

# Corrationalism and the problematic

Gaston Bachelard

If the fear of being accused of psychologism were not so keenly felt by epistemologists they would no doubt pay more attention to the problem of the acquisition of ideas.\* They would then notice that to each new idea there remains attached a perspective of acquisition, an *approach structure* which develops in a kind of *space-time* of essences. They would also see how every new idea, which is at first a maker of mental solitude, becomes in inter-rationalism a need for proselytism. The dialectic 'I was alone and we will be reunited' is at play with respect to the validity of each idea, of each experience considered in terms of a broader cultural awareness. It is in the same detail of thoughts that the non-psychologism of the rational *I* and *you* become reduced to the psychologism of the isolated subject. The necessary isolation of the subject confronted with a new idea and its communication to another subject do not take place in a general rupture that places the thinking being in the midst of a universal doubt, which would be strictly incommunicable. It requires instead, for each notion, confronted with each object, an appropriate doubt, an *applied doubt*. Correlatively, the solitude of the subject is not created by a simple declaration; it can only come to consciousness through a minute psychoanalysis – of the empirical memory in search of a rational memory. And before wanting to conquer others, it needs to be very sure that it is not enslaved by the ideas that others have deposited in us by pure tradition. A rational culture must be in possession of a memory rationalized in such a way that all of its results are re-memorized along with the programme of their development.

In effect, when it is a question of presenting an object to scientific thought, one cannot confine oneself to the immediacy of a not-self opposed to a self. The scientific object is presented in the light of its definition, after the self is already engaged in a particular kind

of *thought*, consequently in a particular kind of existence. The rationalist *cogito* which tends to affirm the thinking subject in an activity of apodeictic thought must also function as an emergence over and above that of an existence already affirmed more or less empirically. The world *destroyed* by universal doubt could only give way, through constructive reflection, to a *fortuitous* world. If one does not give oneself the right to go via the circuit of the notion of a creator God, one does not in effect see what guarantee one would have, after a totally destructive doubt, of having reconstructed precisely *that real world* about which one had previously raised fundamental doubts. The Cartesian universe could say to the philosopher: you will not rediscover me if you have really lost me.

Thus between the two poles of the *world destroyed* and the *world constructed*, we propose simply to slip the *world rectified*.

And immediately the *rational self* is conscious of the *rectification*. To describe the full span of the grasp of rational consciousness it is sufficient to pass from the disorganized given to a given organized in the light of a rational end. Universal doubt will irremediably pulverize the given into a mass of heteroclitic facts. It does not correspond to any real demand of scientific research. Scientific research demands, instead of the parade of universal doubt, the constitution of a *problematic*. It really starts with a *problem*, however ill-posed the problem. Once the scientific self is a programme of experiments,<sup>1</sup> the scientific non-self is correspondingly already constructed as a problematic. In modern physics, one never works on the whole unknown. *A fortiori*, contrary to all theses that affirm something fundamentally irrational, one does not work on something unknowable.

In other words, a scientific problem is posed by starting from correlations expressed as laws. Lacking

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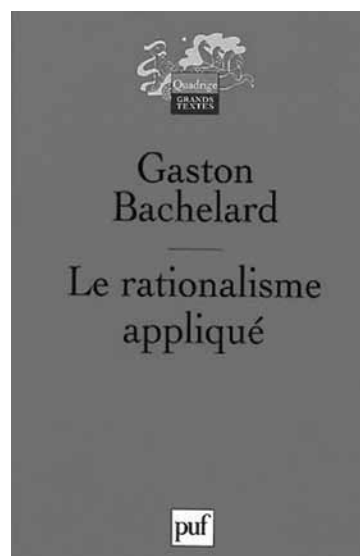
\* This text is a translation of sections seven and eight of the third chapter of Gaston Bachelard, *Le Rationalisme appliqué*, taken from the fifth edition, 1975, pp. 50–60. It appears with the kind permission of Presses Universitaires de France.

a preliminary protocol of laws, a *fact* limited by direct empirical establishment risks being poorly understood. More exactly, affirmed dogmatically – by an empiricism hoisted on its own petard because it cannot but affirm dogmatically what has been established by direct experience – a fact is vassal to the kinds of comprehension that have no relation to today’s science. From this arise errors that the scientific city has no difficulty in exposing. Anyone who has understood, for example, the scientific theory of the *dew point*<sup>2</sup> is aware that they have been furnished with a definitive proof which closes an ancient controversy. The technique of using a hygrometer such as those of Daniell or Rignall – to cite only apparatus known in the mid-nineteenth century – gives a guarantee of objectivity less easily obtained from a simple ‘natural’ observation. Once one has received this lesson in objectivity, one can hardly make the mistake made by Renan, who believed he could rectify common sense in these terms: ‘The vulgar also imagine to themselves that dew falls from the sky and have difficulty believing the scientist who assures them that it comes from plants.’<sup>3</sup> The two statements are equally false. They both bear the mark of an empiricism lacking the organization of laws. Whether dew falls from the sky or comes out of plants, it will only give rise to a very brief problematic. The phenomenon of dew is rationalized by the fundamental law of hygrometry linking the pressure<sup>4</sup> of the vapour to temperature. Relying on the rational organization provided by such a law, one can, without risk of contestation, resolve the problem of dew.

Another historian, very concerned about scientific thought, was a victim of a misunderstanding similar to Renan’s. Taine writing in 1861 to his friend from Suckau wanted to bring him up to date with what had been happening in science in recent months: ‘At the moment light is being intensely studied. There are the experiments of Fizeau<sup>5</sup> which prove that light travels faster in water than in air, and those of Becquerel junior<sup>6</sup> which prove that all bodies are phosphorescent.’ Light ‘travels *faster* in water than in air’. This is the opposite of what he should have said. A simple lapse one might say. No doubt. But a physicist is as shocked by such a lapse as a historian would be on being told that Napoleon’s *coup d’état* preceded the revolution of 1848. More precisely, Taine limits himself to giving Fizeau’s experiment only the value of an empirically established fact. If he had appreciated this experiment in the context of the problematic which made it interesting, he would be unlikely to have made the mistake. Fizeau’s experiment is more than a result; it is a conclusion. It has a rational epistemological value.

And rightly so, being a crucial experiment which decides in favour of the wave theory of light against the emission theory.<sup>7</sup> Doubtless with the theory of relativity the problem will be revisited; a more vast problematic will require new commentaries. But, for a century, the experiment already required a long commentary, a conferring of value, for it represented an eminent epistemological value. It was more than a historical fact, more than a fact which resulted from an empirical verification. It resolved a problem.

In these conditions, a world which has already an objective security is represented to us as an avenue of well-defined problems. This situation has been very well clarified in several notes by Georges Bouligand<sup>8</sup> where the mathematical scientist presents with admirable clarity the dialectic between a global synthesis (the current state of mathematical knowledge) and problems clearly posed as a function of this global synthesis. In the domain of scientific understanding of the real, the situation is without doubt not as clear as the situation characterized by Georges Bouligand for the progress of the mathematical sciences. But the situation presents the same dialectic. In fact if one wanted to describe the activity of scientific thought in the formerly celebrated style of existentialism, one would have to say that scientific thought is systematically



‘situated’ by precise objectification to which it is exposed as a *ladder of precision*. Here again we see the enormous superiority of the *scientific object* over the object of everyday experience for metaphysical instruction, since it is at the point when objectification becomes more and more precise that the important functions of the rationalization of the object are in play. In place of the dualism of the exclusion of the subject from the object, in place of the separation of substances of Cartesian metaphysics, we see in action

the dialectic coupling objective knowledge to rational knowledge.

In the work of scientific precision one can seize the elements of a Copernican revolution of objectivity. It is not the object that designs the precision, it is the method. This metaphysical nuance will be understood if one refers back to some primitive method of measurement. For example, it is said that the term *carat* comes from the name of an African tree (Kwara) whose seeds once dried are more or less equally heavy. The indigenous people, confident of this regularity,



used this grain to weigh gold. Thus, in its first usage, a *natural* regularity was naively deployed in order to determine a technical precision, and that in the measurement of a precious material. In order to found rationalism on measurement it is necessary to reverse perspective.

Indeed an object can determine several types of objectification, several perspectives of precision; it can belong to different problematics. The study of a chemical molecule can be developed from the perspective of chemistry and from that of spectrography. In every case, a scientific object is only the *instructor* with respect to a preliminary, *to-be-rectified* construction, a *to-be-consolidated* construction.

Thus we always confront the same paradox: rationalism is a philosophy which *continues*; it is never truly a philosophy that *begins*.

In these conditions, every experiment on the reality already *informed* by science is at the same time an experiment on scientific thought. It is this *double experiment* of applied rationalism that is appropriate for *discursively confirming* an existence, in the object and in the subject at the same time. The existence of the rationalist subject could not be proved in a unitary mode. It takes its surety from its dialectical power. It is eminently dialectical and discursive since it must work outside itself and in itself in taking on a substance and an existence. And if an ontology is to be made of this,

it should be the ontology of a psychological becoming which provokes an ontogeny of thoughts.

In this case is it not obvious that the *designated* object and the object as *instructor* correspond to two radically different instances of objectification? Respectively they reflect very differently valorized levels of subjective existence. For the most part philosophical discussions of 'the reality of the sensible world' ground themselves in concern about objects taken as examples, pretexts or occasions – that is, at the level of the instance of objectification of the *designated* object. But the simply designated object is not exactly a good meeting point for two minds intending to deepen their knowledge of the sensible world. There is nothing harder to reconcile than philosophical attitudes to a familiar object, divided over whether it should be approached in terms of its familiar setting or on the contrary in terms of its (necessarily original) individuality. And it is yet another quite different thing when one wants to study a phenomenon rooted in an object, a material, a crystal, a source of light. Immediately the necessity for a programme of experiments presents itself, and, for two minds that value their own mutual instruction, the obligation to commit themselves to a single line of further enquiry. It is no longer a question of immediate and intuitive designation, but of a progressive and discursive designation, broken by numerous rectifications.

In order to schematize the rivalry between rationalism and empiricism in this apprehension of objects, this short dialogue might be evoked: To a rationalist, the empiricist has the habit of saying: 'I know what you are going to say.' To this, the rationalist should reply: 'Good! So you are, *on the subject of our discussions*, as rationalist as I am.' But the other continues: 'And you, rationalist, you have no idea what I am going to say.' 'No doubt', replies the rationalist, 'but I have an idea that you are going to say something that goes beyond the subject of our discussion.'

Here one sees that, from the point of view of scientific knowledge, the object designated by common sense has no virtue as an anchorage. It localizes a name in a vocabulary rather than a thing in a universe. The object designated by *this here*, even with the index finger pointing, is most often designated in a language, in a world of appellation. Faced with an object that someone designates to me using its usual name, I don't know whether it is the name or the thing which comes to my thoughts, or even this mixture of name and thing, intertwined, monstrous, where neither experience nor language present themselves in their most important action, their effective inter-psychological work.

All will become clear if we place the object of knowledge in a problematic, if we indicate it in a discursive process of instruction as an element situated between an instructing rationalism and an instructed rationalism. It goes without saying that it is now an interesting object, an object for which the process of objectification has not been achieved, an object which does not return purely and simply to a past of knowledge encrusted on a name. As a passing comment, is it not a sort of philosophical irony that many existentialisms remain nominalisms? Believing they have put themselves on the margins of the philosophy of knowledge, existentialist doctrines are limited, in many circumstances, to doctrines of memory. And often, intending to live their present experience, they leave things with their past of things recognized. The recognized and named object hides from them the object to be known. If one raises with an existentialist an objection about this taste that his theory of knowledge has for the past, he turns entirely towards future knowledge and, faced with no matter what everyday object, he starts to develop the distinguishing trait of his attitude, the subject open to all knowledge. He does not truly envisage an existentialism of progressive knowledge.

The position of the scientific object, of the object actually as instructor, is much more complex, much more *engaged*. It reclaims a solidarity between method and experiment. One must in this case know *the method of knowing* in order to seize *the object to be known*; that is to say, in the realm of methodologically valorized knowledge, the object is likely to transform the method of knowing. But we will come back to this metaphysical discursivity. All that we need for the moment is to have suggested to the reader the necessity of the idea of a problematic antecedent to all experience which wants to be instructive, a problematic founded, before being made precise, on a specific doubt, on a doubt specified by the object of knowledge. Once again we do not believe in the efficacy of doubt in itself, in doubt which is not applied to an object.

In these conditions it is by the exchange of protocols in a problematic that inter-rationalism begins; it is by this precise doubt that the union of those working on a proof is founded. In order to understand the statement of a problem, it is necessary to normalize the neighbouring questions; in other words it is necessary to develop a kind of topology of the problematic. Of course, one must make aberrant questions disappear and attain a corpus of problems. As is so often said, a well-posed problem has been half-solved. Karl Marx, even more briefly, said that to pose a question is to

resolve it. To be clear: to pose an intelligent question to intelligent beings is to determine a *union of intelligences*.

But this union brought about by the opening of a well-determined problematic is not enough; in the passage from a problem to its solution we must see constituted what philosophers of micro-epistemology could call an atom of rational communication.

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We are thus trying to determine the textures of the atom of rationality by following the establishment of relations between a rationalist *I* and *you* [*un je et un tu rationalistes*] at the moment that they are obliged to help each other towards the rational resolution of a problem.

We must first present the object as subject of a problem and the subject of the *cogito* as a consciousness of the problem. In this way the thinking being thinks at the limit of its knowledge after having made an enumeration of what it knows that is relevant to resolving the problem posed. This enumeration, consciousness of a dynamic order of ideas, is consequently polarized by the problem to be resolved. In a merely taught rationalism, the enumeration is codified; it is arranged on a well-defined line, well anchored on its bases. But in a questioning rationalism, the bases themselves are to be proved; they are put in question by the question. The problem is the active summit of research. Foundation, coherence, dialectic and problem are all elements of a rational enumeration, all moments of this mobilization of intelligence.

It is the explicit development of these four moments of applied rationalism that establishes the *cogitamus* which solidifies the rationalist *I* and *you* into a single thought, and consequently into a thinking coexistence. Through this *cogitamus*, the *I* and the *you* are culturally aligned with one another, in the same sense as when mathematicians speak of the *conformal mapping* of two elements of a surface. Two rational minds do not need to be completely identical to be aware of their concordance; it suffices that they are both established in the role of objectively controlled thought. Controlled roles, functions which function on a normalized object, are better translations of *discursive agreement*. In other words, the rational *cogitamus* is less conscious of a *having* in common than of a common *profit*. It is an announcement of the fecundity of thought. It determines an obligation to think in accord; in short, it is common consciousness of apodeictic knowledge.

In order to formulate the fundamental *cogito* of the rationalist subject, it is thus necessary to isolate,

in the formulae of interpersonal psychology, those which correspond to a *secure* induction. The rationalist subject establishes itself in this *security* of possible instruction which must obligatorily involve a rationalist other. When it attains this security, after having gained some psychological perspective through a previous psychoanalysis, the rationalist subject can foresee the resistances of irrationalism. It can even amuse itself, in a moderately demoniacal psychoanalysis, by seeing the adversary attached to irrational values thinking through a fatality of errors. The behaviours of irrational singularity are psychoanalytically clear enough. The themes of originality can be easily enough classified. And confronted with such a thinker, presenting itself as an absolute being, the rationalist psychoanalysts can say: We the many, observe it creating the unique.

In these conditions, it seems to us that the *cogito* of mutual obligation, in its simplest form, should be explicated in this way: I think that you are going to think what I have just thought, if I tell you about the event of reason which just obliged me to think beyond what I used to think. There is the *cogito* of mutually obligatory induction. This rationalist *cogito* is not, moreover, properly speaking of the order of joint empirical confirmation. It is formed before the accord of the I and the you, for it appears, in its first form, in the solitary subject, as a certitude of accord with the rational other, once the pedagogical preliminaries have been established. One can *compel* empirical confirmation: since I recognize that what I am going to think is a normality for a normal thought, I have the means to force you to think as I think. In effect, you will think what I have thought to the extent that I make you conscious of the problem to which I am going to find the solution. We will be united in the proof once we have the guarantee of having clearly posed the same problem. Besides, by recursion, the solution to a problem leads to a new clarity in its statement. The relation problem–solution is an epistemological instance which dominates the empiricism of empirical confirmation. At whatever level one places this confirmation – whether that confirmation is sensory or psychological – once it is confirmation of the resolution of a problem, it benefits from the values of a well-ordered discovery. There is consecration of method, proof of the efficacy of thought, socialization of truth.

Certainly, two minds can find themselves united in the same error. But the shadow which grows is not simply the dynamical inverse of the clarity which is born. Error descends towards conviction while truth mounts towards proof.<sup>9</sup> The debate that will need to be engaged here will lead us to studies of descendant

psychology, which only find their place in a psychoanalysis of knowledge, when there will be time for us to examine the theses of irrationalism. But for now, if one poses the problem of error on the plane of scientific errors, it appears very clearly – or, better, concretely – that error and truth are not symmetrical, as a purely formal and logical philosophy would have us think. In sciences, truths are grouped into systems, whereas errors lose themselves in an amorphous magma. In other words, truths relate to each other apodeictically, whilst errors are amassed assertorically. In the scientific thought of our time, there is an evident disproportion between, on the one hand, truths rationally coordinated and codified in books provided with the guarantee of the scientific city and, on the other hand, several errors which linger in some bad books, most often marked by a detestable originality.

Consequently, if we rely on the pedagogy of the scientific mind, if we examine actual scientific culture, the notion of *epistemological value* is clear and one cannot mistake it as a mark of the union of minds in truth. It is in these distinctions, which can seem delicate, but which are indeed real, that we are going to establish the differences between the psychologism of empirical confirmation and the psychologism of normalization. The condemnation – so frequent and so hasty – levelled at psychologism fails to understand these nuances, which are however essential.<sup>10</sup>

Why then not postulate the *coexistence* of a common thought when it is from *you* that I get proof of the fecundity of my own thought? With the solution of *my* problem, the *you* brings to me the decisive element of my coherence. It presents the keystone for the arch of a system of thoughts that I do not know how to finish. From him to me, coexistence then appears to precede existence. Coexistence does not come solely to reinforce existence. Or, at least, the reinforcement of the existence that a particular subject can receive from another rationalist subject is only one aspect of the most marked metaphysical nuances. In fact, in the I–you of rationalist thought there appear control, verification, confirmation, psychoanalysis, instruction, normativity, all more or less extended forms of coexistence. But eventually comes the promotion to apodeictic existence, to coexistence by apodeicticity.

To know what upholds the apodeicticity which clings to knowledge is to live a division of my own self, a division that could well be captured by the two words ‘existence’ and ‘surexistence’. The subject promoted to this surexistence by the coexistence of two subjects sees installed in itself the dialectic of controlling and controlled subject. It installs in its own

mind, confronting its I, a sort of vigilant you. The word ‘dialectic’ is not here absolutely the right word, for the pole of the assertoric subject and the pole of the apodeictic subject admit of an evident hierarchy. The *cogito* which leaves the first pole, to establish itself as subject valorized by a rationalist *cogito*, cannot return to a *cogito* of empirical confirmation, to an intuitive *cogito*. The *cogitamus* is resolutely discursive. The coexistence of rationalist subjects throws over empirical time its net of logical time. It puts experience in order; it retakes all experience in order to better triumph over all contingency.

The *cogitamus* opens up to us a veritable tissue of coexistence.

Translated by Mary Tiles

## Notes

- [Note that the French *expérience* covers both ‘experience’ and ‘experiment’. Where it is used in a scientific context I have translated *expérience* as ‘experiment’. Trans.]
- [The dew point is the temperature to which a given parcel of humid air must be cooled, at constant barometric pressure, for water vapour to condense into liquid water. The dew point is a saturation temperature. Trans.]
- Ernest Renan, *L’Avenir de la science: pensées de 1848*, Calmann Lévy, Paris, 1890, p. 20.
- [There is an excellent explanation that illustrates Bachelard’s point at [www.ima.co.uk/technical/manual.pdf](http://www.ima.co.uk/technical/manual.pdf). Trans.]
- [It is not quite clear which experiments are referred to here. What is usually referred to as Fizeau’s experiment was conducted in 1851; see [http://en.wikisource.org/wiki/The\\_Hypotheses\\_Relating\\_to\\_the\\_Luminous\\_Aether](http://en.wikisource.org/wiki/The_Hypotheses_Relating_to_the_Luminous_Aether). Trans.]
- [Presumably a reference to Henri Becquerel (1852–1908), son of physicist Alexandre-Edmond Becquerel. Trans.]
- [Emission theory is attributed to Newton; it is sometimes called a particle theory of light. Trans.]
- [Georges Louis Bouligand (1889–1979) was a French mathematician. Bachelard may be referring to Bouligand’s *Le Déclin des absolus mathématico-logiques*, Société d’Édition d’Enseignement Supérieur, Paris, 1949. Trans.]
- Cf. Nietzsche, *The Will to Power*, Book I, §17: ‘what convinces is not necessarily true – it is merely convincing: a note for asses’.
- Movements of proofs less definitive than the movements of apodeictic proofs can also be analysed in a dual psychology. In the problems of knowledge, help coming from the other, however limited it might be, is always reassuring. Edgar Quinet, in *The Creation*, talks of a moment of scientific evolution when the geology of the Maurienne Alps caused trouble in palaeontology. Lyell said about this to one of his colleagues: ‘I believe because you have seen it; but if I had seen it myself, I wouldn’t have believed it.’ This anecdote – so characteristic of a psychological point of view where we discover that rare nuance of *polite humour* – has all the same an epistemological burden. It shows that amazement, so useful in scientific culture, cannot remain *individual*. A little amazed, one wants to amaze someone else. One instructs in order to amaze. To be mutually instructed is to amaze one another. What proof of the need for renewal which animates all culture! Even in small theoretical cultures, such as perhaps, in fragments, geology, the new event awakens the scientist from his dogmatic slumber..



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