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“ENERGETIC” THEORIES OF CULTURE¹

Max Weber (1909)

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The work of Professor W. Ostwald in Leipzig is distinguished in the highest regard by a rare artistry of presentation. This is so entirely apart from the factual range of his work. I do not mean artistry in the sense of that sort of *Stil-Aesthetik* that is all too common today. So much as questions of style come into consideration, his artistry expresses itself instead in that ability, all too rare today, to allow the “things” to speak for themselves by using the least expenditure of words as concisely and clearly as possible. What I mean by his artistry of presentation thus refers instead to the quality of the tools of thinking that he uses in “simplifying” the objects of his inquiry and how he uses them. But even the complete layman can take pleasure in the uncommon elegance of Ostwald’s artistry. All one must do is first read the discussion about atomic weights and chemical bonding and all that is related to it concerning the concept of “solutions” in contrast to “compounds,” something about electrochemical problems, or something about isomerism that is to be found in the mostly so meager parts of the older chemistry manuals. One can then appreciate the astonishing savings of energy that the effort to remain free from hypotheses and to limit that which is really “general” to chemical processes, has brought into the Ostwaldian way of presenting things. Given the peculiarity of this accomplishment one will also find it perfectly understandable that the error in Ostwald’s work is very much like that to be found in the work of his intellectual next of kin, Mach. His mistake can be described both *logically* and *factually*. Considered from a logical point of view, his error is that he 1) takes certain forms of abstract thinking found in the natural sciences and makes them absolute standards for scientific thinking in general, and that he 2) correspondingly views heterogeneous forms of thinking that are demanded by the “economy of thought” (to speak in the language of Mach) found in the problematic of *other* disciplines as imperfect and backward because they do not accomplish what they should not be able to do given their purpose (and it is not only the “economy of thought” of history in the

broadest sense, but also that of biology, which shows this type of heterogeneous aids for thinking, and this is so, as he emphasizes, regardless of whether it is presented explicitly “vitalistically” or “mechanically”). Considered then from a factual point of view, but connected with these logical difficulties, his error is that he 3) would like to label as many events as possible that occur in our experience as special cases of “energetic” relations, and finally, that 4) his passionate urge to rule the object of his inquiry is intellectually on his mind, even in the region of *that which ought to be*, and entices him into deducing purely patriotic standards of value typical of upper echelon bureaucrats from the facts to be found in his area of specialization.

This transformation of the “world-picture” of a discipline into a “world-view” is certainly common enough today. It is also well-known in which direction it is usually carried out in Darwinian biology (and among the scientific anti-Darwinians, which, of course, is always a relative term today, this transformation usually more or less ends up taking the form of pacifism). Mach derives the imperative to be altruistic from the “hopelessly lost condition” of the individual (which for him does not have a factually “thanatistic” meaning, but instead a logical meaning). The historian L.M. Hartmann, who in his metaphysical opinions is close to Mach and Exner, derives the categorical imperative from definite views about the prognoses of historical processes: act in such a way that your actions serve the (social) collectivization process (from which it would follow, incidentally, that Jay Gould, Rockefeller, and Morgan, whose accomplishments have to count as the “early fruits” of socialism according to every important theory of the development of socialism, must qualify as *ethically* congenial personalities). But with Ostwald there are technological ideals corresponding to the monstrous technical-economic significance of chemistry that are in accordance with nature and which guide in untroubled sovereignty everything he writes.

Ostwald is influenced in all this by the (supposedly) “exact” sociological method derived from the work of Comte and Quetelet for the care of which Ernest Solvay has established his “Institute for Sociology (Solvay Institute)” in Brussels. This is an institute with reading rooms, all the material required for sociological work, and ample funds to provide places for work and for publications—and as a patronic creation it is all just so grandiose and in its own way a valid model of the pitiful “scientific” method that Solvay uses in his work and that taken up by his colleague. What sort of changeling will be

produced when technologists trained in pure natural science assault “sociology” is something that can be learned from every look into a work of this kind, and especially into those of Solvay himself.² And the tragicomedy of this squandering of rich means for such a purely dilettantish purpose appears today in nothing else so clearly as the fact that the Institute, to cite one example, published an absolutely worthless work by Charles Henry³ which in voluminous calculations went to the trouble to measure the *social* (NB!) use-value of work, and, as a consequence of this (as with all the “positivists” of this kind and as was already the case with Comte) the *obligatory* amount of compensation for work by the use of “energetic formulas.” They published this work, however, only because not publishing it would contradict the “tradition” created by Solvay. But the current director of the Institute, Professor Waxweiler, points out quite correctly and with overwhelmingly polite forbearance in a few pages of an appendix the senselessness of this work for any factually informative attempt to do this. He even recognizes that this has been the case ever since the work of Thuemmens with its much richer conceptualization of the problem oriented above all else upon economics. So since the Institute under Waxweiler’s direction has applied itself to really more worthwhile work, one can surely hope that these “energetic” reminiscences will soon all be thrown into the wastebasket where they belong.

The popular lectures that we have before us were dedicated to Ernest Solvay and show the merits of Ostwald’s way of thinking and presentation as well as the consequences of the general tendencies of the “naturalistic” thinkers previously mentioned. Even in their weakest passages, they merit consideration as representative of this “type” of sociology.

So far as economic and social-political problem areas are at issue, my comments will focus on the social-political side of things. I will, consequently, limit myself to a brief summary of the chapters that present the “energetic” interpretation of the cultural processes that are very nicely worked out formally and are consequential for my thesis and ignore those things that in my opinion are among the worst things that Ostwald has ever written—an opinion that I just cannot keep quiet about. I also limit myself to a few remarks, partly of a general kind, partly more specialized, which are more removed from the areas of economic and social problems.

Chapter I (Work). We can express everything that we know about the external world in relations of energy, i.e. spatial and temporal alterations in existing proportions of energy ("energy" is defined as work and all of the things that can be produced by changes in it). Every revolutionary change in culture is thus based upon a new energetic relationship (the discovery of new sources of energy or the further use of those already known are considered to be especially important). Following this there is a discussion of the peculiarity of the five types of energy with special emphasis upon chemical energy as that kind that is most easily stored and capable of being transported.

Chapter II (The Goodness Proportion). The "goodness proportion" is the fundamental concept of the entire discussion and is defined as the relation of the quantity of energy B that can be used, which we have gained by a conversion of raw energy A sought for a practical end. As a consequence of the unavoidable co-origination of still other forms of energy in addition to the energy that is already usable, the "goodness proportion" is constantly <1 . The total work of culture endeavors 1) to increase the raw energy supply, and 2) to improve the goodness proportion. The value of maintaining lawful order is particularly important for the latter endeavor (doing away with the wasteful use of energy that occurs in fighting is totally analogous to the replacement of the petroleum lamp (which has a goodness proportion of 2 percent) with the gas lamp with an incandescent mantle (which has a goodness proportion of 10 percent).

"Free" energy is defined as the energy that can be set in motion through intensity differences within the available mass of energy. Then, since only "free" energy is usable energy and, according to the second law of energetics, this free energy is constantly given off within any given closed system of bodies through the irreversible dispersion of energy, conscious cultural work can also be designated as the "endeavor to preserve free energy." The fact that we deviate continually from this ideal is what drives us to the value determining factor, "Time." It is the acceleration of the slow conversion of energy (which in an "ideal case" would be infinitely slow) that makes this useful for us in the first place, but this also means the unavoidably accelerated destruction of free energy. And indeed, the fact that an optimum exists at all times for the relation worth striving for determined by both sides of the process relative to one another makes the further acceleration that occurs with the transgression of this principle uneconomical. The second law of

energetics becomes, therefore, the fixed line of reference for cultural development.

Chapter III (Raw Energy). “Practically everything that occurs on earth” occurs at the cost of the free energy that the sun gives to the earth through radiation. There are, however, according to Ostwald, some exceptions, for example, the ebb and flow of the tides and those phenomena that are dependent upon this. This claim might nevertheless be uncertain insofar as the specific thermal energy of the inner parts of the earth, the practical significance of which Ostwald simply denies, actually influence the temperature relationships of the surface of the earth in general in a practically important way. But since there is no water tight rock strata, perhaps the respectively valid limits of oozing away is co-determining and has an influence on the available mass of water on the surface and everything that occurs that is dependent upon this. Hence the enduring, stable economy must rest exclusively on the orderly utilization of the quantity of radiation-energy available each year. The harnessing of this energy in its “goodness proportion” is, however, still so monstrously capable of increasing that the equally rapid consumption of the radiation-energy stored up in the sun to be found in coal reserves and converted into chemical energy seems totally unthinkable—or, at any rate, a breach of that principle (amounting to a “squandering of our inheritance”) seems totally unthinkable. The author says nothing about the only slightly slower consumption (measured in terms of the supplies on hand) of chemical and form-energy from iron reserves, or about the reserves of copper and zinc that are so important for the production of electricity, etc. Furthermore, a discussion of the extent to which the chemical and form-energy of aluminum (which is practically uncreatable and is nevertheless so outstanding when it comes to rapidly advancing cost-reduction techniques) might completely take the place of the presently indispensable functions of every unquestionably creatable metal, would seem to be entirely in order in a presentation that includes a consideration of the future development of the economics of energy based upon a concentrated, filtered rechanneling of the energy of the sun into chemical or electrical energy. This should only be so much more the case when Ostwald does not believe in an increase in the supply of energy that comes from the sun in the past or the future within a specific geological period. Thus from an energetic point of view a special measure of the *economy* that includes considerations of the

amount of energy that is already available under the vantage point of future factors does not seem at all urgent, while the indispensable chemical and form-energy of every substance used for the production, transmission, and utilization of the most important energies that are used is *equally* irretrievably dissipated. This, after all, is the case with all free energy according to the law of entropy. However, in contrast to other kinds of free energy, this occurs in *historically* foreseeable periods of time, and with a further increase of the contemporary pace it could occur in a little more than a thousand years. So Ostwald's entire analysis is focussed exclusively on the discussion of energetic relations, i.e. 1) the acquisition of new forms of raw energy and 2) the improvement of the goodness proportion through the development of usable energy sources. But for all that, the nevertheless very important role of the given energy *ladder*, which includes for the most part creatable reserves, remains entirely undiscussed as an object of the economy. This means that he does not consider the qualities that condition the usefulness of these forms of energy except insofar as this can be understood in a somewhat forced manner, or at any rate indirectly, in terms of these headings—although one should not doubt that Ostwald's terminology could also be successful here.

But when the aspects of making available new energy forms are so exceedingly favorable for the future, specifically those forms of energy from the sun that can be made into usable energy only by way of living or fossilized plants, as Ostwald assumes, then a question arises for the energetic analysis of culture: how does it come about that we, given these relationships and our generally decreasing birthrate, lay any stress at all upon the *goodness* proportion? Why then does this not become increasingly irrelevant instead of more and more significant? At best one could infer an answer to this question (if even then with a fair amount of trouble and not very completely) from the discussions in Chapter IV (Living Things), V (Man), and VI (The Mastery of Foreign Energies).

If Ostwald had explicitly posed and answered this question then he might have been led in one of his discussions to think through his problems in a more useful way as, for example, Sombart brought up in his analysis of the Reuleauxian concept of the machine. These are alluded to only briefly and in an otherwise wry way on page 82. It is, however, completely wrong to say that "advanced" culture (no matter which one of the ordinary standards of "advanced" one applies) is identical with an absolute *diminution* of the use of *human* energy.

That may well be the case for the *relative* energetic significance of human energy in the comparison of contemporary culture with, for example, ancient culture, but it is not at all correct in even this relative sense for any sort of “cultural progress.” For if it were the case that “culturally advanced” should only *refer to* that which is energetically “advanced,” this would be a tautology. To have considered those problems might also have been to Ostwald’s benefit for his *salto mortale* in the area of academic economics (Chapter XI). Moreover, it might then have been possible to guard against the very false idea that one clearly gets now from his exposition that at least that which we call technical advances always rested upon an improvement of the *goodness* proportion. For this view suggests that the pure energetic *goodness* proportion should *always* be more favorable in mechanized factories than it was when craftsmen were employed, as if, for example, one could ascribe all the stored up energy of the sun to be found in coal to the different kinds of kinetic, chemical (both human and non-human), and other energies, which are allotted *pro rata* to a mechanically produced textile product (including, of course, that unused part of the energy which is dissipated), then carry out the corresponding calculation for a hand loom, and from all this explain the transition from the hand loom to the mechanical loom. The *economic* “costs,” however, are all too remote from this to move simply parallel to the expenditure of “energy” in the physical sense of the word, and the relationship of the “costs and prices” that are decisive for “being competitive” in an exchange economy are more remote from this than ever before rather than being equivalent to those of the quantity of energy consumed. They may nevertheless very often be important “energetically” everywhere. Ostwald himself occasionally mentions the living-economic moments of a fundamental kind that play a part in most kinds of “technical advances” and that require firsthand a *deterioration* of the goodness proportion: the unavoidable endeavor to speed up the conversion of energy. To some extent this state of affairs does not exist in isolation. If someone really could succeed, as Ostwald hopes, at devising a contraption for the direct transmission of the energy from the sun, e.g., into electrical energy, then the energetic “goodness proportion” itself could lag many times behind that determined by the utilization of coal energy in a steam engine and yet the capacity to compete economically resulting from the newly acquired energy might perhaps be overwhelming. The “primitive” tool that man is given by nature, the human muscle, has, nevertheless, a far better “goodness proportion” for the

utilization of the energy set free through the biochemical oxidation process than the best generator can ever attain—and this is indeed considered in economic competition. Ostwald knows without doubt why this is the case. But on given occasions it occurs to Ostwald that he should want “the entire cultural development” to be based simply on just *one* of the different kinds of energetic conditions: “the goodness proportion.” He does this even though he himself sets the development of *new* energy sources next to this at the beginning of his analysis as was noted previously. The purely *technological* problem as it might be considered energetically is not advanced by Ostwald, for it is precisely the reciprocal *relationships* between the utilization of *new* energies and the demands of the “goodness proportion” that would actually be of interest. But we do not learn anything of any consequence about this. Nevertheless, Ostwald’s peculiar treatment of these matters, which leans so heavily on technology, naturally comes up just as short as that of “economics” (in the academic sense).

Ostwald himself does indeed admit at the beginning of his comments that he was conscious that he might only be treating one side of the “cultural phenomena.” This is certainly worth recognizing since it places his work in a different category than that of many other naturalistic thinkers who have a need to come up with a “world formula.” He has the misfortune, however, of still wanting to believe in the “Comtean hierarchy of sciences” that has been out-of-date for a good, long time. He construes this Comtean scheme (113, bottom) as the view that the *concepts* of the “more general” disciplines on the lower rungs of the pyramid of sciences acquire validity for all the higher, i.e., “less general” sciences. They must, therefore, be “foundational” for these. He would shake his head in disbelief if someone told him that such *concepts* do not play a merely limited role for the economic *theories* (the specific component of academic economics that separates it from the others), but that they play no role at all. Furthermore, when considering the national economy in general, it is precisely the most general *theorems* of the “more general” disciplines, i.e., those that are most abstract and for this reason most distant from everyday experience, that are totally insignificant. For example, for the national economy it is a matter of perfect indifference if the astronomers accept the Copernican or the Ptolemaic system. It would be just as fully unimportant for the validity of economic theory (a paragon of certain hypothetical theorems of an “ideal type”) if something like the theories concerning

physical energy go through changes that completely upset the foundations of this theory. It would not even make any difference if the law of the conservation of energy maintains its current range of validity for all physical, chemical, and biochemical knowledge (which is to be expected), or if perhaps one day an “anti-Rubner” comes on the scene who annuls his experiments about the economy of temperature for living things (which is obviously extremely unlikely). The matter might also be illustrated in terms of that problem through which research in the natural sciences was linked to economic interests for such a long time, the real existence of a “*perpetuum mobile*,” i.e., an energy source which bubbled forth with free energy into a given energetic system at no cost whatsoever. Should it be the case that 1) every hypothetical principle of the *abstract theory* of economics was certified as being entirely incapable of being proven false, and, moreover that 2) one might imagine the technical reach of such a utopian source of energy to be every bit as terrific (and one would have every reason to do this), the range of *practical* validity of every abstract and hypothetical principle is nevertheless reduced to 0 when by each source of energy a) each optional type of energy b) everywhere c) at each time d) in each time differential in an unlimited quantity and e) in a chosen direction of activity might be available. The slightest limiting of any of these conditions would immediately have a direct practical significance upon the limiting principle up to a corresponding particle of possibility.

For this reason one only needs to spend a moment thinking about this utopia to see clearly what every modern methodology nevertheless forgets time and time again. They forget that the Comtean hierarchy of sciences is the model of a grand pedant that is alien to life, and that he simply does not understand that there are disciplines with totally different scientific objectives. Moreover, these objectives arise from certain immediate everyday experiences and the content of this “unscientific” experience must be sublimated and worked on under totally independent points of view. The fact that the *different* disciplines should be confronted with and cross each other with respect to their objects of study is certainly self-evident. This happens in the science of the national economy, for example, just as soon as it emerges from “pure” theory. But anyone, like Ostwald, who does not fully comprehend this fundamental state of affairs, or for whom it is enough to simply leave a little place for the effectiveness of “psychical energy” (70) according to the Comtean schema, will, to say the least, not do justice to the peculiarities of the “cultural sciences” (for which Ostwald

would indeed like to establish “foundations”).⁴ For every theoretician who has been taught modern methods knows, or more correctly stated, ought to know, that the “pure” theory of our discipline does not have anything at all to do with “psychology.”

In the three chapters concerning living things, we find first of all (53) the separation of the “anabioten” (plants), who are energy collectors, from the “katabioten” (animals), who energetically considered are parasitic consumers of the energy of the sun collected by the former. Man belongs to the second group according to this division (this is still only provisionally so, however!). He distinguishes himself from the animals energetically only through the enormous and steadily increasing measure of the energy “exterior” to him (outside of his epidermis) that is under his control in the form of tools and machines. For Ostwald the historical development of culture is identical with the history of the incorporation of new kinds of energy into the human sphere of influence (so this occurs here even *without* any improvement of the goodness proportion). A certain proviso follows from this, however, which is briefly discussed in the introduction. This is the fact that one would, of course, have to “allow” talk about “psychical energy” in order to make plausible this way of looking at things. So it is that brief discussions about a variety of topics are woven into his exposition. We find, for example, discussions about the energetic course of development of weapons of war (73f) and about the energetic value of peace contrasted with every kind of struggle. Peace, it seems, is always preferable because every kind of struggle reduces the (energetic) goodness proportion. There is also a discussion of the domestication of animals (85f), but here, as with the discussion of slavery, a knowledge of important results in specialized research is missing. Then later there is a very cute energetic analysis of the significance of fire (92), and also a discussion of the transport and preservation of different kinds of energy and the behavior of the specific kinds of energy under these conditions (Chapter VII).

The way in which he distinguishes “tool” and “machine” according to how the energy is transformed, regardless of whether this distinction applies to humans or non-humans (69), is uncommonly superficial and sociologically as good as worthless. Nor does the author have any more success in his discussion of “the collectivization process” (Chapter VIII).

The significance of this phenomenon for culture will be exaggerated today insofar as “one” (but who?) identifies the entire “science

of culture” with sociology. This is because the invention of the simplest tools proceeds from individuals and their use might be possible through individuals. This occurs, however, only insofar as society might be a “cultural factor,” which means only insofar as the “goodness proportion” is improved (112). Once again, this is to be the *only* standard, and if society comes into consideration at all from the energetic point of view this occurs only insofar as it has an effect through “order” and functional divisions on the relation of the use of energy. According to Ostwald, the balance and not the variety of energy is the decisive measure of the “perfection” of living things. This is a way of considering things like that which K.E. v. Bauer has already justly ridiculed in another place. Besides, when we include the kinds of “foreign” energy over which man has control, then there is indeed nothing to say about a relatively favorable *balance* of energy (goodness proportion), not, at any rate, according to the technology of the time. (Most of this “foreign” energy is utilized only to a minimal percent—the muscle is, as mentioned already, the best known generator.) So what then about the “balance of energy” of culture?

If we take the statements at the top of page 112 somewhat close to literally, Ostwald does not rank art, for example, taken in the broadest sense, in any way at all among the “cultural factors,” unless, as is reassuringly seen on page 88f., art finally avoids such blunders as are still found in Schiller’s “*Göttern Griechenland*” as paradigms of the “limitations of the beginner,” and takes into consideration the conversion and shifting of energy to matter. Taken in this way, art could place itself in the service of mass-enlightenment and work against the wasteful use of energy. One sees here that with respect to a Naturalism that remains true to its principles, Ostwald has exceeded DuBois Reymond’s anathema against the development of winged forms (because these are of an “atypical” and “paratypical” constitution and, as off-spring with six extremities, are anatomically dubious). The only question is, how should art satisfy this program? One summons up the maximum amount of energy conversion per square meter of canvas when one paints explosions or sea battles. A color sketch done by the young King Wilhelm the Second, which I once saw in a private collection, would come rather close to this ideal. Two ironclad ships are depicted with the colossal formation of gunsmoke. But what use is that against the wasteful use of energy by civilians? Perhaps the famous rolling mill of A.V. Menzel takes an even more favorable position in the (energetic!) “goodness proportion,” but its didactic mass effect, specifically upon housewives, upon whom it would depend very much, is hardly any greater.

Poetically and artistically illustrated cooking recipes might be entirely acceptable, but what else? And above all else, how? Presumably the law of the conservation of energy and the law of entropy could portray art only "symbolically," but then all those unpleasant "unrealities" would come up! Ostwald's predecessors, who were also looking for a "rational" definition of the purpose of art, e.g., Comte, Proudhon, and Tolstoy, were every bit as philistine as he. They, however, did not set themselves to the task as blindly as he does. An incongruity seems to exist in Leipzig. Lamprecht, for example, is for scientific purposes far too much in *touch* with art, while Ostwald—irrespective of the value of his work for the chemical analysis of dyes used in painting—far too little. Despite the fact that they undoubtedly allude to the problem frequently, a "balancing out" of these differences in intensity corresponding to an unpleasant characteristic of "psychic energy" is impossible. Proceeding in this way Ostwald does not even succeed in establishing a truly "energetic" examination of art. For what would such an examination even look like? According to the "energetic" goodness proportion the garland should be given to the "Luca fa presto," which is contrary to the current "common" view. For it is not any alleged absolute value of the ultimately desired result as such, but rather the result *compared* with the "consumption of energy" (which is precisely the "goodness proportion") that must supposedly be decisive. And the *savings* of energy that is achieved through today's technical "triumphs" in the production of paints for the artist, the manufacture of artistically-designed furniture, or in the raising of stones for monumental construction, etc., is the savings that would incorporate in itself the real *artistic* "progress." For only this, and not the accomplishments of the architect, the painter, or the cabinet maker, improves the goodness proportion. So it seems, in a most marvelous way, that for the so-called "artist" the rule of "simplicity" can only be established in artistic means "energetically" (from the goodness proportion). One does not quite see why Ostwald did not resolutely come to these conclusions himself after he had floundered about so far as to come to the postulate analyzed above. It would be high time! For it is really "energetically" unbearable to think, for example, that the production of an artistically perfect table has consumed an enormous amount of energy of kinetic, chemical, or biochemical forms, etc., which can *never* be reclaimed from the table, which, indeed, energetically valued, represent no more potential calories than a lump of wood of the same size. That

specific “form” of energy which marks it as a work of art is *useless* for the extraction of energy. Too bad that “art” *begins* at just that point where the technician’s “way of looking at things” *ends!* But perhaps that is the way it is with everything that we call “culture.” If so, then Ostwald should have recognized this and stated it explicitly. But as it is, the relationship between his ideas and a “science of culture” remains totally obscure.

However, let us get back to Ostwald himself. The highest form of improvement in the goodness proportion that “society” makes possible is apparently (122) the establishment of a tradition of experience through the formation of general concepts, as is ultimately the case with each and every science (169f) devoted to prophesizing the future and its control through invention (121-2). Speech is in this respect the instrument of socialization. (By the way, according to page 152, plants have already made “discoveries”—a doubtful “teleological” extension.)

But alas, the state of language and its science is still so lamentable even today! After the attempt to “establish” phonetic laws (127-8) failed (here Ostwald does not seem to be familiar with the gist of this problem nor its contemporary state), the professional philologists have made absolutely no serious attempt on their part to rise to the highest level of every science. For them this would be the artificial synthesis of languages, which would satisfy the energetic demands (concerning this, see the bottom of page 126). He apparently has the analogy of the importance of the synthesis of uric acid for organic chemistry in mind. Tremendous amounts of energy are thus lost in direct conflicts between languages and international language problems, since natural languages have simply shown themselves to be too imperfect for this task. This, however, can in no way be proven. Ostwald apparently does not know in what sense he is indeed “in the right” concerning the “philologists.” To be sure, the Renaissance made the preservation of Latin as the universal learned language, which it had become, impossible. Those developments of scholastic Latin that once seemed so promising were later for the very same reasons ridiculed as “barbaric” and became the grounds for its puristic eradication. There is, in fact, a most fundamental defect in such a learned language, since English is an adequate instrument for trade. Getting rid of the consequences of natural languages is not as easy as Ostwald assumes. The problem is one of understanding the positive, creative significance of the so often troublesome ambiguity of naturally-developed linguistic creations. This ambiguity represents, in part, a greater poverty, but also a greater richness in

potential content than is required and conditioned by the formation of *abstract* concepts. But given Ostwald's limited range of interests in the natural sciences (which is a *logical*, not a factual limitation), we should not expect him to clarify these matters for us.

The pace in the following chapters concerning "Rights and Punishment" (X), "Value and Exchange" (XI), and "The State and its Authority" (XII) is grand and in part frantic, but the fundamental postulates presented here are hardly anything but "energetic." However, as stated previously, I will disregard these chapters except for a few isolated comments. Ostwald fails to appreciate, as is generally the case, the peculiarity of the formation of legal concepts (one sees this in his comments concerning the "theft" of electricity [12]). For in the formation of legal concepts we simply do not take into consideration in any way whatsoever (as was recently worked out so well by von Jellinek) if the "energetic" characteristics hold true, but rather whether the characteristics determined by legal norms (a foreign moving "object") are applicable.

So, when the formation of legal concepts tends to proceed *formally* and the extension of legal norms to "new" situations is delegated, in general, to the lawmaker and not to the judge, there are very good practical reasons for this that have nothing to do with an ignorance of chemistry: "form is the enemy of arbitrariness and the twin-sister of freedom." But whether or not a situation is "new" in a legal sense is never a consequence of natural scientific considerations alone, but follows instead primarily from the *total* context of the respective indisputably valid legal norms. Organizing these legal norms into one internally non-contradictory system is the one most fundamental task of jurisprudence and provides the primary standard even for the decision in "prima facie" (and occasionally definitive) cases where dependence upon a norm is not clear. Not even devotees of "free judicial" thinking would in principle dispute this. To what extent a scientific approach could ever be of any use depends completely upon the individual case. But, in the final analysis it is the non-scientific considerations that are consistently decisive in those very cases that are not "provided for," and it does not matter whether or not this appears to the chemist as "backwardness."

Moreover, the comments concerning the meaning of "equality before the law" (142) and the "proportionality" of punishment (143), e.g., calling for milder prison sentences for the more socially prominent since they are affected relatively harder by them, are hardly of an

“energetic” character. These comments might correspond instead to the “retaliatory” standpoint which has otherwise been so denounced by the naturalist as obsolete. One can certainly come to related, although widely deviating, conclusions even in an “energetic” consideration, but then one would have to determine the energetic “goodness proportion” between the *norms* of punishment and their *success*. Taking up Ostwald’s viewpoint one would then, using the “goodness proportion,” approximately estimate the energetic expenditure involved in the formation of the prison walls as well as the chemical energy expended in the apprehension and arrest of the prisoners, and the biochemical energy of the prison authorities, and then ask with what minimum of energy expenditure could the “energetic” goal of punishment, i.e., the maintenance of order through the removal of the disturbing elements, be attained. In this respect, when one is content with the very small expenditure of kinetic and form energy that the alternatives of corporal punishment or hanging present, their the “goodness proportion” would appear energetically more favorable than castration, which Ostwald recommends for the carriers of the murder instinct (but why only for this?). Since Ostwald makes special reference to the necessity of preserving the work-energy of the offender for society, nothing would stand in the way of distinguishing punishments according to profession. Pensioners, but also philologists, historians and similar loafers, who do not improve the goodness proportion, should be strung up (and incidentally, considering their uselessness, why not go ahead before they make themselves a nuisance as criminals?). Workers, technicians, entrepreneurs who contribute to the well-being of society, and above all, those men who improve the goodness proportion to the highest degree, the chemists, should, on the other hand, get corporal punishment. If Ostwald rejects these conclusions, then he must admit that there are presumably considerations other than the “energetic” ones which are determining—although he only wanted to offer “energetic” considerations in his work. Likewise, the comments concerning “equality before the law” contain in no way “energetic” ideals, but instead ideals of “natural law.” Similarly, the observations concerning the “meaning” of the legal order that in the same way coincide entirely with the physiocratic view of “natural law,” hardly gain any persuasive power when supported by “energetic” arguments that they do not already have for those who share them for completely different reasons. The cheerful conviction (38) that it is only the “stupidity” of men that impedes our general success in striving toward the optimal goodness

proportion will, unfortunately, elicit a shake of the head from social historians. This mixing up of value judgments and empirical sciences pops up in the most unpleasant way all over the place. But even a dilettante like Ostwald could ultimately see that the relationship between need and cost simply cannot be defined “energetically”—and this is so even when one makes allowances for his totally worthless discussion of the economic concept of value and the *justum pretium*, which are identical with the scholastic way of thinking.

He would have to admit himself that the claim (55) that the “general problem of living things” consists in “securing for themselves a life of the longest possible duration, *whereby* the species is to be considered as a collective entity” [sic!] is not ultimately of an “energetic” origin. But then he might well have asked himself where the categorical imperative of the “whereby” clause obtains its legitimation. So what do I care about “the species”? A scientist might very well not even presume to give an authoritative answer to this practical question, but least evident of all is how any sort of *ethical* obligation to act this way or that way toward the “species” could ever follow from any sort of energetic “goodness proportion.”

In the discussion of the last chapter (Science), which is dedicated to education, there appears first of all in the statements on page 182 a certain unfamiliarity on Ostwald’s part concerning the state of scientific pedagogy. Those who are not bound by confessional or other authoritarian interests will certainly agree with the comments about religious instruction (in the footnotes), but the question about the status of ancient languages, which he treats from a most personal point of view, is in no way as simple as he assumes. I was much impressed when — certainly in contrast to the official Catholic position — a particularly enthusiastic educator of a strictly clerical persuasion explained to me his preference that the young should receive training in the natural sciences (in addition to religious instruction). He did not expect that this kind of training would in any way be detrimental to his confessional interests (and this seems reasonable judging from the spirit of modern Catholicism and its adaptability), but he did anticipate that freedom-loving “subjectivism” would be eliminated and replaced by “organic” ideals in the Thomist sense. However, as everyone knows, scholars of the first rank, whose passionate interest for “technical progress” would fully satisfy even Ostwald, have pointed out that students who previously received “vocational-technical” training almost always have a more limited way of thinking than those with “classical”

training. These conclusions are based on intensive experience in seminars — and “energetically” are ultimately decisive. So these matters are really not so simple.

And when one identifies “character building” with the “development of *social* qualities” and then relates this ambiguous concept further with “energetically (i.e., technically) useful qualities,” as Ostwald undoubtedly does, there are consequences that are unfortunately much further removed from the “freedom of thought and convictions” than Ostwald realizes. But the closing sentence of the book (184) indicates that this is what he expects to be the consequence of the spreading of natural scientific knowledge. For an apostle of “order” who also opposes “energy-wasting” *echauffements* that serve ideals that are not *technological*, which Ostwald is and must be to be consistent, unavoidably spreads an attitude of submission and compliancy toward the given *social* order.

He does this whether he wants to or not (which probably occurs much against Ostwald’s will), but this attitude was consistently characteristic of the matter-of-fact-men of every epoch. Freedom of conviction is quite simply not a valuable ideal when considered technologically or from a utilitarian standpoint and cannot be “energetically” established. And it is not certain that the interests of science would always be served by subordinating all progress in scientific thought to the standard of the practical “control” of the external world — not even when one judges science by the same standard. It was not just by coincidence that it was not Bacon, the patriarch of this scientific-theoretical point of view, but thinkers of a totally different direction, who created the methodological foundations of the modern, exact sciences. That which we today call “searching for the scientific truth for its own sake,” was called, e.g., by Swammerdam, in the language of the time, “the proof of God in the anatomy of a cause,” and as a heuristic principle the good Lord was not too bad at that time. One certainly must admit, on the other hand, that it was *economic* interests that gave the necessary impetus for the development of sciences such as chemistry (and many other natural sciences), and continue to do so. But should we now turn this *fact* about the principle (re)agents for the development of chemistry into the “meaning” of scientific work, as was done earlier with the good Lord and his “glory”? If this is what it comes to we are better off with God!

Although the foregoing observations might have given the impression that I believe the energetic viewpoint to be completely unfruitful

for our discipline, this is not my view. It is entirely proper at some time to take into account the physical and chemical balance sheets of technical and economical developmental processes. Ostwald must certainly be correct in mentioning that Ratzel has benefited from discussions with him. We could benefit from his discussions as well, and certainly his general comment (3) that it is necessary to take into account all of the statements that result from the application of the laws of energy to social phenomenon, deserves our unreserved agreement. But when he goes on (3) to add that the task is one of "laying the foundations" of a sociology from the viewpoint of energetics, this is just a consequence of the unsuccessful Comtean account of the hierarchy of the sciences. It is precisely the concrete, specific results of chemical, biological, etc., research which, insofar as they enter into our considerations, arouse our interest. By contrast, the fundamental theorems only arouse our interests as exceptions and never as an essential "basis," as was previously stated. This state of affairs continues to be conspicuously difficult for advocates of the natural sciences — but actually this should not surprise a thinker who proceeds from the viewpoint of the "economy of thought." Furthermore, it cannot be denied that the terminology of many disciplines, e.g., that which is found in our economic theories of production, would become significantly less ambiguous by taking into consideration how concepts are formed in physics and chemistry. But then Ostwald overrates all of these gains in such a ridiculous manner that he almost invites the scorn of those familiar with the real problems of the "sciences of culture." So if the preceding discussion took on a somewhat facetious tone here and there — but to an extremely modest degree when one considers the way in which our problems are dealt with by Ostwald — then this should not be misunderstood.

I have good reason not to throw stones at people who make a few silly mistakes when they step outside their area of competence, for this playing around with concepts from one's own field in bordering and neighboring fields is today increasingly unavoidable, even though mistakes easily occur. But considering the extreme arrogance with which representatives of the natural sciences are wont to regard the work of other (namely the historical) disciplines, which must proceed in other ways corresponding to other methodological goals, it is completely in order to observe that Chevolson's "twelfth commandment" is valid even for such an important thinker as Ostwald. Ostwald has been so ill-advised in his sources of information, and furthermore, he has

only damaged his own affairs by introducing his favorite practical *postulates* in every possible area (economics, criminology, education policy) into an investigation that in purely scientific inquiry, should be limited strictly and factually to the *causal* implications of energetic relationships and the methodical consequences of energetic concepts. These postulates are not even determinable based upon “energetic” states of affairs,” and Ostwald himself used entirely other principles in coming up with them.

This is regrettable despite every difference of opinion. Notwithstanding the most inconsiderate criticism of the innumerable blunders that occur on two-thirds of all the pages of this pitifully bad book (of which not even ten percent have been dealt with here), Ostwald is and remains a thinker whose refreshing enthusiasm as well as his open-minded, undogmatic sense for modern problems would have to make it a pleasure for anyone to work together with him on the major problem, “technology and culture.”

So when this work has been dealt with in such detail here, it is not only because of the importance of the author, but because it, with all of its merits and weaknesses, is a “Type” for the way in which “naturalism” *in general* (whether crudely or finely) always proceeds. For “naturalism” may be defined as the attempt to derive value-judgment from scientific facts. One often learns more from the mistakes of otherwise important scholars than from the correctness of insignificant figures. It is essentially because of its characteristic and typical *errors* that this little failed work has been dealt with so thoroughly here. No contemporary historian, national economist or other representative of the “sciences of culture” would be so presumptuous as to proscribe to the chemists and technicians what method and which viewpoint they should use.

The precondition for working together constructively with the advocates of these disciplines is, however, that they learn to be just as modest — and no one can desire this any more than the author of this review. But as long as they do not recognize that it was and is certain *historically* given and historically alterable *social* conditions, i.e., constellations of *interests* of specific kinds, which made first possible and will make possible (or even impossible) the utilization of *technical* “discoveries” in general, and that consequently the way in which the future of technological development takes shape is also dependent upon the development of these constellations of interests and in no way upon purely technical “possibilities” alone — no fruitful discussion between us is possible.

FOOTNOTES

1. Wilhelm Ostwald, *Energetische Grundlagen der Kulturwissenschaft* [Energetic Foundations of a Science of Culture] (Philosophical-Sociological Library, ed. by Rud. Ersler, Vienna, Vol. XVI) W. Klinkhardt, Leipzig, 1909, 184 pp.
2. We take as an example a terse bit of analysis from E. Solvay, *Formales d'Introduction à l'Energetique physico- et psycho-sociologique* (Institut Solvay, *Notes et Memoires*, Fasc. I, 1906): The respective energetic output (*rendement* = R) of a living organism follows from the formula

$$R = \frac{E_l}{E_c} = \frac{E_c - (E_f + E_r)}{E_c}$$

where E_c is the raw energy collected through respiration, nourishment, or exposure (*E. consommées*), E_f the energy morphologically fixed at a specific time (*E. fixées*), E_r the unutilized, residual energy (*E. rejetés*), and finally, E_l the energy released through the oxidation process of the organism (*E. libérés*). The fraction $\frac{E_l}{E_c}$,

which is decisive for the *rendement*, improves from childhood (where E_l is very large) until one is fully grown when it reaches an optimum and then drops again with age through the growth of E_r (because of a growing inability to utilize the energy collected). Now from a "sociological standpoint" only a fraction of the total, free organic energy = E (*Energies utilisables*) comes into consideration for the calculation of the energetically pure output from an organism. This is especially so for the individual *man*. This fraction is that portion that is useful for work in contrast to that fractional part E_t that is displaced in heat and which remains unusable as in every machine. However, this "use energy" of the individual is not altogether *socially* usable energy (*E. socioénergétique*) since individuals first pursue only their *own* "physico-energetic" interests. Consequently, only a fraction of their use-energy is made socially usable. The "*socio-utilisabilité*" of the individual is to be determined, therefore, by multiplying the individual use-energy with each of the coefficients u that are ordered according to the degree of social use-energy. The quantity $\sum_u E_u t$ for the period of the total life of the individual follows from all this. Through addition of the single energetic *rendements* of all the individuals in one society in one unit of time, a measurement of the *average* part U (which makes up its social usability) and division of the product of U with the sum of the individual energetic *rendements* through the sum of the energy consumed by the society during this unit of time, we come up with the formula for R_s (*Rendement sozial* = the social usability of *all* individuals at a given moment):

$$= \frac{U (E - [E + E_R + E_T])}{E_c}$$

Objects that are *not* of a physico-energetic character, i.e., whose consumption does not result in the *destruction* of energy in the interest of the organism, but that influence the *rendements* relationship, can in principle be inserted into the formula through the fact that they reflect the corresponding increase or decrease of E_c (the fixed raw energy to be utilized or at disposal), hence the energy at the same level through the consumption of *food stuffs* (as the real type of energetic consumption). Solvay believes that he is permitted to make this claim even for those needs that might be *purement d'ordre imaginatif ou moral* (12). He even believes that the “mis-used” consumption, i.e., the consumption that varies from the average consumption resulting from the “*homme normal*” can be taken into account in this formula. One sees this when allowing for the fact that this sort of *énergétisme excessif* of the individual can indeed express itself in certain circumstances as “*énergétisme privatif*” to the benefit of the whole, but that under circumstances it is in no way at all anti-social, namely when it involves the “*hommes capables*” that, as compensation for this over-consumption, yields a higher percent of energetic accomplishment. So these circumstances are not just not anti-social, they can even improve the energetic *rendement* of the society. Therefore, the energetic formulas and those common units of measurement in energetics (kilogrammeter, calorie, etc.) are *generally* applicable.

To make a brief assessment of Solvay’s project at this point, one must, however, guard against the view that the total futility of his model stems from the fact that his formulas cannot include sufficient calculations to capture the complexity of the phenomenon. To such an objection Solvay could always respond, and rightfully so, that it is possible “in principle” to integrate all the factors in any such complexly developed state of affairs simply by introducing more and more variables. The fact that many of his coefficients could never be measured exactly and that some are not at all measurable quantitatively is also not a “fundamental” mistake. Consider, for example, that the law of marginal utility uses the fiction of a purely quantitative measurability of needs and that methodologically this is fully justifiable. *Why* this is justifiable is not a point that needs to be considered now. The totally worthless character of Solvay’s entire project stems instead from the incorporation of *value* judgments of a pure and simple subjective character into what appear to be such strictly “exact” formulas. From the “*point de vue social*” the *socio-utilisabilité* of the individual person (this quality itself and certainly the extent to which it is manifested) and everything dependent upon this is surely determinable only according to completely subjective ideals. But with these ideals the individual is confronted with the question about conditions that *ought to exist* in the society. As a result of this, innumerable nuances come into consideration, including the numerous possible standards of value and an infinite number of compromises between the countless possible means to a desired end that compete with one another or may have unwanted consequences along with those that are desired, because of results that follow from standards of value that clash directly with one another. These, of course, are all of equal value so long as neither of those *belief*-factors supposedly surmounted by positivism, either “theological” or “metaphysical” beliefs, are not brought in through the

back door. For in their absence, the question whether an individual who has generated an *énergétisme excessif* is “profitable,” for example, Gregory VII, Robespierre, Napoleon, August the Strong, Rockefeller, Goethe, Oscar Wilde, Ivan the Terrible, etc., is in spite of a “socio-energetic viewpoint” *only* determinable through objective value judgements. This is also so for the decisive further question to which *degree* these figures and the countless others who are more or less like such types as these are “profitable” or if they “do not pay their own way.” But to concoct mathematical symbols for this value judgment is just fiddling around foolishly as if such little stunts had any meaning at all for *each individual* subject *who makes judgments of value*. Solvay and I must have, for example, totally different coefficients! — But it is totally nuts to thrash through this worthless straw acting as if something “scientific” was going to emerge from it. The fact that Solvay’s total output is not worth the paper it is written on must have been stated clearly enough already, but it is at that point where Solvay himself recognizes the difficulties that exist in applying his formulas (15) that the fun and games really begin. He is concerned at this stage with the “*phénomènes d’ordre intellectuel*.” Solvay says (“*considérés en eux mêmes*”) that they correspond to none of the specifically quantitative developments of energy for their own characteristic development, but present instead actually (“*essentiellement*”) a succession of characteristics stemming from the conditions of neuro-muscular energy. (This way of looking at things is a well-known surrogate of strict “psycho-physical parallelism.”) The same quantitative consumption of energy can consequently represent accomplishments of very different *values* (*valeur*). They *must* (NB. *par ordre de qui?*) nevertheless fit well into these formulas and these quantities *must* be measurable since *they surely* [sic!] play such a large role in sociology (and to add to all this that which would belong to the complete logic of this conclusion, it is *a priori* absolutely certain that sociology can only get along with energetic formulas). The matter is indeed even very simple: one cannot admittedly measure the characteristic developments of energy themselves and does not *want* to measure the accompanying (*concomitante*) characteristics (in the sense of the usual psycho-physical parallelism) which are not characteristic of these “*phénomènes d’ordre intellectuel*.” One can, however, measure *their effects* (*effet*). From this there follows a whole series of amusing hobgoblin-like leaps. How, for example, does one *measure* the “*effet*” of the Madonna Sistima or a work of “alley art”? Then since Solvay is, like so many others, reluctant to confess openly that the word “*effet*” appears here only half-way by slight of hand instead of the ambiguous word “*valeur*” that was used previously, the following argument can be set in motion. The “normal” purpose of “*effort cérébral*” by “normal” individuals lies in self-preservation. *Therefore* (NB!), *this must also be the case for the (normal) collective individual*, i.e., society. By self-preservation is meant protection against things that are physically and “morally” [sic!] injurious. *Consequently* (!), the normal *Effekt* of cerebral exertion *always* (NB!) signifies an improvement of the energetic *rendements*. This is not only the case for technical inventions or for bright workers when compared to those who are not so bright, but is also so outside the intellectual sphere. Music, for example, calls forth conditions in the brain that provoke a

modification of the oxidation processes that, in turn, serve the purpose of improving the utilization of the organic energy that is thereby released (and, therefore, presumably a better digestion and the like, although to be sure earlier Solvay accounted for the effect of ideo-energy upon the size of E_r , i.e., the excretion of feces, as being of no serious consequence). Thus the energetic significance of music is proven and it consequently supports, like everything like it, “in principle” this measurability. This, however, is sufficient to carry us again blissfully to the beautiful land of formulas about E_l and E_r . To be sure, there are many coefficients there for which the units of measurement have not yet been found, e.g., according to Solvay, the number of possible ideas in one unit of time, etc. There are also intellectual or artistic creations for which the profit remains potential, and still others that show a deficit and that are, therefore, harmful for society. (Solvay has in mind here perhaps the suicides that took place on account of Werther, that adversely affected the energetic worth of this work.) But at any rate, he thinks that *every* person [sic!] will “in principle” be able to figure things out “in principle” precisely according to the measure of his social worth, be it positive or negative (and this, of course, changes during the course of his life) in just the same way as his physico-energetic value was calculated (which we discussed previously). This is all done on the basis of the *norm* of evaluation (i.e., the direct or indirect improvement of the socio-energetic *rendements*). This “in principle” possibility is, however, of monstrous importance, and all the more so, as, of course, “in principle,” even the calculation of such “ideo-energy” is possible, which as a consequence of the immaturity of the contemporaries first becomes effective centuries later. But to the good fortune of the author, “it does *not* belong to his work” to investigate the *method how* we can then set ourselves to the job of measuring the *valeurs physico- et psycho-énergétiques*—for, in his view, just to have a grip on the major lines of research (21), the sketch of which is enough to satisfy him as is usually the case with other similar examples of naturalistic self-deception, “*tout l’ensemble des recherches sociologiques proprement dites.*”

The remarks that follow these concern the phenomenon “price” in the contemporary exchange economy. Naturally, the calorie and oxidation processes hidden behind this phenomenon are the “definitive” measures of value. Directly or indirectly, they supply the form of the goods of exchange to the organism. The fact that one never even buys the oxygen in the air indirectly (in its basic value), so long as there is a surplus of land, or, on the other hand, that the “oxidation processes” that one would in truth have to speculate about when, e.g., purchasing a “genuine” Persian rug, according to Solvay, are actually a word-puzzle for totally subjective estimations about the value of the product by *individuals* does not bother our author at all. Nor is he disturbed by the fact that, as he himself concedes (as discussed above), there is no quantum of energy that univocally corresponds to these energetic processes—just as is the case with the same sort of results represented by all other “social” values. But then every first semester student of national economy could say the same thing about these shenanigans. Like the way in which we are vaulted by this

passion to express everything about the work of art in energetic terms from beginning to end, that is, from “*valeur*” (which at this point must indeed mean *aesthetic value*) to the “*effet*” (the consequences of the oxidation process), the view leads us to the consequence that the improvement of the physico- and psycho-energetic *rendements* of the “*homme moyen*” might be the decisive means for improving the *rendements* of society itself. From this it follows that the calculations of this fanaticism for “productivity” show the way to the law-giver whereby the “*rendement normal*” can be attained, which, as far as he is concerned, is contingent upon the existence of the “*humanité normal*,” i.e., the replacement for the “*hommes idéalement sains et sages*” (who do no *more* than is normally required to maintain their own personal *rendement* and as a result of this make only the “socially necessary” minimum of their energy available for social purposes).

Since every social group presents a unit of chemical reactions, and since the time is not too far away when every process in the universe will have received its energetic evaluation (*évaluation énergétique*), the day when such a normatively “positive” sociology is also possible cannot be, according to Solvay’s view, too far away either—at least “in principle,” that is (as one must surely be allowed to add here, too!). I will not, however, make any comments about Solvay’s practical proposals here. His fanaticism for “productivity” just like his “compatibilism” can in their intellectual content be compared to the conception of classical French utopianism (more or less along the lines of the ideas of Proudhon) in approximately the same epigonous, phillistine way as the “accomplishments” that we have come to be acquainted with in the preceding remarks that are related to the train of thought found in the works of Quetelet and Comte.

Ostwald himself remains far behind these “accomplishments” in the consequences to be found in the work of his under consideration here. This is so although, or rather, *because* he has more “*bon sens*” than they. Solvay’s comments about the absence of a univocal correlation between “intellectual” content and quantitative relations of energy are, e.g., never taken into serious consideration in this work.

3. Ch. Henry, *Mésure des Capacités intellectuelle et énergétique*, hr. 6 of the *Notes et Memoires*.
4. Incidentally, whether or not a modern chemist ought to talk about “psychic energy” in the way that Ostwald has a habit of doing is itself a question. At any rate, even one who accepts the viewpoint of psycho-physical causation (and hence rejects “parallelism”) would hardly be able to understand that which Ostwald understands by “psychological” processes as capable of being evaluated “energetically,” namely, “thoughts.” Ostwald does this, however, both explicitly and implicitly. We would prefer to cover sentences like the following one (97, n.) with the veil of love: “thoughts can [sic!] be interpreted as not existing in space, but they do not exist [sic!] without time and energy and are [sic!] subjective.” One wants to stand fully by Münsterberg’s Psychology as is always the case—and Ostwald would certainly benefit from reading a

few chapters from this work. The “energeticist” is, after all, in conformity with his methodology, only supposed to be concerned about “objective” nerves and brain-output, which depict *quantities* of the real thing. He is, in other words, supposed to be concerned with chemical energy, and not “subjectivities.” For there is no definite *measurement* of conversion between these things and quantitative “energetic” relations by means of the peculiar qualitative character of the former (the “content” of thoughts). This possibility is, however, conceptually essential for each kind of “energy.” Suppose, for example, that someone succeeded in finding a decisive factor for those processes contingent upon the “soul” in the energy balance sheets and that one fixed “introspective” knowledge as a specific “sense organ” for “psychic” energy and the changing “content” and “conversion” of this energy (which would already be considered necessary according to Ostwald [98], because otherwise psychological processes could never be included under the concept of an event). Then there would be absolutely no way to distinguish even the most senseless babble and behavior of a paranoid from the most highly esteemed intellectual accomplishments insofar as they affect the energetic goodness proportion “inside the epidermis.” Moreover, no “energetic” goodness proportion could give a standard, for example, for whether a judgment was “correct” or “false” (an obvious, but decisive point). *Both* require an energetic effort and there is absolutely *nothing* that makes it probable that the effort expended in a “correct” judgment with respect to the biochemical “goodness proportion” or in any other way distinguishes itself from the relationships affected by an “incorrect” judgement. Nor, as might be said immediately, only to guard against a well-known point of view which, like even Solvay (see above, p. 50, n. 2), identifies the “true” with the “useful,” can the “goodness proportion” be brought in through something like an “energetic” probe in the “outer world.” For there are many truths that are not doubted whose utilitarian balance sheet is “energetically” burdened so overwhelmingly by a waste of energy (funeral pyres, for example, represent a waste of chemical energy, while political parties and wars represent a loss of biochemical and chemical energy), that they could hardly ever contribute this deficit by improving any kind of energetic goodness proportion at all. This is all the more so since there are also such truths among these that are totally *without* influence upon this “goodness proportion.”

Ostwald obviously does not share the view of this utilitarian theory of knowledge. He just considers all merely historical, i.e., not *paradigmatic*, truths (170), and quite correctly so, as not technical, but *for this reason* also as being *scientifically* worthless. The only book that he has written that is really worth reading, *Great Men*, is then also concerned with 1) only the men who have made a great improvement in the energetic goodness proportion and with this 2) only insofar as it is paradigmatic for the *practical* question of which course of instruction is most capable of serving the improvement of the goodness proportion. Thus it is not an historical, but rather a didactic accomplishment that is wanted; otherwise his purely “heroic” presentation would hardly do justice to the influence of the driving forces of scientific development. As everyone knows, it is more and more the rule that important discoveries are often made

by several different individuals entirely independent from one another, and more and more frequently it is only chance that determines the passionately controversial matter of "who was first" (the only goal that comes into consideration). The historians and others like them will be rather cool toward Ostwald's somewhat naive phillistinism, which is just how they must receive his work. But, e.g., Rickert, at any rate, could hardly have wished for a better paradigm of specifically "natural scientific" thinking (in a logical sense).

Enough! Even through the incorporation of the psychical into the energetic dreadfully little would be established for a "foundations of the cultural sciences" (in Ostwald's sense). Admittedly, Ostwald only suggests the possibility of such an incorporation of the psychical into the energetic in this book (70), while on the other hand he also again emphasizes that the *limits* of his inquiry lie precisely at that point where "psychological" factors become involved. But *how* should this incorporation be carried out? I have sought elsewhere in connection with the work of Kraeplin and others to bring home to the readers of the *Archiv für Socialwissenschaft* as well as a layman can, just how infinitely complicated, "energetically" considered, the intricate play of the "psychical" upon the "psycho-physics" of work takes shape. But Ostwald obviously does not have this aspect of the psycho-physical problem in mind. However, should he have something like Wundt's doctrine of the "law of the increase of psychical energy" in view, which has already been disposed of scientifically, and which confusedly conflates the "increase" of that which we call the "intellectual content" of a culturally relevant process (hence an *evaluative* designation) with the category of psychical existence, then the mischief that Lamprecht has caused with this confusion must be a warning to us. It is also worth noting that the Freudian doctrines, which seemed to ordain a kind of "law of the preservation of psychical (affect)-energy" in their first formulation, have in the meantime been reformulated by their own author in such a way that they have lost every bit of rigour in an "energetic" sense (which might even have consequences for their psychopathological value). At least the strict energeticist will at any rate no longer find them of any use. They would, of course, naturally in no case provide a legitimation for getting rid of all those approaches of the "sciences of culture" that might serve as a common denominator to the benefit of any sort of "psychology" but that were not comprehensible for "energetics"—just in case, given their peculiarity, they should ever be able to do this. But, again, enough of all this. For us the point was to determine in general the place where methodologically the author overstepped the region where his point of view has *theoretical* validity (we have already considered practical issues).