

The Savants and the Rest

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The scientist and the layman are separated by a void which for more than a century has been occupied by various communication networks. It constitutes the domain of that which, in French, is rather inelegantly termed “la vulgarisation scientifique”¹ and, in English, is known as “the popularization of science.”

The existence of a population negatively defined in terms of its lack of knowledge is a *sine qua non* of any attempt at popularization. Without this supposedly ignorant mass as a target audience, popularization could not have existed or given rise to so many commercial enterprises—in journalism, publishing, the theater and the museums—since the nineteenth century.

The noble purpose traditionally assigned to popularization is to combat ignorance by spreading scientific knowledge among the public. To “inform,” to “familiarize,” to “enlighten,” these frequently cited objectives enable us to distinguish between the mission of the popularizer and that of the teacher. It is not really a question of “instructing,” even less of making a scientist out of the layman, but merely of lightening his burden of ignorance.

Moreover, this ill-informed public must be credited with a minimum of intellectual baggage. Just as, in the past, Saint Jerome’s Vulgate was aimed at a Latinized clergy, the popularization of science is aimed at a literate public which at least knows how to read and write. It is fair to say that the improved access to reading provided by both the schools and the public libraries² may have had much to do with the success of mass popularization in the nineteenth century.

Aside from the favorable conditions created by the historical circumstances, at a more basic level the popularization enterprise is thought of as a necessary consequence of scientific progress and the increasing complexity and specialization of knowledge. That is to say, it presupposes, in addition to a great vertical cleft

between the scientist and the layman, a series of horizontal fissures between groups of experts sealed off in their own specialties. Popularization implies not only an updating of the ancient dichotomy between light and darkness but also the continuous rebuilding of the Tower of Babel.

Thus, in postulating the strict necessity of popularization, we acknowledge a rarely formulated premise: every advance in knowledge adds to the number of those who do not know. In their creative zeal, the scientists are constantly expanding the circle of the uninformed. The pathways of communication—from the founding of academies to electronic mail—must be multiplied in order to restrain the galloping proliferation of ignorance.

There is a specific condition which distinguishes the popularization enterprise from the numerous other scientific information systems, namely the “desire to know.” Popularization will not work without it, since, unlike primary education, it is not a civic obligation but, in most cases, a good, the consumption of which is a matter of choice. Thus, a combination of not-knowing and *libido sciendi* could be regarded as a constant characteristic of the public for popularization.

Even without taking our critical analysis of the traditional representations of popularization any further, it is already possible to make three essential points concerning “those who do not know.” Their existence is the *raison d’être* of popularization; their number and proliferation are a precondition of its commercial success; and their desire to know determines what it is able to achieve.

What would happen if one or more of these fundamentals were to be questioned? I propose to subject two of them to a critical epistemological and historical analysis. As opposed to the traditional view of a mass of outsiders ignorant of what science is doing, might it not be possible to argue that the uninformed are part of the scientific enterprise? Could not the classical image of a desire to know be replaced by one of voluntary ignorance or a desire not to know?

I Science and Opinion

The servant girls of Thrace found it funny when Thales, totally absorbed in his own thoughts, fell straight down a well. The

image of the absent-minded scholar is as old as Western science.³ Even more than Plato's stereotype of Thales, the laughter of Democritus provides an interesting illustration of the relationship between *episteme* and *doxa*. The pseudo-Hippocrates is summoned by the Abderites because Democritus is mad and his madness is infecting the entire city. Hippocrates arrives and converses with Democritus, then goes away convinced that the supposed madman is a great sage. If he laughs at everything, it is because the lives of men, the very ones who consider him mad, are so lacking in moderation and reason. If he lives in isolation, it is because he is writing a treatise on madness. This anecdote is interesting because it shows that the alienation of the scholar from the crowd goes hand in hand with an affinity, extending across frontiers, between the philosopher of Abdera and the physician of Cos. These two related phenomena not only create a gulf between the élite and the mass but also result in the two categories reason and madness being turned upside down.

The ancient notions of science and opinion still provide a conceptual framework for thinking through the relations between science and the public but, for a long time now, the laughter of Democritus has no longer been heard. Considered by the humanists of the Renaissance as the springhead of satire, for the Age of Enlightenment the laughter of Democritus was no longer a sign of wisdom but a symptom of cruelty, no longer a liberating but rather a murderous force.⁴ The divorce between science and opinion calls for different treatment.

Popularization is generally justified by citing "the chasm which has opened up between the creators of science and the common man." Presented as a consequence of the advance of knowledge which is progressively excluding the amateurs, the dilettantes, and the part-timers and, in the nineteenth century, required the professionalization of scientific research with training programs, diplomas awarded by learned societies, and specialized journals, popularization appears to be a "necessity." Hence the eagerness of the popularizers to assign themselves the task of mediating between those who know and those who do not, to act as a relay, and to maintain bridges. This is how the active researchers who occasionally engage in popularization justify the time they devote

to the public and how the publicists, journalists, and experts in communication justify their existence. This common role of so-called “third man” endows them with an important mission: to maintain the integrity of the social fabric.

Viewed as “bridge-building” between scientists and laymen, popularization would appear to be not only an historical necessity but also a task that grows ever more urgent as knowledge advances. The more the gap widens, the more pressing the need for this adjunct to science. The article on “popularization” in the *Encyclopédie française* describes a process which has passed through three phases⁵: what was in the days of Fontenelle—an indispensable reference in any treatise on popularization—a simple difference in **styles** evolved in the nineteenth century into a difference in **languages** requiring “translation” and, finally, in the twentieth, into a difference in **worlds**, generally illustrated by the theory of relativity, the other indispensable reference. From a different style, to a different language and now a different world, has the wall erected between scientist and layman become insurmountable? Has the gulf between the two worlds made them incommensurable?

“Opinion is a poor thinker. It does not think at all.” These famous words of Gaston Bachelard are generally understood as the point of departure for a theory of the scientific spirit. Whether that spirit is formed by breaking with primary experience, in defiance of naively realistic, self-interested representations, or by overcoming the epistemological obstacles which make up the very web of common or popular knowledge, these theses have been rendered so commonplace as to constitute a sort of epistemological vulgate. Bachelard’s study being more or less contemporary with the above-mentioned article by Sudre, it might be pertinent to re-read it in the context of this ideology of popularization. In fact, *La Formation de l’esprit scientifique* (The forming of the scientific mind) permits the popularization of science to be envisaged as both an imperative and an impossibility.

First of all, the litany of epistemological obstacles recited in *La Formation de l’esprit scientifique*, abundantly illustrated with examples borrowed from the scientific literature of the eighteenth century, may be read as a sort of indictment of the forms of scientific

discourse which flourish among the popularizers. The picturesque, the useful, the interesting, direct experience, facility, emotion, in short all the devices employed by the science writers of the nineteenth century stand condemned. As Yves Jeanneret rightly points out, among the philosophers Bachelard has inaugurated an "era of suspicion" with regard to popularization.⁶ If science is a thing apart, then it is illusory to hope to present it by mobilizing all those elements which had to be excluded to make it possible. Attempting to "translate" scientific discourse into ordinary language means not only betraying and mutilating but annihilating it. For science is not a collection of results, of parcels of knowledge which one may or may not possess, it is a "frame of mind," a demanding mental discipline, necessarily abstract and aloof, which "possesses" those who practice it.

Secondly, Bachelard is not content merely with discrediting the common knowledge, personal fantasies, and social representations, surrendered into the hands of the psychoanalysts and sociologists. He opens up a gulf between science and opinion: opinion is not merely an inferior form of knowledge, misguided and clumsy, "it does not think at all." In the Age of Enlightenment, Kant called this "living under tutelage." A convenient, comfortable attitude. "I don't need to think since I can afford to pay; others will perform that tedious task on my behalf."⁷ Bachelard sounds the same moral note. If the scientific spirit holds a monopoly on thought, if it is the only subject of thought, it is because it alone is active. The rest are lazy, passive, waiting to be invited to speak. In 1784, Kant considered it well nigh impossible for an individual to tear himself away from the comforts of tutelage, "but that the public at large might seek enlightenment seemed to him more probable, indeed inevitable provided they were granted their freedom." Today, this confidence seems to have evaporated. Freedom is not enough to bridge the gap between the scientists and opinion. Peoples, like princes, keep their minds "in tutelage" while the scientific spirit must constantly throw off the constraints and "tear itself free." There is no possible means of establishing communication between the two worlds other than by making the break, by leading the mind along the path of catharsis. Popularization must be "education" or it is nothing.

Thus, the Bachelardian epistemology appears to cast doubt upon the popularization enterprise viewed as a simple process of mediation or a relay linking different categories of thought. But the epistemologies of rupture strengthen more than they call into question the one-sided representation of the public. Popularization continues to be defined in relation to the logic of scientific development, imposed by scientific development and subject to its law. This attitude still dominates the language of the popularizers despite profound changes across the board. Popularization has turned professional, it is becoming increasingly the preserve of journalists and scientific intermediaries. Though this situation may sometimes give rise to tensions, even conflicts between the popularizers and the knowledge producers, they all agree upon defining the public as an uncouth mass needing to be informed. Popularization invents a public defined in relation to science rather than in relation to itself. A vague, supposedly inert mass, a passive repository of messages imprinted upon it by those who make or pass on knowledge.

This representation of the public as “the others” of science, labeled the “diffusionist model,” confers an almost priestly dimension upon the activity of popularization in as much as it sacralizes the information at the source. However, it cannot withstand a study of the social representations. Research in social psychology carried on since the seventies, which takes seriously rather than attempting to discredit the reasoning of the readers or consumers of science, their ways of developing their knowledge and their relations with technology, is resulting in knowledge and thought being restored to the ignorant.⁸

From the elegant remarks of Fontenelle in *L'Entretien sur la Pluralité des mondes* (A plurality of worlds) to the eye-catching or sensationalist headlines in *Believe it or not*, the literary form of popular science has changed no less than its content. Countesses and socialites, workers and peasants, children and adolescents, the audiences are many and the popularizers adapt themselves to this diversity even though their rhetoric continues to convey a Manichean view of their task, as the mediator between the scientist and the layman. The illusion of “the third man” has been the target for attacks led jointly by sociologists and semioticians.⁹ The

sociologists regard popularization as a professional strategy devised by scientific communities to attract public funds. Jean Perrin is said to have built the Palace of Discovery to win public support for the creation of the CNRS.¹⁰ James Watson is said to have written *The Double Helix* to draw research workers into molecular biology.¹¹ Some go so far as to say that popularization is mainly ideological and that it maintains rather than closes the gap between the scientist and the layman.¹²

A detailed comparative analysis of the scientific texts has led to the denunciation of the bipolar view of the literature of science—on the one hand, the incomprehensible scientific treatise and, on the other, the translated or paraphrased version for the general public—in favor of the notion of a *continuum* of texts, each written in accordance with a highly specific code and rhetoric adapted to different publics, from the narrow circle of specialists to the reader of the wide-circulation weekly.¹³ The anthropology of the sciences underlines the unceasing task of reformulating scientific statements in terms of the public to be addressed, the authorities to be won over, the funds to be obtained, etc. Under the critical eye of the social sciences, the gap between science and opinion postulated by popularization is tending to fade away to be replaced by a sort of stratification of knowledge.

Lowering the drawbridge and breaking down the isolationism into which science has retreated: is that enough?

II Active Ignorance

As Bachelard rightly says, the scientific spirit is an organized body or collective built up in the course of a struggle against the obstacles to be overcome, its judgments based on a set of rules of procedure and permanent sanctions. However, in constructing the utopia of the city of science, Bachelard refused to see that it is not only the cavern of opinion that is filled with shadows and gloom. They also pervade the city of learning and even determine the way it works.

First of all, ignorance is all-pervading because of the compartmentalization of the specialists, which necessarily limits their field

of knowledge. As the saying goes, they know more and more about less and less. Not only because they do not or no longer know what is going on in other branches but, more fundamentally, because they shut themselves off from other means of access to knowledge. Even though an important section of the modern popular science press is aimed at the scientists, bringing them news of other specialties, it is difficult to transmit modes of reasoning, and the tacit knowledge acquired by years of experience in cultivating a particular discipline by which competences are so precisely defined.

Beyond this new application of the principle of incompetence, it is important to be aware that ignorance is active everywhere in the research enterprise. How?

A host of examples come to mind, for the canonical tales of great inventions readily bestow upon ignorance a heuristic function. "One day, unexpectedly, Pasteur rang my doorbell," recounts Jean-Henri Fabre, who was astounded to find that the scientist, who had come from Paris to investigate the diseases of the silkworm, was ignorant of everything: caterpillar, cocoon, chrysalis, metamorphosis. This entomologist's recollection is intended to illustrate a lesson many times confirmed. "Yes, ignorance has something to be said for it; when we leave the beaten track behind we may encounter something new."¹⁴ Georges Claude, a physicist who, among other things, invented lamps and the liquefaction of nitrogen, expressed a similar opinion: "Knowing nothing, one can advance free of all constraints, propelled only by one's inspiration and common sense, without feeling oneself paralyzed or reined in at every step by ideas or facts that are often false or questionable."¹⁵

The authors who make ignorance a factor that favors innovation often combine it with a virtue: obstinacy. Put crudely, the message would be: knowledge on its own leads to conformism. Ignorance and persistence form a combination that encourages creativity.

However, these pretty tales should be treated with caution. It is possible to see in them evidence of the exaggerations and stereotypes generated in the retelling of the stories of scientific discoveries for the general public.¹⁶ Moreover, this praise of ignorance has had little impact on the great divide between the scientist and the layman, so obvious is it that the ignorance in question is altogether relative and very judiciously doled out.

A more serious consideration of the history of science, with no attempt to project the standards of contemporary scientific discourse onto the past, will show, however, that the ignorant public is not always—perhaps never—a passive spectator of the achievements of a learned élite. In the early days of experimental science, which began to develop during the classical period, the public shared in the process of demonstration. The now classic study of Robert Boyle's *The Air Pump* stresses that the public played an essential part in establishing the experimental proof, the "matters of fact." Called upon to be an actual witness of the demonstration or a virtual witness who gains access to the data through the publication of a detailed account of the experiment, the public is the legitimating body which approves and recognizes the reality of the fact established by the instrument and the experimenter who manipulates it.¹⁷ Admittedly, in this case it was a question of an experienced and select public, and it should be added that the gentlemen invited to witness Boyle's demonstrations were chosen on the basis of their social standing and respectability rather than their knowledge of physics.

Appeals to the public also play an important part in the establishment of a scientific theory or indeed a discipline. This is particularly evident in the *Encyclopédie méthodique*, at the end of the eighteenth century. Initially envisaged as a simple updating of the *Encyclopédie* published a few years earlier by Diderot and d'Alembert, this publishing enterprise became a tool of scientific specialization. "It must bear the same relation to the *Encyclopédie* as the palace of the Louvre bears to a cottage", said its publisher Joseph Panckoucke.¹⁸ This metaphor expressed the intention not only to change the scale (140 volumes in quarto instead of 28 folio volumes) but also to construct a well-ordered, structured edifice. The division into disciplinary dictionaries, supervised no longer by enlightened philosophers but by authorities in the field concerned, favored the breakdown of knowledge into compartments and the emergence of a specialized discourse.

As pretexts for striking balances, appeals to the public are encountered throughout the process of scientific specialization. In the nineteenth century, with the arrival of the great exhibitions, held at regular intervals of four or five years, the scientists took

advantage of the invitation to report on their specialties in order to promote a new image of their discipline. Thus, the famous report on the state of the life sciences drawn up by Claude Bernard on the occasion of the Universal Exhibition of 1867 served to promote experimental physiology by redefining its vocabulary and its methods and drawing a clear distinction between its practitioners and naturalists in general. Before a public consisting of those attending the Congress of General Education which accompanied the Universal Exhibition of 1900, Emile Durkheim expounded his idea of a professional, university-based sociology.¹⁹ The tribunal of public opinion remains a device often used to convince one's peers of the legitimacy of a new field of knowledge.

To go still further, the "appeal to the people" is one possible means of opposing established doctrines and carrying out a scientific revolution. Indeed, public opinion can serve as a guerilla force to attack the official line. To enable chemical medicine (iatrochemistry) to triumph over the medical tradition inherited from Galen, Paracelsus, and his successors deployed arguments which proclaim the authority of everyday experience, of "know-how" acquired through long familiarity with the substances employed, and dispute the validity of the knowledge dispensed by the intellectuals tucked away and sequestered in their faculties. Even at the end of the eighteenth and during the nineteenth centuries, when the mathematization of physics opened up a gap between the knowledge of the élite and that of the artisans, the repeated criticisms of Newtonian science and the attempts to promote an alternative science of color, electricity, etc. show that the phenomenon is a recurring one and is not limited to the case of the "alternative therapies."

Attempts doomed to failure, with no prospect of success? History would appear to have ruled against these fringe workers of all descriptions who claimed that *doxa* was more rational than mathematized, codified, approved science, who hoped to establish a "popular science" as the rival and not the servant of the science of the élite. A few fine specimens are still to be found in nineteenth-century France, speaking out loud and strong, daring to defy the scholars recognized by the *Académie*: François-Vincent Raspail refused the degree of Doctor of Medicine so that he could

remain free to criticize the Faculty and practice the “medicine of the poor”²⁰; Auguste Comte thundered against the science practiced in high places, at the *Académie des sciences* and the *Ecole polytechnique*; Victor Meunier, physiologist and journalist, did not hesitate to challenge Pasteur and criticize his experiments on spontaneous generation before the Academy.²¹ True, these men did not really make any very great contribution to science and distinguished themselves more in the popularization than in the production of knowledge. For a long time now, scientific controversies have ceased to involve public opinion and are played out within communities of specialists, among experts. Indeed, the expression “*science populaire*” has disappeared from the French language to be replaced by the term “*vulgarisation*” which suggests an attempt at translating a language rather than the cohabitation of two ways of doing science.²² Communities of specialists now hold a monopoly on scientific status.

Was the ideal of an alternative popular science merely a utopian dream which scientific progress was “necessarily” to consign to the dustbin of history? In my view, a teleological reading of history heavily conceals the stresses and struggles which have determined the profile of contemporary science. The confusing of facts and standards results in a tendency to regard as natural and necessary the process of professionalization of scientific research and the progressive exclusion of amateurs from the domain of legitimate science. However, the distinction between scientist and layman has become entrenched only gradually, sometimes rather haphazardly, in an interplay of rivalries. One of the most famous episodes to contribute to the rules of legitimacy of scientific discourse is the condemnation of Franz Anton Mesmer by the *Académie des sciences* in 1785.²³ This Austrian physician who drew the crowds to his “tub,” claiming it to be capable of curing all ills thanks to a mysterious animal magnetic fluid, was investigated by a commission of inquiry of the *Académie royale des sciences*. After repeated observations and attempts to subject the tub to their experimental discipline, the savants of the *Académie*, with the exception of the naturalist Jussieu, declared that the contribution of the magnetic fluid to Mesmer’s cures was pure myth, thereby consigning Mesmer to the ranks of the charlatans. As Chertok and Stengers

point out, this act of exclusion helped to establish the rules of legitimate scientific discourse, in conformity with those in force in experimental physics and chemistry.²⁴ The process of definition by exclusion is obvious in the words of Condorcet, the permanent secretary of the *Académie*, shortly after Mesmer was condemned. He assigned three functions, all negative, to the academic institutions: "The first is to raise a permanent barrier to charlatanism in all its forms, which is the reason why so many people rise up against it; the second is to ensure that the proper methods continue to be employed in the sciences and prevent any scientific field from being totally abandoned. They also have a third very important function, so long as scientists do not scorn public opinion: that of making them independent of it."²⁵ Raising barriers, prevention, making independent ... the frontier between the scientists and the lay public must be constantly redrawn, renegotiated. Condorcet gives clear expression to the ambiguity in their relationships: the scientists cannot—or are unwilling—totally to scorn public opinion and yet they must create the conditions that will make them independent of its judgment. Far from being popular, science must accept the risk of unpopularity. Moreover, the frontier between scientists and laymen is a variable one, depending on the type of science. The status of the amateur is not the same in, for example, physics and botany.²⁶ Even though the amateurs only rarely participate in the production of knowledge—in astronomy and botany, for example—the configuration of each science, its rules of validity and conditions of legitimacy are always defined in relation to the modes of thought of these groups situated on the fringes of the official scientific community. Sometimes it ignores, rejects, or discredits them, sometimes it puts them to work, organizes them, or seeks their support and allegiance.

The mobilization of the public in the service of a science makes sense only if one acknowledges that it is never totally deprived of science. The ignorant are credited with knowledge which may be innate—"common sense"—or may be acquired "blindly" through empirical practices. Auguste Comte is one of those who even assume that, despite its abstraction and technical or mathematical sophistication, science is a product of common sense. Not only does this approach minimize the gap between science and opinion, it

also enables an appeal to be made to the people, to common sense, in order to correct the course of science. Through a return to the source, Comte hoped to halt a process of degeneration of the scientific spirit. Since the seclusion of the savants in their colleges and academies causes science to degenerate rapidly, Comte appealed to the proletariat. Annie Petit gives an admirable summary of Comte's convictions: "Fortunate are those who do not know. Fortunate are the proletarians whose untouched minds are totally available."²⁷ Comte attributed regenerative powers to the proletarians because he considered them malleable and receptive to his own teaching. For Comte did not intend to confer upon the proletarians the task of censoring and monitoring the scientists until they had taken a popular course of Sunday instruction. What is remarkable is that neither the *Positive philosophy* nor the *Treatise on popular astronomy*, which sprang from this popular instruction delivered between 1829 and 1844, was at all designed to pass on scientific knowledge, still less to keep the public informed. They were simply intended to give the public frames of reference, whether encyclopedic (the hierarchy of the sciences) or historical (law of the three stages), and even a temporal framework for everyday life (the positivist calendar appended to the *Catechism of Positive Religion*). Auguste Comte popularized less to instruct than to organize, supervise, and standardize the development of the sciences.²⁸

It is easy to condemn this policing of science as a dangerous totalitarian enterprise. Under the pretext of regenerating the positive spirit, Comte wanted to restrict astronomy to the study of the solar system, to proscribe the theory of probability, and dismember organic chemistry. This unrepentant critic was very soon made to look ridiculous by the prodigious advances of astrophysics, probability theory in the social sciences and organic chemistry, both scientific and industrial. The servant girls laughed at Thales. The scientists are laughing at the philosopher who wanted to bring them under his control.

Nevertheless, these criticisms do say something about one of the roles of ignorance in scientific research. Over and above the priority concern with limiting the expansion of mathematics, most of the Comtian prohibitions are based on the conviction that it is impossible, or unreasonable, given the human condition—the fee-

bleness of our intellectual capacities and the extent of our needs—to gain a positive knowledge of the universe beyond the solar system. It is the same with all the prohibitions which define the positive stage: concerning first and final causes, concerning the intimate nature of beings ... any attempt to know them must be actively **renounced**. If Comte had spoken Latin like Dubois-Reymond, he would have summed up all this in the one word “Ignorabimus.” However, the Comtian ignorabimus is less an invitation to think of the ultimate limits to the extension of the field of knowledge, to exalt the mystery, than a call to mobilize the forces of science and to organize a program of research by objectives, with well-defined targets. “Ignorabimus” is less a future than an imperative. Let us ignore causes and the universe beyond our own world. Let us abandon all this research and consider it out of our reach. Indeed, this profession of faith in ignorance must be continually renewed, for every researcher, so says Comte, has a spontaneous tendency to go beyond the domain of legitimate knowledge and aspiration. In formulating these ideas of a passage from “spontaneous positivism” to “systematic positivism” Comte’s aim and endeavor is to jettison free and rather undisciplined individual inquiry in favor of organized, even programmed collective research. In other words, the idea that scientific resources need to be managed and the notion of a research economy, a science policy, are rooted in the acceptance of the proposition that “we scientists” do not and never will know everything.

III Voluntary Ignorance

That no one chooses to be ignorant would appear to be the principle on which a great many popularization enterprises have operated. If there are people mired in ignorance, it is because a nonegalitarian and unjust society has forbidden them access to knowledge. In this respect, the ideal of the Enlightenment remains the preferred reference point of the popularizers of the nineteenth century. For Louis Figuier, one of the most prolix of scientific writers, “science is a sun: everyone must draw near to it for warmth

and light."²⁹ No doubt everyone wants to leave his own humble hearth in order to approach the central fire. The editorials of the nineteenth-century periodicals lost no opportunity of invoking the "thirst for knowledge" of their readers. Science is desirable, even to be coveted, it exercises an almost erotic attraction. A classical stereotype represented science in the form of a feminine allegory of nature disclosing her charms before the eyes of the scientist. The rhetoric of the manuals and practical dictionaries tended to appeal to the professional or social interests which **drove** their readers to keep informed and up-to-date. On the other hand, in order to popularize pure science, at the Palace of Discovery, Jean Perrin is counting on pure desire: "When people have the leisure ... they will broaden their minds, they will seek Beauty, they will learn science and carry it further, they will be sustained by the keen desire to discover and propagate the divine in us all."³⁰

As a matter of fact, the scientists of the Popular Front displayed more optimism about knowledge than did the philosophers of the Enlightenment. "Sapere aude! Have the courage to make use of your own understanding! That is the watchword of the Enlightenment"³¹. Kant never supposed that the Enlightenment had any innate powers of attraction. On the contrary, he contended that will was needed to employ the understanding. It required courage and audacity since it was a perilous and risky exercise to reason for oneself rather than obey the tutelary authorities. "Daring to take a step without the walking frame" is always a timid, gauche, and clumsy gesture, but it represents independence and freedom, which is not bestowed by mere leisure but must be won little by little.

But are we not in the same situation today as when La Boétie protested against the "voluntary servitude" of the French? The nanny role of the experts is cheerfully accepted, even welcomed. They are paid to reason and tell the public, the consumer, what he should think, how he should look after his health, preserve the environment, and so on. Today's "wise men" no longer laugh, like Democritus, at the folly of men. They come together learnedly at international summits to sound the alarm.

If science is now so gloomy, could the public itself, living under tutelage and in ignorance, rediscover the laughter of the child? Not the silly laughter of the serving girls of Thrace which verges

too closely upon the panic of the Abderites, but the innocent laughter of one who makes a game out of that which surpasses his understanding.

For several decades, game-playing has been the watchword of numerous science centers. What lies behind this change of objective? Now, at the close of the twentieth century, efforts at popularization no longer place very much faith in a spontaneous enthusiasm for knowledge. The "need for science" is more of a constraint imposed by the technological world in which we live. The objective initially assigned to the *Cité des sciences et de l'industrie* in the eighties was "to familiarize the public with its technical environment."

How is the public to be "familiarized"? By opening up the "black boxes" of technology so that everyone can follow all the steps? This didactic conception of popularization has failed to take hold. The mission of the museums of science and technology is to appeal to the public's **desire** to know rather than its **understanding**. Thus, the advertising for the *Cité des sciences et de l'industrie* emphasizes "the pleasure of learning." Playing with scientific effects, fiddling about with the hands, that is the principle of the new interactive museums. The underlying idea, confirmed by surveys, is that the easier the access to scientific information the greater the demand for more. "Hands-on" experience is said to whet the appetite. The brochure distributed by the Fleet Center in San Diego defines the aims of the exhibitions as follows: "We want our center to give you a feast of science and to keep you hungry for more."

Arousing a hunger and thirst for science through the pleasure to be derived from playing games, is that the surest means of enabling everyone "to dare to take a step without a walking frame"? An unbridled appetite for knowledge too often produces a "Bouvard and Pécuchet" effect and leads to absurdity, or at the best to a fetishistic attachment to a handful of scientific results which can all the more easily be elevated into dogma in that they are stripped of all context.

Might not the experience of an acknowledged ignorance, voluntary rather than resigned or passively endured, be preferable to such a logic of desire? It is not a question of remaining a child, under tutelage, of opting for voluntary servitude, but of adopting a position of active ignorance, open to all research, bolstered by an

alert mind. A Socratic attitude of not-knowing, deliberately assumed and premeditated.

In my view, despite its apparent generosity, the endless aspiration to “bridge the gap between scientist and layman” by doling out scraps of knowledge is concealing the solidarity of the human condition. If the ideal of sharing knowledge appears to be more and more of an illusion, it is because today, more so than at the dawn of Greek science, because of the very expansion of the sciences, ignorance is what humanity has most in common.

It is possible to imagine a popularization program which, instead of being aimed at familiarizing the public with science—already omnipresent in our everyday world—is designed to hold science at arm’s length, to place it in historical and cultural perspective. A popularization which points out not only the established paths of knowledge but also the paths which have been forsaken or banned or have fallen into disuse would perhaps give the players on the science scene an opportunity to take a more detached attitude to a knowledge which, in a manner of speaking, possesses them as much as they possess it.

Suppose that instead of going off to write about madness and chuckle to himself, Democritus had sat down to dinner with his fellow citizens. By the end of the meal they would doubtless all have been laughing in unison at their common ignorance.³²

Notes

1. Jacques J., Raichvarcg D., *Savants et ignorants. Une histoire de la vulgarisation scientifique*, Paris, 1991.
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3. The failure of comprehension is all the more profound in as much as, according to Michel Serres, Thales may have been at the bottom of the well to observe the stars.
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