert those repeated sequences. But it is hard to adopt an engrossing goal for repetitive work such as "I'll see if I can do 875 of these routines before the day is over." (I once invented goals like that for myself for a whole summer.) Many workers, therefore, adopt other goals such as pleasing the boss, displeasing the boss, enjoying conversations with one's co-workers, and so forth.

Meaningful Work

I do not say that we are compelled to make programs out of every series of "things" at lower levels of which we become aware. We do it, I guess, only when we expect to have to do one sort of task again and when that thing we expect to do will help us maintain some internal standards. And I am claiming that when we find ourselves repeating a series of acts (sequences), we look for a program to fit that repetition into. We seek, that is, a way of organizing what we are doing at a higher level. To say it another way, we try to fit what we are doing into the standards we have at higher levels. We ask ourselves, so to speak, where this activity fits into the standards ready at the next level up? So the worker assigned to repeat minuscule tasks asks how this work fits into larger tasks and into principles and into the reality of the world. This is what people mean, I think, when they say that workers want "meaningful" work or that they want to know the "larger picture."

Cognitive Adjustments

I think that every time we find ourselves doing something or thinking something in response to even a little disturbance, taking action on the outside world is not at all the whole of the matter. We also take action, so to speak, inside ourselves. Maybe we think we know how to recognize ice cream, but a friend tells us, "No, what you are eating is frozen yogurt." We take some low-level action such as taking another spoonful and paying more attention to taste sensations, but we also make some changes in our standard for the cognitive, conscious category "ice-cream." I am saying that we deal with a disturbance (such as the "No" our friend utters) in the control mode, but we also at the same time use the passive observation mode and the imagination mode to cope with disturbances to higher standards that are not

now calling for action. (Powers describes those modes on pages 219 ff. of the 1973 book.)

When disturbed by some feature of an event or idea, we change the weightings that make up the reference signals (internal standards) at the various levels. Sometimes we reorganize drastically. Generally, I suppose, we try not to change the more encompassing standards at the higher levels. But something always happens, small or large, to the organization of our criteria for control when we meet a disturbance in the outside world that we think will call for recurring action from us or when we encounter an unsettling idea that we think will come up again in disturbing settings.

I know that is pretty vague, but this is not the place for precise detail. I don't think I can supply much precise detail yet, anyway, though I think one example of what I think I am talking about is the "chunking" described by George A. Miller (1956). Maybe I am too much influenced by Krech and Crutchfield (1948), whose book I have admired all these years:

[Corollary to Proposition III:] Other things being equal, a change introduced into the psychological field will be absorbed in such a way as to produce the smallest effect on a strong structure (p. 98).

Proposition II: The cognitive reorganization process typically consists of a hierarchically related series of reorganizations (p. 117).

Cognitive Dissonance

The processes of readjustment in the systems of control manifest themselves in a great many patterns of behavior. The individual acts of adjustment are similar enough from time to time and from person to person that psychologists have been able to agree pretty well on their observability, and a great deal of research has been done on the frequencies and conditions in which the patterns appear.

One example is cognitive dissonance; the original book on the topic under that label is Festinger's (1957); a review of later research is Cooper and Fazio (1984). One aspect of cognitive dissonance is what is also known as the "balance" or "equilibrium" effect. The idea, put simply, is that if I perceive A and B to be in the same category, and I like A, then I will feel a necessity to like B. Runkel and Peizer (1968), using symbolic logic, showed the simplest form of the theory to be in fact trivial. Both the trivial form and the more sophisticated forms have filled thousands of pages, of which I will mention here only a few of the earlier works: Heider (1946, 1958), Newcomb (1953, 1959), Runkel (1956a), and Abelson et alii (1968).

What the equilibrium hypothesis comes to in unconscious processes, I don't know. All the experimentation, whether of conscious or unconscious processes, shows only, of course, that some of the subjects behaved as predicted. One can argue, from control theory, that the equilibrium process is not a universal function, or one can argue that the necessary internal standards were not operating for the subjects who failed to behave as predicted. One can also speculate that human categorizing, especially in the unconscious, need not be that of ordinary two-valued logic. That is, some people at some times seem to be able to love both A and B even though they know that A and B hate each other.

Cognitive Complexity

Indeed, some of us have hypothesized that people of high "cognitive complexity" or high "dimensionality of cognitive structure" are able to be entirely comfortable with combinations of perceptions that would disturb the cognitive functioning of persons of lesser complexity or dimensionality. Examples of "some of us" are Lundy and Berkowitz (1957), Runkel (1956b, 1963), Runkel and Damrin (1961), Triandis and Fishbein (1963), and Zajonc (1960).

Recapitulation

The mechanisms of control often call alterations into being in some of the internal standards at a particular level of the control hierarchy, and often entirely new standards are formed. One feature of internal standards is that they often reify, especially when they are conscious standards; they put the quality of thingness on our experience. The function of making "things" from perceptions has advantages and disadvantages. At the conscious levels, the adjustments in internal standards entail thinking. The fact of thinking when events or ideas come to attention can become itself an internal standard. Living can become, as Hamlet said, "sicklied o'er with the pale cast of thought." It can also lead to a great deal of explaining.

Need for Achievement

We all like to rearrange parts or aspects of our environments. We "prepare" our food instead of biting into it as it comes out of the ground or off the hoof. We arrange pencils and paper in the desk drawers. We assign persons to certain offices. We organize families, church congregations, companies, and circus parades. We take special pleasure when the rearrangement builds something--when it makes a "thing" that

wasn't there before. It is especially satisfying to bake a cake, write a book, construct a house, bring a commercial company into being, and the like. The new thing satisfies an internal standard at a higher level than the level at which any of the parts does or even at which all of them do while yet unorganized.

That urge to remake a part of our environment to suit better our internal standards for a world that will satisfy other internal standards--I think that urge arises partly from what I am writing about here. It arises partly from the urge to take pieces or aspects that we care about in the environment and, using an internal standard from a higher level, conceive a new thing with them, a new whole that is greater, somehow, than the sum of the parts. The new thing can be as small as a haiku or as large as the Encyclopedia Britannica, as small as a design on the head of a pin or as large as the Pyramid of Cheops. We differ, of course, in the way the urge manifests itself--the way it shows itself in our behavior.

In the literature of psychology, there is a concept (and variable) known as "need for achievement," originally named by Henry Murray (1938). David C. McClelland and his followers carried forward the research on the manifestations of the need; early reports were those of McClelland et alii (1953) and McClelland (1958). In their methods of assessing this need (chiefly the Thematic Apperception Test), I think McClelland and others estimated, in effect, a rough combination of the level of the internal standard, the persistence or time-span the person associates with the vision, and the scope or sheer size of the vision. Although all of us always look for ways of rearranging our environments, some of us feel pressed to rearrange larger parts over longer periods of time and according to more inclusive conceptions.

When a low score on need for achievement shows up, the score does not mean, in my opinion, that the person has no motivation to put a hand on the environment, nor does it mean that the person wishes to spend little time doing so--a person can spend six hours a day designing a new layout for the model trains in the basement as well as designing a new airplane company. The low score simply means that the person does not care to reorganize the environment in as splashy a way as some other people.

What makes the "need for achievement" look like something special, I think, is that when the topic comes up, we usually think of something large--of achieving the presidency, or building a skyscraper; we do not usually think of achieving the status of customer at the grocery store or of building a full sack of garbage under the sink. Some people develop internal standards for building skyscrapers, some do not.

Explaining Things

When we readjust our controls to encompass the new event or the new idea, the adjustments perforce occur more in the standards of the higher levels than in the lower levels. I suppose these adjustments make use of the imagination mode, where thinking occurs. At the levels of consciousness, this readjustment is indeed experienced, I think, as thinking--as figuring things out, explaining, understanding, and the like. Some of it comes through as intuition, some as slogging rationality such as hunting for categories by trial and error, and some as the agonizingly slow use of logic. Explaining things is a necessary function, I think, because it is itself a process of readjusting the weightings of lower-order inputs that make up our higher-order internal standards so as to keep errors and conflicts to a minimum. Readjusting to reduce error and conflict is a process we simply do because of that motivational property of the control system. To do it, thinking is not required, though we can bring thinking into the process if we wish and often do.

Our culture, perhaps our schooling, seems to press us to explain things. We often explain things when doing so serves no useful purpose or even when the explanation interferes with useful purpose. One spouse says, "You forgot the apples?" And the other says, "Oh, well, I ran into George in the produce section, and we got to talking...." The first spouse, in baking an apple pie, is not going to be able to use any of that information about George. The first spouse might very well, however, welcome the information that the other spouse cares about the frustration of delaying the pie-making. The second spouse could have said, "Oh, so I did, and that's a frustration for you, isn't it? Now you'll be delayed while I go back after them. I'll hurry."

We like to explain ourselves to ourselves, too, and we spend a lot of time worrying about how our experience fits into our conceptions of ourselves. But that topic by itself makes several books.

Our urge to explain encourages us to talk and to write. It puts shape on communicative customs. It furnishes us with the urge (curiosity) to examine the world around us to see whether more information about it will enable us to explain things even better. It leads us to systematize our examinations of the world and our reasoning about it; it leads us into religion, scholarship, and science, not to speak of engineering, commerce, games of chance, and stock markets. It also leads us into reification, argument, conflict, hatreds, vilification, vendetta, and revenge.

People differ a great deal in their willingness to say "I don't know." And after giving an answer, if they are asked, "How

do you know?' many people will be confused by the question or will answer, "I just know, that's all," and many people will become angry at being asked. Try asking those questions about the self of the other person, something like, "What made you take up photography?" and "How do you know?" It seems to be shameful or even inconceivable in our culture not to have a ready answer to most questions and especially to questions about ourselves.

Our urge to explain things often turns our attention away from what other people are wanting to tell us. Suppose I am standing in a crowded lobby, and someone backs onto my toe. "Ouch!" I cry, "You are standing on my toe!" The person replies, "Oh, sorry, I was trying to get a look at the balcony up there, and" But I was not asking for a history of his movements and purposes; I wanted only for him to know that my toe was hurting. I would have been more satisfied with, "Oh, that must hurt. Sorry."

I think we are pushed into explaining things (including ourselves) by the normal interconnection of the hierarchical control systems. Looking for ways of categorizing, ordering, subsuming under principles, and fitting into the structure of the world--those processes are part of the assimilation of new perceptions. This is part of the inherited, moment-to-moment way of doing things of every human, or every mammal, or every creature.

I think one of the best evidences for my claim about the ubiquity of thinging in controlling our perceptions is that fact that when we are asked to explain something, the very first thing that occurs to most of us is to put a name on it--to convert the phenomenon we are asked to explain to a thing. Or to tell what it "is"--which is the same thing. Why do things fall? Because of gravity, which is a force that....

I don't say there is anything wrong with naming things. I say only that it seems to me significant that when asked to explain a happening, we first name it instead of simply going ahead to explain it. Surely the naming could come at the end, instead of at the beginning? "Things fall to the earth because the great mass of the earth curves the space near itself severely and thus makes a trajectory to the earth's surface the easiest and 'straightest' way for small, near things like that apple to move." And if you want to, you can add that curving the space is called gravity, and was once thought of as a force.

Many people explain things by replacing one name--a common word or phrase--with a new one. An actual case is the psychologist about a hundred years ago who explained that the reason opium puts people to sleep is that it has dormative powers. The psychologist replaced "puts people to sleep" with "has dormative powers" and chose a thing-word (powers) to replace a process-word (puts), thus achieving a scientific-sounding explanation.

Why do my eyes itch? Because you have conjunctivitis. There is no end to this kind of explanation. Do you notice that someone speaks rarely and tells you little about himself? Well, he's an introvert, you know. And that woman got a high score on that intelligence test because she's intelligent. The reason George says things that make us think he worries and feels guilty is that he is high on psychasthenia.

When asked what we are doing, we typically do not answer by the motions we are making at the moment--"I am pushing this trowel into the dirt." Indeed, the questioner will often take insult if we answer that way. Instead, we tell the goal we have in mind: "I am planting tulips." We do not usually describe what we are doing at a level lower than program. We usually like to make a packaged thing of our activity, to conceive it as a task, project, game, or episode. Sometimes, it is true, we give an answer that conveys continuity: "I am just lying here basking in the sun--or I was until you came along."

In language use, we like to be allowed to finish our sentences. We do not like to have the subject changed without warning. Nor do we like to be pushed from one level of perception down to another. Inviting a friend to comment on the comparability of Japanese and American architecture, we don't like the friend's first comment to be on our pronunciation of "comparability."

Now I should write about **principles**. Unfortunately, I cannot think of anything to say about how principles connect to thingness or to the press to explain things. Maybe I'll think of something next month.

Now to **system concepts**. Here we explain to ourselves (and others, when we are operating on the outside world) how the actual world actually functions. To be more accurate, we explain what we think is the actual functioning of what we think is the real world. A lot of our explaining is conscious, but we are often unconscious of the assumptions we are making about the real world. A good example is going downstairs in the dark and discovering at the bottom that one has placed one's foot as if there were another step where there is not. Another is assuming that (acting as if) one's spouse knows one's wishes even though one has not told her of them.

Many words have been used to stand for the internal counterpart of a belief about the shape and functioning of the world outside our neural nets: image, isomorphism, map, picture, representation, script, understanding. All these words, unfortunately, imply that we can ascertain a reliable correspondence between a feature of our internal symbolism and a feature of the external, "objective" world. That implication is unfortunate, because we can know only our perceptions, never the "objective" external world.

It is true that we can often recognize a reliable correspondence between a symbolic representation and a perception. Going downstairs is again a good example. We can stand at the top of the flight, count the steps, close our eyes, descend, and discover that our foot finds what we expected at the end of the count. A great many correspondences, however, are next to impossible to test. Is my wife really a mind-reader? She is often right about what I want even though I have not told her. Upon those occasions, is she making successful guesses on the basis of her knowledge about recurrent patterns in my behavior, or is she "reading" directly through my skull into my innermost desires? How could one set up a suitable experimental test? Reasonable tests of mind-reading have indeed been mounted, though it is easier to persuade college students to submit to them than to persuade spouses.

Hunting for Evidence

In the middle ages, even engineers believed that when you threw an object through the air, or fired a ball from a cannon, the object flew along until the original "impetus" was exhausted, and then fell pretty much straight down. There are still a lot of people who believe that, including college students. It is easy to discover the actual trajectory if you have some suitable equipment such as a very fast camera. You can even get a fair idea of the trajectory if you watch closely while someone gently tosses a ball transversely between you and a blank wall. But few of us need to know that much about ballistics, and without some necessity, few of us find ourselves in a position to make a careful observation, with or without special equipment.

We are told that the world is round. How many of us find ourselves in a position to verify that claim with our own eyes? A great many sailors have seen ships come into view as if they were arriving over the top of a hill and have found that experience to be unconvincing evidence of a round earth. If we fly east from New York and after a while find ourselves in New York again, how can we know from our own experience that we have not simply flown in a circle over a flat earth?

With only a little willingness to believe that other people like to conspire to deceive us, we can believe that all that stuff in the geography books about a round earth is a conspiracy by godless publishers. That newspaper accounts of rockets in space are a deception by people who want to scare us. That the advice from astrologers is scorned by scientists because the scientists want to keep their monopoly on giving advice. That geologists are fooled by the evidence of the earth's age in its rocks because they lack sufficient faith in God. How many college graduates are knowledgeable enough about assessing evidence to be able to explain convincingly the relative usefulness of an aptitude test and a horoscope?

How can we make sense of accounts in newspapers and newsmagazines, often contradictory, of the effects of new medicines, the ozone layer, contaminants in foods, clear-cutting of timber, changes in taxation, clearing of forests for farming in Brazil, and so on?

We want to have images of the real world, physical and social, that will be useful to us, but trying to build a reliable image is often difficult even when we rely directly on our own senses. And much of the presumed information we get about the world comes to us in words, not direct sensations. It is not surprising that we often get mixed up about what is "real" and what is not.

Reifying

Maybe the chunking we do with our perceptions is most obvious in our pictures of the external world. We often speak of the "world of things" as being the most elementary, tangible, no-nonsense, objective, unbiased (and so on) kind of experience that we have. Most of us do not label those down-to-earth feelings of confidence with phrases such as "the world of processes" or "the world of continua." A few physicists talk like that and so do a few Eastern adepts at meditation, but no uninstructed person. Most people find some of the concepts of modern physics extremely difficult to comprehend even intellectually. And most people find the contemplation of the world as continuous and unnamable perception, rather than as a collection of namable things, to be not only impossible, but inconceivable. Most of us find it easy to believe in "things" such as egos, the Gross National Product, human organizations, and phlogiston.

Even for serious, careful observers of the sensed world, the temptation to reify is well-nigh irresistible. By the time we are able to talk intelligibly, we have already been given thousands of categories in which to perceive the external world. Those categories bias our observations. Having made our observations in as unbiased manner as we can, we then "describe" them, which means putting them into categories; we must tell what things or events we saw. The categories we already have are usually the easiest to use. We then invent a theory to connect the things or events--that is, the categories we have invented or accepted from others. The theory consists of statements--strings of words. Even the most mathematical theory is accompanied by words to tell how to interpret the mathematics. We then give those strings of words to other people, who interpret them according to their categories. They may then make observations of their own to see whether they agree with our own observations.

The "things" social scientists try to connect with their theories are not the things chosen in some other sciences. If

geologists find that rock type A is very often, maybe almost always found just under rock type B, they do not conclude that rock type A causes rock type B. They ask themselves what kinds of happenings or functions in the great ball of stuff comprising the earth could result in that pattern of layers. The "connections" are not directly between sets of data. The inspiration is to invent a model (actually constructible, with the right materials) of the behavior of the earth. The connections sought are not to show that a certain level of one variable goes with a certain level of another. One seeks instead to show that the operation of one function enables or sets off the operation of another function. The functions, depending on what materials or circumstances are available in the environment, may or may not cause changes in a variety of variables. If we observe a certain number of acre-feet of lava being pushed out of a volcano, it is not going to help our understanding much to tally the acre-feet against the number of feet the shoreline becomes extended or against the depth to which a nearby river is dammed.

My point here about passing on our descriptions of what we see is only that when we tell how we think the things or events we saw must have been connected (whether by statistics or by model), we must put a label on the sort of connection we saw. Often, we then come to believe that the label stands for some "real" thing--some feature of the world that would actually be tangible or visible if we only knew how to put our sense organs in the right place or if we only had the right kind of microscope. We observe, for example, that a match put to some materials causes them to burst into flame, but put to other materials, it does not. Instead of looking for an explanation that leaves the materials and the matches as the only tangible things, we might theorize that things that burn readily have more burn-readiness in them than other things do. We might put the name "phlogiston" on that burn-readiness stuff.

As another example, we observe that we see some people more often at gatherings we attend than we see other people. We form the notion that some people more often attend gatherings of any sort than other people, and we form the idea of "sociability" to explain that observation. We make up a questionnaire asking people about their social habits. It turns out, just as we expected, that some people score higher than others. (The questionnaire has items on it like, "Do you enjoy attending cocktail parties?") We then invite a hundred respondents to a cocktail party, and observe that the people who attend had scored, on the average, somewhat higher on sociability than those who stay away. Then we conclude that people "have" a personality trait we can call sociability, and some people have more of it than others, and those who have a lot of it find themselves, willy-nilly, going to cocktail parties more often than those with only a little of it. We conclude that there is something, somewhere, inside the person corresponding to sociability, and if we had a microscope that could look into the correct part of the

brain and into the correct neurons, we would be able to see sociability.

So our minds are always ready to interconnect experiences of configurations, transitions, and on up to system concepts, where we fit our experiences into our beliefs about the nature of the world:

Why is that man digging hole? Because they are going to fix some pipes under the street.

Why is that man digging a hole? Because he works for the street department.

... Because that's the way he makes his living.

... Because he does not have a college education; now you be sure to do your homework tonight!

... Because that the work God has chosen for him.

Reality

I made much, early in this paper, of the notion that reality (the unknown and unknowable reality) surely has the character, everywhere, of continuousness, and that it seems to us to exist in separable chunks and episodes only because our perceptual hierarchy interprets it that way. But you may say that the apple is surely a separate thing from the hand that grasps it. And that when we run into a brick wall, we surely experience a discontinuity, even a fatal one. I cannot deny those experiences. And it is useful for us to be ready for those discontinuities. A rock or a tiger's tooth passing the boundary between air and flesh disrupts the organization of the flesh severely. It is beneficial to see the rock and the tiger's tooth as things that are separate from our flesh and things best kept that way. A runner colliding with a tree seriously disrupts his momentum if not his flesh. It is beneficial for us to see the tree as something not good to encounter carelessly. It is beneficial for the hunter to see patches of light moving together in the forest as a deer.

The discontinuous things, however, exist for us at our scale of space and time. A rock or a tooth passes our skins only with damage, but a mosquito's proboscis or a malaria microbe goes through with no difficulty. We ourselves are stopped by the brick wall, but water molecules and air molecules, if they are moving slowly, are not. When a phagocyte encounters a bacterium, a terrible and deadly battle ensues. The substance of one enters the substance of the other only by damaging the other irreparably. But at the scale of our own perceptions, we are entirely unconscious of that destruction going on within our

bodies. The functions in our blood go on, as far as our larger-scale perceptions are concerned, smoothly and continuously.

For us, in our puny bodies, a collision between a large meteorite or comet and our earth would be a gargantuan catastrophe, and an encounter between planets or solar systems would be one of wholly unimaginable violence. But violence is not what astronomers see in their telescopes. When galaxies collide, stars and planets find their way among one another as easily as microbes find their way through our skin. When astronomers study their photographs, I think they imagine stately spirals and reaches of stars flowing and turning and changing their clusters as if moving in a grand and elegant pavane.

Even when an encounter disrupts structures irreversibly, beyond repair, the suddenness and the feeling of damage to rightful structure are our own interpretations; neither suddenness nor violation is a quality of nature. What seems "sudden" to us is an event that goes by before our own rate of action can do anything about it, and especially if we might actually have wanted to do something about it. Perhaps what seems sudden to us seems very slow to an ephemerid, whose whole life passes in a day. If we were to slow ourselves down so that crashing into a brisk wall would look like a slow-motion movie, the encounter would no longer look like crashing, but more like an orderly rearrangement of substances. What seems to us to be damage is a sudden change in the structure of something we prefer to see unchanged. If we dig a hole in the lawn to plant a tree, we don't say we have damaged the lawn. But if the dog digs a hole to bury a bone, we say the dog has damaged the lawn.

In brief, if we could slow ourselves down or speed ourselves up in relation to the outside world, or if we could change our size to larger or smaller by a couple of orders of magnitude, we would come to very different notions of suddenness. We would find it much easier to see that continuity lies everywhere, and that the boundaries and separations and "things" we perceive help us to interact with the world at distances and speeds that are safe at the space-time scale of our own bodies and senses. I was able to visualize these ranges much better after reading the Morrisons' book "Powers of Ten" (1982), which displays pieces of the universe ranging in size from 10^{-16} meters to 10^{25} meters.

Further Work, If Any

What can be done with these thoughts, if anything?

It could be profitable, I think, to go back to some of the research topics I have mentioned and repeat the experimentation, more or less, but using control theory to specify the conditions necessary (such as checking on what is being controlled) to reach a possibility of modeling. It may be

that certain of the features of the Gestalts, of chunking, or of cognitive complexity are indeed ever-present and universal functions.

Maybe someone could explain to me what a perception of continuity would look like at the level of categories or above. Or is this a wrong question?

What are the levels of perception and the relative frequencies of their use that are the most healthy for the most people during eight hours at various types of jobs? Or is this a wrong question?

Does an internal standard at one level always or usually give us a more chunked (discontinuous) perception of the lower levels than the internal standards at the lower levels? I don't think I am saying this in the best way.

We could investigate, using some method of monitoring continuously the internal standards at work (I know, that's a large order), Korzybski's hypothesis that people (anybody?) can be trained to use a more extensional way of thinking than he or she now does. What are the effects on health, if any, of living too much at intensional levels?

I think I could think up a couple of dozen research projects if I were to stare at previous pages here for an hour. Maybe that's wishful thinking.

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