GESTALT THEORY

BY MAX WERTHEIMER

FOREWORD: BY KURT RIEZLER

In the following pages Social Research publishes a speech that Max Wertheimer delivered at a meeting of the Kantgesellschaft in Berlin in 1924.¹ The spoken lecture was taken down in shorthand, as Wertheimer had no manuscript, and only a few notes. The lecture so impressed his audience that he was urged to publish it, and to this he consented, making only minor changes. As Wertheimer’s only programmatic statement on gestalt theory in general, this is a unique document. It throws light on the inner impulse and leading ideas in the research already done and still to be done in gestalt psychology. It shows the attitude, spirit and passion of Max Wertheimer better than has been done in any other written word of his, and better than can be done in any article in his memory.

A few words may help the reader to recognize the philosophical attitude of the speaker in his spoken word. Wertheimer was a musician and a logician and a scientist. But the “and” suggests an aggregate, and hence is wrong. As one he was the others, in a unique and intangible unity which was the inner form of the man and his thought, the touch of genius in him, and his simplicity.

The marvel of the perfect melody posed a problem to Wertheimer the logician. The melody cannot be explained by starting from elements and building up the form as a sum of relations between these elements. The single tone is what it is in the whole—as part, not as piece; and the whole breathes in every part. The melody is remembered, recognized; we can transpose a melody, change all its elements, even some relations between them, but we still recognize it.

¹ The translation, by N. Nairn-Allison, is as close to the original as possible. An extensive excerpt is published in Willis D. Ellis, A Source Book of Gestalt Psychology (Harcourt, Brace: New York 1939).
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It is the inner form that leads our recognition. As logician Wertheimer saw the challenge of this logical problem reach into the center of the traditional logic of classes, and he started to doubt many an established claim.

Max Wertheimer felt uneasy about a certain human barrenness in the scientific psychology of his time. The questions are empty; the answers are dead. The conceptual scheme, the logical tools do not fit, and thus violence is done to many marvels. He looked at nature with a pure heart and a humble mind, aware of our conceptual clumsiness, hating any violence, ready to respect the phenomena, to listen patiently to what they can tell us if we ask the appropriate questions in an appropriate language. The scientist in him would not consent to explain away whatever does not fit a preconceived scheme. To him a confused answer given by nature meant a confused question put by man.

There are things, phenomena, a great many of them, where elements, the single factors that seem to be given, cannot be isolated, changes cannot be correlated—things that resist and resent being cut into pieces. Looking more closely and submissively, he asked: maybe it isn’t even true that these single elements are given? Is this cutting into pieces the only method we have? No, it can’t be. There are other possibilities. He refused to sacrifice the living phenomena to arid cleverness. He was aware of what every mathematician is aware of: that mathematics has possibilities not yet exhausted or even explored, far beyond its present stage; and that therefore science is not entitled to tie the notion of scientific method to a preconceived scheme of order before consulting the subject matter. Reverence and deep respect for nature, a desire to let things be what they are, led him to mistrust the greater part of the psychology of his time. This mistrust led him to more and more important discoveries, which in turn justified his mistrust. Thus the scientist in him put questions to the logician; the logician posed problems far beyond psychology proper.

He did not permit his belief in the gestalt to take the cheap way out of the romanticists who resort to the irrational. On the contrary,
concrete research was his pride, and his modesty. Observing this or that concrete instance, experimenting, sharpening the conceptual tools of a logic in the making, unriddling the riddle of a particular case, accepting the concrete challenge, neither generalizing nor anticipating, never submitting to shallow matters of course — this, not metaphysical speculation, was his passion.

When we, the children of historical thinking, ask about his specific spiritual inheritance we should understand that such an historical question is alien to the man and his way. He did not think of history, nor care where he came from. He was not interested in his place in the history of thought. He followed no tradition, but heeded the call of his heart, the voice of the things. Yet if we insist upon asking the question, Wertheimer was, whether he knew it or not, cared for it or not, the heir of a great tradition which, as an attitude toward nature, may well outlive many current schools of thought and many arrogant anticipations of scientific results. It is the tradition of Spinoza and Goethe.

Nature is a unity, though not a uniformity — one in all her variegated phenomena. His lecture shows his reluctance to believe in or acknowledge beforehand any split between organic and inorganic nature, nature and man, body and soul, science and history. Our separations of fields, realms, sciences and methods are preliminary; distinction, separation, classification do not solve the fundamental problem. What we are confronted with are different manifestations of a universal structure. Structural analogies lead more deeply into nature than do differences in material contents. Different aspects of nature in different realms of science may be but projections on different yet still preliminary conceptual planes. In the words of Goethe, we can but explore the explorable and silently revere the unexplorable.

Though Wertheimer never allowed this general idea of nature to enter his concrete research as a presupposition, and blind him to the phenomena, it never deserted him. It guided him as a heuristic principle, and enabled him to see many things that others could not see, and to open the eyes of friend and pupil.
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ADDRESS: BY MAX WERTHEIMER

What is gestalt theory, what is its aim?

Gestalt theory grew right out of concrete scientific work; it grew out of definite, urgent problems in psychology, anthropology, logic, epistemology. Concrete problems were its starting point, and the work converged more and more on one fundamental, central problem.

What was the basic situation? It was a situation that many students, many philosophers of our time alike encountered. It was a situation that the young person, indeed the youngest beginner, had to face again and again. The problem: we come from the full reality of living events to science, of which we seek clarification, deeper penetration into the core of what is happening; and then we often find, it is true, instruction, information and connections — yet at the end we feel poorer than before. Let us take psychology as an example. After a particularly vital inner experience we turn to our books and attempt to discover how psychology, how science has elucidated these matters. Now we read and read. Or we may ourselves carry out an investigation along the lines of the traditional methods, and we are left with the feeling of having gathered much and yet actually of having nothing. Somehow what we considered the most crucial, the most essential and the most vital has, through this process, been lost.

Let me be specific. Have we not all experienced the meaning of: a pupil grasps the point? Have we not all personally experienced the process of such understanding — dawning enlightenment in mathematics or in physics? You should look and see what psychology, the textbooks on pedagogy, on educational psychology had until recently to say on this subject. I really recommend you do it some time, and do it from this viewpoint. One is shocked at the poverty, aridity, unreality, the utter triviality of what is said. One reads of concept formation, abstraction, generalization, class concepts, judgment, of syllogisms and maybe of associations. In addition, such fine words as creative imagination, intuition, talent and the like, are
sometimes introduced. They may suggest the most beautiful things
to the reader, but if one wishes to add the beauty of scientific exact-
ness, then a rigorous examination reveals that these terms merely
name the problems but do not offer any factual grasp of, or any pen-
etration into, the decisive issue. Science now has a whole collection
of such ideas, which have also become fashionable among the cul-
tured and which happily give free scope to the imagination, such as
"personality," "essence," "intuition" and such like. But if we wish
to penetrate more deeply, then these concepts in their concrete per-
formance mostly fail completely.

That is the basic situation which has already confronted many
and which continues to face many more. How have they coped with
it? It is a characteristic and very important feature of our cultural
development that this self-same problem has reappeared everywhere
during the last few decades, in every corner and cranny of the most
diverse sciences. The attempts to solve it have been very different.
You all know of the momentous attempts made to cope with this
singular and rather sorry situation. There is, for instance, the effort
at a radical separation of science and life. Science, it is said, has noth-
ing to do with all these lovely things, science is sober and you must
not demand of it what it cannot fulfil. You will recall the historical
period of despair in science, when it was felt that by precise demar-
cation of the realms of science one would escape the "rationalism"
and "intellectualism" of science. Science, it was said, should not go
further and has nothing to do with all the other matters. And this
attitude was manifested by its strongest and best advocates with a
truly grandiose resignation.

Another way of coping with the problem was the attempted sepa-
ration of the method of natural sciences from the humanistic disci-
plines (Geisteswissenschaften). The theme was: we grant that the
methods commonly considered scientific are necessary to the so-
called exact sciences—the natural sciences—but to these alone.
There is another region of knowledge, namely, the humanistic sci-
ences, which must elaborate their methods in antithesis to the
natural sciences, and renounce such delightful conceptions as de-
terminability, stringent procedure, objective clarification. The humanistic sciences simply use different categories. There are quite a number of other approaches, but these two examples may be sufficient.

What is the core of the situation? Are we then so sure that just this is by necessity the dominant character of science? Are the exact sciences really and necessarily and generally as we presumed them to be? Is it not possible that a certain attitude, certain fundamental assumptions concerning scientific method and approach have become widespread and have achieved prodigious maturity without being at all a necessary feature of general scientific method? Are we sure that science does not contain inherent trends going in a quite different direction, which are continually being stifled only because of a seemingly necessary, omnipotent method? Is it not possible that this method may be adequate in certain matters and may fail in others? Is it not possible that something in the former basic attitude of science frequently, though not always, blinds it in the face just of the essential, the living, the decisive factors we encounter in life and in the vital appreciation of events?

Gestalt theory does not attempt to patch up or evade, nor does it endeavor to settle the problem by decreeing: this is science, life is different; other factors are at work in the spiritual realm than in the material. Gestalt theory does not seek a solution in a separation of the subject matter of knowledge. It endeavors at a crucial point to probe the innermost core of the problem, by asking: at this precise point is there not something in the approach, the basic thesis, the fundamental preconceptions, that used to be considered indispensable to the realm of science but in actuality is not so at all?

For a long time it seemed self-evident, and very characteristic of European epistemology and science, that the scientist could only proceed in the following way: if I have before me a phenomenon to be investigated and understood, I must view it first as an aggregate, as something to be dissected into piecemeal elements; then I must study the laws governing such elements. Only by compounding the elementary data and by establishing the relations between the sepa-
rate pieces can the problem be solved. All this is not new; during recent decades it has raised problems in the minds of most scientists. Briefly characterized, one might say that the paramount presupposition was to go back to particles, to revert to piecemeal single relations existing between such individual particles or elements, to analyze and synthesize by combining the elements and particles into larger complexes.

Gestalt theory believes it has discovered a decisive aspect in recognizing the existence of phenomena and contexts of a different — of a formally different — nature. And this not merely in the humanities. The basic thesis of gestalt theory might be formulated thus: there are contexts in which what is happening in the whole cannot be deduced from the characteristics of the separate pieces, but conversely; what happens to a part of the whole is, in clear-cut cases, determined by the laws of the inner structure of its whole.

I have now stated to you a formula and could really stop here, because this is gestalt theory, no more, no less. Here, however, we face another question. This formula is today taught as the solution of the problem by different — in practice by very divergent — groups of theorists, with very different interpretation. So you see I could now, as I am sure many of you who came here today expected, undertake to expound — as is generally the practice among philosophers — the points of agreement, which sometimes converge nicely, and the points of dissension in interpreting this thesis.

My point of departure was that gestalt theory had emerged from actual research work. However, it did not only emerge from research work; it also becomes a vehicle for research. What matters is not that a problem has been introduced into science from the outside, but that concrete scientific labor has uncovered the problem; that the concrete elaboration of the discovery lays bare the process of the inner laws. It cannot be eliminated, as is unfortunately so often done, by stating certain possibilities, systematizing, pigeon-holing and then holding a world-review. The point is to penetrate to the real facts, armed with the spirit of the new method and guided entirely by the objective character of the data. Such a thesis cannot be
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discussed in generalities; it is a desire to progress, a dynamic force, a challenge to science.

There is another difficulty which I shall illustrate briefly with an example from the exact sciences. If a mathematician propounds a theorem, it might be noted, catalogued, labeled and docketed in a specific historical, theoretical category and classified as to sphere. I do not believe that any working mathematician would do anything of the sort; philosophers, on the other hand, have unfortunately given such matters primary consideration for many decades. No, a mathematician would insist: you do not, you cannot grasp the theorem unless you understand its functioning, achievement and consequences; you have nothing if you have a mere formula, in its mere distinction from other formulae, without the conception of its dynamic functional relationship to the whole. This is radically true of gestalt theory, and it therefore naturally follows that an endeavor to explain gestalt theory in the course of an hour is not merely exceedingly awkward, but must inevitably be doomed to failure. This is much more difficult than would be the case of a mathematical theorem, though the claims be as precise — since philosophy, in contrast to mathematics, is not in the fortunate position of having the basic interpretation of every functional relationship recognized more or less identically by each and all.

All the concepts used in this discussion, such as “part,” “whole,” “inner structural determination,” are heavily encumbered in philosophical discussion; everyone interprets them — they suffer particularly from being considered as cataloguing material instead of as an aid to the penetration of concrete data; so that people frequently imagine themselves capable of settling these matters as they would certain “philosophical” problems, completely out of the blue, devoid of all actuality and far removed from positive scientific work.

What, then, can I do? There is nothing I can do but take you to the workshop and introduce you briefly to our working methods, showing you how gestalt theory proceeds in the spheres of various problems and divergent scientific fields.

Let me repeat. The problem, as I have briefly outlined it and the
situation from which it emerges, is not an isolated problem of a particular science, but is fundamentally a problem of our times. Gestalt theory has not suddenly and unexpectedly dropped from the heavens above; but everything, from all the sciences, even the most diverse philosophical dispositions, converges upon the urgent solution of this the most fundamental — according to gestalt theory — of all problems.

I shall revert to an historical episode in the history of psychology. In the field of psychology, when one turned from a living experience to seek explanation and clarification in science — what did one find? He would find there were elements, sensations, images, willpower — even emotions as luck would have it. There were also laws determining these phenomena, and the scholar had only to make his choice or combinations in order to cover the phenomenon in question. In the course of this work, guided by this approach, more and more difficulties were encountered, culminating in a sharply accentuated form in the way the problem was formulated by Ehrenfels.

It was an apparently simple problem; to an outsider, to a layman, approaching science from life, the mere asking of such a question would appear incomprehensible, for he would not understand why the question was put. It was as follows. We are capable of retaining and of recognizing melodies and optical figures. Everything psychological is based on the sum of the elements. It is not at all surprising that anyone hearing a melody for the second time should recognize it by memory. From being a very simple question the situation had now suddenly grown entirely obscure: Ehrenfels, referring to observations by Mach and others, considered that a melody is also recognized after it has been transposed. Nothing remains the same in the sum of the elements and yet I recognize the identical melody; I may not even know, under certain circumstances, that the elements before me are different. For example, transpose a melody from C major to C# major and most people would not realize that the thing as a sum of elements has completely changed. What is the reason for this?
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There were various ad hoc remedies. Attempts have been made to save the situation by means of ad hoc theses; Ehrenfels proceeded in a radical manner, other psychologists branched out differently. If we consider Ehrenfels' thesis today, we wonder how it was possible to produce a theory which did nothing positive but add an x, and at the same time we must marvel at the man's daring in resorting to such a thesis in obedience to the demands made by scientific strictness.

What, considered strictly, is the conclusion of Ehrenfels' thesis? If a melody consists of six notes which I reproduce by playing six quite different notes and it is nevertheless recognized—what remains? Certainly these six elements are there as a sum-total . . . but besides these six a seventh has to be assumed, and that is the gestalt-quality (Gestaltqualität). It is this seventh element that makes it possible for me to recognize the melody. And odd though this solution may appear, there are many grandiose instances in the history of science, for instance in physics, where a scholar, feeling the scientific responsibility of making some assumption, has had the daring to set forth a crude but clear hypothesis which has in turn lent the greatest advantage to subsequent development, even though the positive side of the thesis may not yet have contributed to ultimate progress in the matter.

There were other attempts at solving the problem. One solution pointed out that in regular transposition something remains unchanged, namely, the intervals, the relations. Some felt themselves compelled to assume such odd things as "relations," in addition to the elements, as separate pieces. This was done until it was realized that this assumption did not actually help matters. There is a basic rule: something may be altered in each component part and still the whole remains identical, or very little may be altered and the whole is completely changed. This basic rule holds just as well for relations. The relations themselves may be considerably changed and yet everyone may recognize the same melody; on the other hand the relations may be very slightly changed at some critical point and everyone will be aware that something quite different has resulted,
it will not be recognized. These, of course, are all matters upon which I can only touch briefly.

Other remedies were also sought. They belonged to that category so well known to all the sciences and which so frequently recur in similar situations in the history of philosophy, when it is said: the given phenomena — are acted upon by “certain higher processes,” and it is to these higher processes that such achievement must be attributed.

This, then, was the situation until gestalt theory posed the radical question: is it at all the case that when I hear a melody I really hear the sum of individual notes, at least as a primary basis? Is it not perhaps the other way around, that what I have taken up in me, the manner in which I perceive the single tone, is that of a part determined by the structure of the whole? In other words, what the melody gives me is not built up (by some added aids) secondarily out of the sum of the individual parts, but what takes place in the individual part radically depends upon the whole. Is it not clear that the flesh and blood of a certain note in a melody depends upon the part it plays in that melody? that B as a leading tone of C is quite different from B as the tonic? that the role and function of data in a whole belong to the life and essence of the data?

Again, I have had to abridge.

I should now like to point to the series of problems which follows the posing of such a question. I shall first refer intentionally to a highly unpretentious, simple problem in psychology, the threshold. It has always been agreed that a stimulus evokes a corresponding sensation, that this sensation is constantly coordinated to the stimulus. Given a certain stimulus, I must, fundamentally, experience a certain corresponding sensation; when the stimuli are different beyond a certain degree, I experience two different sensations. Many studies have been made on this score; the threshold experiments belong to the most thorough and the dullest in early psychology. These investigations faced ever-increasing difficulties which scholars endeavored to master by explaining the dependency of such matters on higher mental factors such as judgment, illusion, attention, etc. — charac-
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characteristically applying expedients that were typical of the older psychology.

Then the radical question was posed: perhaps it is not at all true that corresponding to a definite sensation there is a definite stimulus, and is it not rather that what develops is that which tends to develop in this part of the whole? That is a simple formulation. It leads to experiments. The experiment shows that the question whether I see one or two colors depends extremely upon the figural whole-qualities of the visual field and on other whole-conditions. It is possible with the same piecemeal stimuli to produce, in an astonishingly extreme fashion, something completely homogeneous because certain figural whole-factors tend toward unity from within; while in the case of other figural whole-conditions with intrinsic pressure on separation, on segregation, on contrast, two different colors can be produced. And thus the task develops of analyzing the nature of those "whole-conditions" and their functioning.

Our next step is to examine whether what I see in one part depends upon the part of what whole it may be. Does it depend upon its position in the whole, on what function it has as a part of this whole? Again experiment shows this to be the case. What I am pointing out is something that every painter feels. There is nothing actually new in what I am saying, although no scholar would previously have expected this dependency to be so crude that, for instance, of two parts under observation one can be turned into a lighter and the other into a darker merely by changing the whole-conditions, while objectively the stimuli remain the same.

(I will not here go into the complications involved in the theory of contrast. The usual theory of contrast is, in my opinion, only a grand patchwork on the basis of the summation theory. It appears more and more clearly that the theory of contrast, though at first very plausible, fails for this very reason. It is not, in psychology of contrast, a question of a sum of "inducts," namely of contrast-producing mutual influences of parts, but of gestalt conditions.)

In the next step I assert: the conditions of the whole decisively determine what one sees or hears in one part of this whole. A human
being faces a field, and what happens there is essentially dependent upon the tendency of that field to become fraught with meaning, homogeneous, to be dominated by an inner necessity; this feature is one of the most enjoyable outcomes of our new approach. Frequently astonishingly strong means have to be applied to destroy or change the organization of a field which tends toward the meaningful, toward a good gestalt.

From its whole-tendencies the field also derives its dynamics; and the dynamic, which was formerly hardly present in psychology, has now pressed its way to the very fore. In this connection some of the most extraordinary and yet some of the simplest relationships became evident. However, I do not speak of all these events, but will take another step in the same direction. Here I am — the Ego — first a part of the field. I am not fundamentally an Ego standing in relief against other Egos, as has usually been maintained; no, the genesis of an Ego is one of the strangest and most remarkable of phenomena which, it would appear, is also controlled by whole-processes. As I have stated, I am a part in this field. What happens then in this case? Will my behavior be, as a rule, determined by piecemeal experiences and the like? Experiments seem to show ever more clearly that this is not the case, but that here again laws determining the whole hold sway; and they are responsible for human beings reacting so frequently in a sensible, adequate way.

Let us go a step further. It would not be correct to describe this field as though it primarily consisted of a sum of sensations. Here again the problem repeats itself. Primarily we should expect to find pieces, sensations. If we view the matter in this way, the queer consequence would have to be drawn that in the case of children, primitive tribes and animals, primarily only piecemeal sensations could be expected to exist. To these would then be added something on a higher plane, and to that something higher, and so on. Research, however, wherever the attempt was made, has always shown the opposite. Only a few anthropologists, guided by self-deception, still maintain the conviction that it might still be possible somewhere to find the piecemeal basis of psychological phenomena. People
found themselves forced to admit that in fact what is psychologically vital is a tidal gulf of happenings, even in what is most simple; but, they added, in dealing with science we must analyze and get down to the elements — who would dare, scientifically, to attempt to grasp the rushing stream? And yet physics does it all the time! It is merely an outworn epistemological prejudice to suppose that physics deals merely in particles. On the contrary, physics has for many decades dealt just with what is flowing, streaming, controlled by whole-processes.

Viewed from this aspect, it must undoubtedly become clearer that the primitive, the basic, the fundamental have little to do with the late cultural derivative — namely, elementary sensation. The romanticists understood this a thousand times better when they spoke of sensations in their sense of the word; they certainly did not mean a specific shade of red. Is it typical for a child or a primitive to experience a shade of red in the sense of elementary sensations? The stimulating, the gay, the strong, surely come much closer to the living facts and reactions of even the simplest of mankind.

I have already said: the human being is a part of the field; but while being a part he has his whole-character and reacts as such. In place of the connection between a stimulus as piecemeal excitation of the peripheral nerves and piecemeal sensation, another relationship must be considered: the significance of what is for an organism a surrounding field and of the reaction of an organism to such a field; the effects of changes in the field-conditions and of changes in the condition of the organism. Here a reaction is not the experience of an isolated content and of a piecemeal behavioral response. Here a reaction is primarily a process of changed attitude, of striving, desiring, feeling — not in the sense of a sum but of a structured whole.

To proceed. While I can naturally only briefly indicate all these difficult problems, I hope I shall succeed in making it perfectly clear that everything I have said is based on concrete research and frequently on experimental decisions. Man is not only part of a field, but a part and member of his group. When people are together, as when they are at work, then the most unnatural behavior, which
only appears in late stages or abnormal cases, would be to behave as separate Egos. Under normal circumstances they work in common, each a meaningfully functioning part of the whole. Consider South Sea Islanders working together, or children at play. An Ego standing vis a vis or in contrast to the others usually develops only under very special circumstances. If for any outward or inner reasons a harmonious balance is not attainable between a person and the people with whom he lives, then definite disturbances of the equilibrium must appear and in extreme instances lead to precarious substitutes for the natural equilibrium which will transform the psychological structure of that person. This led to the hypothesis that a wide range of mental disease, for which no actual theory had previously been submitted, might be the consequence of such fundamental processes. I only use this as an example to show how the problems I am discussing are within the reach of strict scientific decision.

I could proceed along these lines. This series of problems clearly leads to the problems of history of cultures and ideas — far beyond single provinces of knowledge. But I will leave this and instead continue my illustrations. I said before that the concept of stimulus, the relationship between stimulus and sensation, must suffer radical changes through this method of approaching the problem and through its resultant consequences. These changes will enrich the concept and make it more concrete. This is not only so in the case of psychology, it is also true of physiology, of the biological sciences. Here also the expedient has been used of putting one little machine beside another little machine — in summation — in order somehow to account for the meaningful — or as it is sometimes formulated, the purposeful — functioning of the living organism. Here again the concept of reflex is nowadays still frequently used as a blind coupling of two isolated parts that do not belong to each other. The piecemeal stimulus brings about automatically, mechanically, this or that piecemeal effect, in a completely arbitrary way. It becomes more and more evident that in all probability this is not even true of the most primitive organisms, such as the unicellular.

In this field much clarification is due to the work of Driesch who,
however, tries to master our basic problem in a different way. Fundamentally the thesis of vitalism springs from the same problems but, from the point of view of gestalt psychology, it commits the error of trying to solve the problem by adding to what it considers to be blindly-functioning natural processes, something which in itself allows of no scientific treatment. It does so without questioning whether the physical inorganic processes can be generally characterized as piecemeal, blind, mechanical combinations of elements, which are considered by many epistemologists as the only given data in physics. Koehler made a decisive contribution by demonstrating that there are processes even in inorganic physics which are genuine whole-processes, where what happens to one part is determined by the intrinsic structure and tendencies of the whole, not the other way around. I might also mention briefly that it has already been possible to apply this approach to biogenesis, to the development of the organism.

What I want to emphasize in this context is simply this: I want to make it clear that the essentials of the foregoing selected psychological examples are manifested in fundamentally the same way in biological, in organic and even in inorganic processes. Therefore, to solve the problem by saying that we are here dealing with a specifically psychological phenomenon would seem to be an evasion, a disposal of the problem by having recourse to a distinction between different fields of science. It is possible — and in some cases certain — that whole-processes will vary very widely between the psychic and those to be found, let us say, in an electric field. But that does not alter the fundamentals. The fundamental question with which we wish to deal simply, clearly and strictly remains the same: is the meaning of a part derived from the intrinsic structure of its whole, or are the happenings of the whole a mechanical, piecemeal, accidental, blind consequence of the happenings in the single parts? This latter often happens in physics, particularly if a number of machines are coupled together, as in the case of man-made machines. This is a point where gestalt theory is least easily understood, because, during the course of the centuries, numbers of prejudices con-
cerning nature have been conceived and piled up, such as that nature must follow blind laws and that what happens to the whole must occur through a process of summation. It was difficult enough for physics to banish teleology from its precincts. Teleology is really and truly no solution of this problem. Nowadays we have to apply quite different methods to attain a solution that used to be approached by means of the crude, superficial thesis of purposivism in teleology.

Let us take one step further. How about the relationship between body and mind? What about my knowledge of the psyche of another human being? There are ancient dogmatic theses on these subjects which have almost become part of us. The psychic and physical, it is said, are absolutely heterogeneous; they are two fields which “fortunately” are completely divorced from one another. We have, to be sure, a number of metaphysical conclusions from this thesis, designed to make the soul appear very beautiful and nature pretty black. Moreover, if I am able to sense the psyche of another human being, if I know and feel what is going on in him, then this can only be due to an inference by analogy, that is, on the principle that a certain psychic something is coupled, is senselessly linked to a physical something. I observe the physical and from it infer the heterogeneous psychic something. The schema is about as follows: I see a person switch something black on the wall and conclude that he wants light. Such connections may exist. (Whether they arise, as is assumed, typically in a piecemeal coupling of the heterogeneous, might here be left undecided.) This dissection — the dilemma is the same in this field as in all others — has embarrassed numbers of scientists in the extreme, and to save the situation they have reverted to the oddest of theses. It is really an imposition on an unsophisticated person to ask him to believe, when he sees another person shocked, terrified, or angry, that what he has seen are just certain physical data; that they have nothing intrinsically to do with the psychological; that they are simply linked externally to what happens in the other person. You have often before seen these two events coupled in your experience. . . .
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The most varied efforts have been made to master the problem. People speak of intuition, they say there is no other possibility; after all I can see another person’s fear. It is not true that I merely see the physical process with which the other is senselessly coupled. The best part of the intuition thesis is the positive feeling that the thing must be really quite different. However, the word intuition can after all only represent a name for what one wishes to understand by it. Another thesis is analogous which explains that there is a psychic, spiritual seeing besides physical sight. It has been said for instance that it is equally ununderstandable that red should be seen at 700 wave-lengths as that another person’s fear can be seen; however — I see it with my mind’s eye. In their present form these theses are scientifically fruitless; what matters in science is productive penetration, not cataloguing and systematizing.

What then is the actual position? If we look more closely we shall discover a third prejudice, namely, that the psychological occurrence, that which happens when a person is afraid, is a psychically conscious phenomenon. What! Imagine yourselves seeing someone behaving kindly toward his fellows, or living a pious life; could anyone seriously conceive of this man as actually having a corresponding, let us say — sweetish — feeling? Nobody means anything of the sort. What one has in mind is a characteristic psychological attitude and behavior, something which has yet very little to do with consciousness. One of the easiest expedients in philosophy has been simply to identify mind with consciousness.

Let me illustrate my point. People speak of idealism as opposed to materialism, thereby suggesting something beautiful by idealism and by materialism something gloomy, barren, dry, ugly. Do they really mean by consciousness something opposed to, let us say, a peacefully blossoming tree? When one considers what one finds repellent in materialism and mechanism, and what seems great in idealism, does one find the material properties of the elements to be the issue? Frankly, there are psychological theories and even plenty of psychological textbooks which, although they speak continuously only of conscious elements, are more materialistic, dryer, more
senseless and lifeless than a living tree which has probably no consciousness in it at all. It cannot matter of what materials the particles of the universe consist; what matters is the kind of whole, the significance of the whole, the meaning of the whole, the nature of the whole.

In returning to the more concrete problems I have been discussing, it becomes rapidly evident that only we Europeans, at a late stage of culture, have hit upon the idea of separating the physical and psychic of many physical processes in this way. Think of someone dancing. In his dance there is joy and grace. How is that? Does it represent on the one hand a display of muscles and movement of the limbs, and on the other hand psychic consciousness? No. But that does not solve our problem; it only sets the task. In my opinion we have been fortunate in finding a fruitful point of departure. There are actually many such processes which are revealed as identical in their gestalt structure once we disregard the material characteristics of the parts. If a person is timid, diffident or energetic, cheerful or sad it can be proved — and such studies have been made — that the nature of the physical occurrence, which can be described concretely, and the psychological process, are identical or akin in their gestalt structure.

Again I have only been able to intimate these points. The purpose of my example is to demonstrate the connection between our problem and certain philosophical issues. I would stress this point even more. What is the position of the theory of knowledge and of logic? Theory of knowledge was fettered for hundreds of years to the dogmatic prejudice according to which the world consisted basically of summative particles, or bundles, as in David Hume and Kant. Kant implies dogma of senseless summation, although his theories quite frequently bear a positive relationship to our problem. And how about logic? What does traditional logic teach us? Concepts which, when strictly regarded, are sums of characteristics; classes, which, when strictly regarded in the light of the achievements of traditional logic, may be represented as sacks containing the members; syllogisms consisting of any two propositions thrown together at random.
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so long as they have certain necessary characteristics. . . . If one carefully considers what a concept is in living thought, or the actual grasping of a conclusion, or what is decisive in the course of a mathematical proof, then it will become clear that, in this sphere, the categories of traditional logic are of no use.

I will indicate how seriously I think the problem should be treated, by asserting that sensing it will get you nowhere — it may, of course, prove valuable from a human or artistic point of view, but so far as science is concerned, the task commences only upon the realization that traditional logic is piecemeal in principle. That is the beginning of the task, which is really one of the most difficult — the beautiful question how, in principle, a logic is possible that is not based on piecemeal procedure. Nothing has been attempted so far that can compare in exactness to the achievements of traditional logic. I will now give you an extreme example. The development of a great many sciences culminated in the brilliant perfection of piecemeal methods — difficulties emerge and are apparently solved by additional assumptions. Just recall for instance the brilliant contribution Hilbert made to mathematical axiomatics. Consider the gain to science in attaining such essential clarification, and then remember that what Hilbert does might be characterized as the strongest condensation of piecemeal procedure. If one were to discuss the point with Hilbert, and contend that thus the most meaningless axioms could summatively be lined up together, he would answer that his mathematical instinct would protect him from anything of the sort.

The question arises here in the field of mathematical axiomatics just as in the field of other problems: does everything mathematical have to be fundamentally piecemeal? and what would a mathematical system look like that was not fundamentally piecemeal? Several attempts have already been evolved along these lines; they did their best, but they mostly quickly reverted to the piecemeal. It is a fate experienced by many, since training in piecemeal thinking is prevalent and inveterate. Again the core of the problem is not solved by recognizing and proving that well-known mathematical axiomatic
statements are piecemeal and that certain aspects therein contained may be regarded as pointing toward a new method; no, the problem can only really be tackled to a certain degree when a start is made leading to positive results. The outline of such a procedure appears to some mathematicians for the time being as a tremendous problem, but nevertheless as a problem that will perhaps have to be solved if, for example, we want to go ahead in the modern problems of quantum theory.

This is an attempted survey of a few selected problems. I do not know whether I have achieved my aim. Perhaps I should in conclusion insert a summarizing basic statement. If I view the situation from the standpoint of set theory, and ask, how would a world look in which there was no science, no understanding, no penetration or grasp of inner relationships, the answer is very simple. Such a world would consist of a mere agglomeration of disparate elements. The next question would be: what would a world be like, how must a plurality be conceived, if science should be able to proceed in a piecemeal way? This can also be quite simply characterized. The only requirements would be the recurrence of couplings of a senseless, piecemeal nature; then everything needed to operate traditional logic, piecemeal mathematics and science would be at hand. There is a third kind of formation of set theory which, up to now, has not been sufficiently studied — that is, those sets where a manifold is not built up of separate elements but the whole conditions of a set determine the character and place of any particular part of this set.

Figuratively speaking, then, what is the situation we are in? Everyone sees one particular sector of this world and this sector in itself is small indeed. Imagine the world consisting of a large plateau on which musicians are seated, each playing. As I walk around I hear and see. Here there are various possibilities, which are different in principle. Firstly, the world could be a senseless plurality. Everyone acts arbitrarily — everyone for himself. The combination I would gain if I could hear ten of them or all of them at the same time, would be an accidental effect of what each of them does individually. This would correspond to a radically piecemeal theory
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such as the kinetic theory of gases. A second possibility would be that whenever one musician played C, another would play F so and so many seconds later; I would establish some blind piecemeal relationship linking the acts of the individual musicians which would again result in something totally meaningless. That is the conception most people have of physics. However, correctly regarded, physics interprets the world differently. Our third possibility would for instance be a Beethoven symphony where from a part of the whole we could grasp something of the inner structure of the whole itself. The fundamental laws, then, would not be piecemeal laws but structural characteristics of the whole. And with this I will conclude.