Even my cats gaze dreamily out of the window at a universe which is no longer theirs.

How are we to resist, if resist we can? This house into which I have withdrawn is merely an expedient and it serves only my mere physical existence. What mental or spiritual convictions, what will to maintain to my own kind of existence can I assert? For me it is not enough merely to say, as I do say, that I shall resist the invitation to submerge myself into a crystalline society and to stop planning in order that I may be planned for. Neither is it enough to go further, as I do go, and to insist that the most important thing about a man is not that part of him which is "the product of forces" but that part, however small it may be, which enables him to become something other than what the most accomplished sociologist, working in conjunction with the most accomplished psychologist, could predict that he would be.

I need, so I am told, a faith, something outside myself to which I can be loyal. And with that I agree, in my own way. I am on what I call "our side," and I know, though vaguely, what I think that is. Wordsworth's God had his dwelling in the light of setting suns. But the God who dwells there seems to me most probably the God of the atom, the star, and the crystal. Mine, if I have one, reveals Himself in another class of phenomena. He makes the grass green and the blood red.

JOSÉ ORTEGA Y GASSET

THE TITLE of Ortega y Gasset's best known work, *The Revolt of the Masses,* suggests that it might be a Marxian exhortation to the proletariat to shake off their chains. It is nothing of the sort. The book is a searing indictment of the increasing power of the common man in twentieth century industrial society. True democracy, Ortega maintains, flourishes only when citizens of widely differing views are willing to delegate responsibilities of government to a superior minority. Today we see it everywhere degenerating into a "hyper-democracy" in which the average man himself insists upon holding the reins. Since this "mass man," whether rich or poor, hates everyone unlike himself, he tries to stamp his mediocrity and vulgarity upon everyone. He may do it quietly, through a variety of pressure groups, or violently by a Communist or Fascist revolution. In either case the result is the same: a homogenized society of identical, other-directed, middle class blanks.

This critique of western culture is of course far from new. Some of its presuppositions go back to Plato, and in recent times many American writers, including H. L. Mencken and Walter Lippmann, have played variants on the theme. But in Ortega's book, first published in 1930, it found a crackling, jabbing expression that made the book a profoundly disturbing one.

At the time of his death, José Ortega y Gasset (1883-1955) was Spain's most distinguished philosopher and man of letters. When civil war broke out in 1936, Ortega, then professor of philosophy at the University of Madrid and one of the intellectual bulwarks of the Republican government, left Spain as a voluntary exile and did not return until 1945.

His last decade was what he sadly called a kind of "non-existence." He wrote little, took part in nothing. In philosophy he was a vitalist, holding views similar to those of Henri Bergson and William James.

The following chapter, from *The Revolt of the Masses*, has the distinction of being the most uncomplimentary piece of writing ever directed against the modern scientist. Ortega saw him as a "learned ignoramus," arrogant in his illusion that because he knows one small thing well he is therefore qualified to pronounce upon all things. It is a much stronger attack than, say, the preposterous spoofing of Charles Fort or those recent books that contrast "scientism" unfavorably with humane letters. Even a working scientist can skim through Fort with amusement and the recent books with only mild annoyance. But there are few scientists who will read this selection without acute discomfort and the dark suspicion that much of what Ortega says is true.

JOSÉ ORTEGA Y GASSET

The Barbarism of "Specialization"

MY THESIS was that Nineteenth-Century civilisation has automatically produced the mass-man. It will be well not to close the general exposition without analysing, in a particular case, the mechanism of that production. In this way, by taking concrete form, the thesis gains in persuasive force.

This civilisation of the Nineteenth Century, I said, may be summed up in the two great dimensions: liberal democracy and technicism. Let us take for the moment only the latter. Modern technicism springs from the union between capitalism and experimental science. Not all technicism is scientific. That which made the stone axe in the Chelian period was lacking in science, and yet a technique was created. China reached a high degree of technique without in the least suspecting the existence of physics. It is only modern European technique that has a scientific basis, from which it derives its specific character, its possibility of limitless progress. All other techniques—Mesopotamian, Egyptian, Greek, Roman, Oriental—reach up to a point of development beyond which they cannot proceed, and hardly do they reach it when they commence to display a lamentable retrogression.

This marvellous Western technique has made possible the proliferation of the European species. Recall the fact from which this essay took its departure and which, as I said, contains in germ all these present considerations. From the Sixth Century to 1800, Europe never succeeds in reaching a population greater than 180 millions. From

1800 to 1914 it rises to more than 460 millions. The jump is unparalleled in our history. There can be no doubt that it is technicism—in combination with liberal democracy—which has engendered mass-man in the quantitative sense of the expression. But these pages have attempted to show that it is also responsible for the existence of mass-man in the qualitative and pejorative sense of the term.

By mass—as I pointed out at the start—is not to be specially understood the workers; it does not indicate a social class, but a kind of man to be found to-day in all social classes, who consequently represents our age, in which he is the predominant, ruling power. We are now about to find abundant evidence for this.

Who is it that exercises social power to-day? Who imposes the forms of his own mind on the period? Without a doubt, the man of the middle class. Which group, within that middle class, is considered the superior, the aristocracy of the present? Without a doubt, the technician: engineer, doctor, financier, teacher, and so on. Who, inside the group of technicians, represents it at its best and purest? Again, without a doubt, the man of science. If an astral personage were to visit Europe to-day and, for the purpose of forming judgment on it, inquire as to the type of man by which it would prefer to be judged, there is no doubt that Europe, pleasantly assured of a favourable judgment, would point to her men of science. Of course, our astral personage would not inquire for exceptional individuals, but would seek the generic type of "man of science," the high-point of European humanity.

And now it turns out that the actual scientific man is the prototype of the mass-man. Not by chance, not through the individual failings of each particular man of science, but because science itself—the root of our civilization—automatically converts him into mass-man, makes of him a primitive, a modern barbarian. The fact is well known; it has made itself clear over and over again; but only when fitted into its place in the organism of this thesis does it take on its full meaning and its evident seriousness.

Experimental science is initiated towards the end of the Sixteenth Century (Galileo), it is definitely constituted at the close of the Seventeenth (Newton), and it begins to develop in the middle of the Eighteenth. The development of anything is not the same as its constitution; it is subject to different considerations. Thus, the constitution of physics, the collective name of the experimental sciences, rendered necessary an effort towards unification. Such was the work of Newton and other men of his time. But the development of physics introduced a task opposite in character to unification. In order to progress, science demanded specialisation, not in herself, but in men of science. Science is not specialist. If it were, it would *ipso facto* cease to be true. Not even empirical science, taken in its integrity, can be true if separated from mathematics, from logic, from philosophy. But scientific work does, necessarily, require to be specialised.

It would be of great interest, and of greater utility than at first sight appears, to draw up the history of physical and biological sciences, indicating the process of increasing specialisation in the work of investigators. It would then be seen how, generation after generation, the scientist has been gradually restricted and confined into narrower fields of mental occupation. But this is not the important point that such a history would show, but rather the reverse side of the matter: how in each generation the scientist, through having to reduce the sphere of his labour, was progressively losing contact with other branches of science, with that integral interpretation of the universe which is the only thing deserving the names of science, culture, European civilisation.

Specialisation commences precisely at a period which gives to civilised man the title "encyclopaedic." The Nineteenth Century starts on its course under the direction of beings who lived "encyclopaedically," though their production has already some tinge of specialism. In the following generation, the balance is upset and specialism begins to dislodge culture from the individual scientist. When by 1890 a third generation assumes intellectual command in Europe

we meet with a type of scientist unparalleled in history. He is one who, out of all that has to be known in order to be a man of judgment, is only acquainted with one science, and even of that one only knows the small corner in which he is an active investigator. He even proclaims it as a virtue that he take no cognizance of what lies outside the narrow territory specially cultivated by himself, and gives the name of "dilettantism" to any curiosity for the general scheme of knowledge.

What happens is that, enclosed within the narrow limits of his visual field, he does actually succeed in discovering new facts, and advancing the progress of the science which he hardly knows, and incidentally the encyclopedia of thought of which he is conscientiously ignorant. How has such a thing been possible, how is it still possible? For it is necessary to insist upon this extraordinary but undeniable fact: experimental science has progressed thanks in great part to the work of men astoundingly mediocre, and even less than mediocre. That is to say, modern science, the root and symbol of our actual civilisation, finds a place for the intellectually commonplace man and allows him to work therein with success. The reason of this lies in what is at the same time the great advantage and the gravest peril of the new science, and of the civilisation directed and represented by it, namely, mechanisation. A fair amount of the things that have to be done in physics or in biology is mechanical work of the mind which can be done by anyone, or almost anyone. For the purpose of innumerable investigations it is possible to divide science into small sections, to enclose oneself in one of these, and to leave out of consideration all the rest. The solidity and exactitude of the methods allow of this temporary but quite real disarticulation of knowledge. The work is done under one of these methods as with a machine, and in order to obtain quite abundant results it is not even necessary to have rigorous notions of their meaning and foundations. In this way the majority of scientists help the general advance of science

while shut up in the narrow cell of their laboratory, like the bee in the cell of its hive, or the turnspit in its wheel.

But this creates an extraordinarily strange type of man. The investigator who has discovered a new fact of Nature must necessarily experience a feeling of power and self-assurance. With a certain apparent justice he will look upon himself as "a man who knows." And in fact there is in him a portion of something which, added to many other portions not existing in him, does really constitute knowledge. This is the true inner nature of the specialist, who in the first years of this century has reached the wildest stage of exaggeration. The specialist "knows" very well his own, tiny corner of the universe; he is radically ignorant of all the rest.

Here we have a precise example of this strange new man, whom I have attempted to define, from both of his two opposite aspects. I have said that he was a human product unparalleled in history. The specialist serves as a striking concrete example of the species, making clear to us the radical nature of the novelty. For, previously, men could be divided simply into the learned and the ignorant, those more or less the one, and those more or less the other. But your specialist cannot be brought in under either of these two categories. He is not learned, for he is formally ignorant of all that does not enter into his specialty; but neither is he ignorant, because he is "a scientist," and "knows" very well his own tiny portion of the universe. We shall have to say that he is a learned ignoramus, which is a very serious matter, as it implies that he is a person who is ignorant, not in the fashion of the ignorant man, but with all the petulance of one who is learned in his own special line.

And such in fact is the behaviour of the specialist. In politics, in art, in social usages, in the other sciences, he will adopt the attitudes of primitive, ignorant man; but he will adopt them forcefully and with self-sufficiency, and will not admit of—this is the paradox—specialists in those matters. By specialising him, civilisation has made him hermetic and self-satisfied within his limitations; but this very inner feeling of dominance and worth will induce him

to wish to predominate outside his specialty. The result is that even in this case, representing a maximum of qualification in man—specialisation—and therefore the thing most opposed to the mass-man, the result is that he will behave in almost all spheres of life as does the unqualified, the mass-man.

This is no mere wild statement. Anyone who wishes can observe the stupidity of thought, judgment, and action shown to-day in politics, art, religion, and the general problems of life and the world by the "men of science," and of course, behind them, the doctors, engineers, financiers, teachers, and so on. That state of "not listening," of not submitting to higher courts of appeal which I have repeatedly put forward as characteristic of the mass-man, reaches its height precisely in these partially qualified men. They symbolise, and to a great extent constitute, the actual dominion of the masses, and their barbarism is the most immediate cause of European demoralisation. Furthermore, they afford the clearest, most striking example of how the civilisation of the last century, *abandoned to its own devices*, has brought about this rebirth of primitivism and barbarism.

The most immediate result of this *unbalanced* specialisation has been that to-day, when there are more "scientists" than ever, there are much less "cultured" men than, for example, about 1750. And the worst is that with these turnspits of science not even the real progress of science itself is assured. For science needs from time to time, as a necessary regulator of its own advance, a labour of reconstitution, and, as I have said, this demands an effort towards unification, which grows more and more difficult, involving, as it does, ever-vaster regions of the world of knowledge. Newton was able to found his system of physics without knowing much philosophy, but Einstein needed to saturate himself with Kant and Mach before he could reach his own keen synthesis. Kant and Mach—the names are mere symbols of the enormous mass of philosophic and psychological thought which has influenced Einstein—have served to *liberate* the mind of the latter and leave the way open for his innovation. But Einstein

is not sufficient. Physics is entering on the gravest crisis of its history, and can only be saved by a new "Encyclopaedia" more systematic than the first.

The specialisation, then, that has made possible the progress of experimental science during a century, is approaching a stage where it can no longer continue its advance unless a new generation undertakes to provide it with a more powerful form of turnspit.

But if the specialist is ignorant of the inner philosophy of the science he cultivates, he is much more radically ignorant of the historical conditions requisite for its continuation; that is to say: how society and the heart of man are to be organised in order that there may continue to be investigators. The decrease in scientific vocations noted in recent years, to which I have alluded, is an anxious symptom for anyone who has a clear idea of what civilisation is, an idea generally lacking to the typical "scientist," the highpoint of our present civilisation. He also believes that civilisation *is there* in just the same way as the earth's crust and the forest primeval.

The young physicists are beyond all doubt the noisiest, rowdiest, most active and most intellectually alert group we have here. For them the world changes every week and they are simply delighted by it. A few days ago I asked one of them, as they came bursting out of a seminar, "How did it go?" "Wonderfull" he said. "Everything we knew about physics last week isn't true!"

—DR. WALTER STEWART, economist at the Institute for Advanced Study, Princeton, N.J.