

Joseph Wood Krutch (1893-1970) *The Best of Two Worlds*

The Colloid and the Crystal

The first real snow was soon followed by a second. Over the radio the weatherman talked lengthily about cold masses and warm masses, about what was moving out to sea and what wasn't. Did Benjamin Franklin, I wondered, know what he was starting when it first occurred to him to trace by correspondence the course of storms? From my stationary position the most reasonable explanation seemed to be simply that winter had not quite liked the looks of the landscape as she first made it up. She was changing her sheets.

Another forty-eight hours brought one of those nights ideal for frosting the panes. When I came down to breakfast, two of the windows were almost opaque and the others were etched with graceful, fernlike sprays of ice which looked rather like the impressions left in rocks by some of the antediluvian plants, and they were almost as beautiful as anything which the living can achieve. Nothing else which has never lived looks so much as though it were actually informed with life.

I resisted, I am proud to say, the almost universal impulse to scratch my initials into one of the surfaces. The effect, I knew, would not be an improvement. But so, of course, do those less virtuous than I. That indeed is precisely why they scratch. The impulse to mar and to destroy is as ancient and almost as nearly universal as the impulse to create. The one is an easier way than the other of demonstrating power. Why else should anyone not hungry prefer a dead rabbit to a live one. Not even those horrible Dutch painters of bloody still - or shall we say stilled? - lifes can have really believed that their subjects were more beautiful dead.

Indoors it so happened that a Christmas cactus had chosen this moment to bloom. Its lush blossoms, fuchsia-shaped but pure red rather than magenta, hung at the drooping ends of strange, thick stems and outlined themselves in blood against the glistening background of the frosty pane - jungle flower against frostflower; the warm beauty that breathes and lives and dies competing with the cold beauty that burgeons, not because it wants to, but merely because it is obeying the laws of physics which require that crystals shall take the shape they have always taken since the world began. The effect of red flower against white tracery was almost too theatrical, not quite in good taste perhaps. My eye recoiled in shock and sought through a clear area of the glass the more normal out-of-doors.

On the snow-capped summit of my bird feeder a chickadee pecked at the new-fallen snow and swallowed a few of the flakes which serve him in lieu of the water he sometimes sadly lacks when there is nothing except ice too solid to be picked at. A downy woodpecker was hammering at a lump of suet and at the coconut full of peanut butter. One nuthatch was dining while the mate waited his - or was it her? - turn. The woodpecker announces the fact that he is a male by the bright red spot on the back of his neck, but to me, at least, the sexes of the nuthatch are indistinguishable. I shall never know whether it is the male or the female who eats first. And that is a pity. If I knew, I could say, like the Ugly Duchess, "and the moral of that is..."

But I soon realized that at the moment the frosted windows were what interested me most - especially the fact that there is no other natural phenomenon in which the lifeless mocks so closely the living. One might almost think that the frostflower had got the idea from the leaf and the branch if one did not know how inconceivably more ancient the first is. No wonder that enthusiastic biologists in the nineteenth century, anxious to conclude that there was no qualitative difference between life and chemical processes, tried to believe that the crystal furnished the link, that its growth was actually the same as the growth of a living organism. but excusable though the fancy was, no one, I think, believes anything of the sort today. Protoplasm is a colloid and the colloids are fundamentally different from the crystalline substances. Instead of crystallizing they jell, and life in its simplest known form is a shapeless blob of rebellious jelly rather than a crystal eternally obeying the most ancient law.

No man ever saw a dinosaur. The last of these giant reptiles was dead eons before the most dubious halfman surveyed the world about him. Not even the dinosaurs ever cast their dim eyes upon many of the still earlier creatures which preceded them. Life changes so rapidly that its later phases know nothing of those which preceded them. But the frostflower is older than the dinosaur, older than the protozoan, older no doubt than the enzyme or the ferment. Yet it is precisely what it has always been. Millions of years before there were any eyes to see it, millions of years before any life existed, it grew in its own special way, crystallized along its preordained lines of cleavage, stretched out its pseudo-branches and pseudo-leaves. It was beautiful before beauty itself existed.

We find it difficult to conceive a world except in terms of purpose, of will, or of intention. At the thought of the something without beginning and presumably without end, of something which is, nevertheless, regular though blind, and organized without any end in view, the mind reels. Constituted as we are it is easier to conceive how the slime floating upon the waters might become in time *Homo sapiens* than it is to imagine how so complex a thing as a crystal could have always been and can always remain just what it is - complicated and perfect but without any meaning, even for itself. How can the lifeless even obey a law?

To a mathematical physicist I once confessed somewhat shamefacedly that I had never been able to understand how inanimate nature managed to follow so invariably and so promptly her own laws. If I flip a coin across a table, it will come to rest at a certain point. But before it stops at just that point, many factors must be taken into consideration. There is the question of the strength of the initial impulse, of the exact amount of resistance offered by the friction of that particular table top, and of the density of the air at the moment. It would take a physicist a long time to work out the problem and he could achieve only an approximation at that. Yet presumably the coin will stop exactly where it should. Some very rapid calculations have to be made before it can do so, and they are, presumably, always accurate.

And then, just as I was blushing at what I supposed he must regard as my folly, the mathematician came to my rescue by informing me that Laplace had been puzzled by exactly the same fact. "Nature laughs at the difficulties of integration," he remarked - and by "integration" he meant, of course, the mathematician's word for the process involved when a man solves one of the differential equations to which he has reduced

the laws of motion.

When my Christmas cactus blooms so theatrically a few inches in front of the frost-covered pane, it is also obeying laws but obeying them much less rigidly and in a different way. It blooms at about Christmastime because it has got into the habit of doing so, because, one is tempted to say, it wants to. As a matter of fact it was, this year, not a Christmas cactus but a New Year's cactus, and because of this unpredictability I would like to call it "he," not "it." His flowers assume their accustomed shape and take on their accustomed color. But not as the frostflowers follow their predestined pattern. Like me, the cactus has a history which stretches back over a long past full of changes and developments. He has not always been merely obeying fixed laws. He has resisted and rebelled; he has attempted novelties, passed through many phases. Like all living things he has had a will of his own. He has made laws, not merely obeyed them.

"Life," so the platitudinarian is fond of saying, "is strange." But from our standpoint it is not really so strange as those things which have no life and yet nevertheless move in their predestined orbits and "act" though they do not "behave." At the very least one ought to say that if life is strange there is nothing about it more strange than the fact that it has its being in a universe so astonishingly shared on the one hand by "things" and on the other hand by "creatures," that man himself is both a "thing" which obeys the laws of chemistry or physics and a "creature" who to some extent defies them. No other contrast, certainly not the contrast between the human being and the animal, or the animal and the plant, or even the spirit and the body, is so tremendous as this contrast between what lives and what does not.

To think of the lifeless as merely inert, to make the contrast merely in terms of a negative, is to miss the real strangeness. Not the shapeless stone which seems to be merely waiting to be acted upon but the snowflake or the frostflower is the true representative of the lifeless universe as opposed to ours. They represent plainly, as the stone does not, the fixed and perfect system of organization which includes the sun and its planets, includes therefore this earth itself, but against which life has set up its seemingly puny opposition. Order and obedience are the primary characteristics of that which is not alive. The snowflake eternally obeys its one and only law: "Be thou six pointed"; the planets their one and only: "Travel thou in an ellipse." The astronomer can tell where the North Star will be then thousand years hence; the botanist cannot tell where the dandelion will bloom tomorrow.

Life is rebellious and anarchial, always testing the supposed immutability of the rules which the nonliving changelessly accepts. Because the snowflake goes on doing as it was told, its story up to the end of time was finished when it first assumed the form which it has kept ever since. But the story of every living thing is still in the telling. It may hope and it may try. Moreover, though it may succeed or fail, it will certainly change. No form of frostflower ever became extinct. Such, if you like, is its glory. But such also is the fact which makes it alien. It may melt but it cannot die.

IF I wanted to contemplate what to me is the deepest of all mysteries, I should choose as my object lesson a snowflake under a lens and an amoeba under a microscope. To the detached observer - if one can possibly imagine any observer who *could* be

detached when faced with such an ultimate choice - the snowflake would certainly seem the "higher" of the two. Against its intricate glistening perfection one would have to place a shapeless, slightly turbid glob, perpetually oozing out in this direction or that but not suggesting so strongly as the snowflake does, intelligence and plan. Crystal and collid, the chemist would call them, but what an inconceivable contrast those neutral terms imply! Like the star, the snowflake seems to declare the glory of God, while the promise of the amoeba, given only perhaps to itself, seems only contemptible. But its jelly holds, nevertheless, not only its promise but ours also, while the snowflake represents some achievement which we cannot possibly share. After the passage of billions of years, one can see and be aware of the other, but the relationship can never be reciprocal. Even after these billions of years no aggregate of colloids can be as beautiful as the crystal always was, but it can know, as the crystal cannot, what beauty is.

Even to admire too much or too exclusively the alien kind of beauty is dangerous. Much as I love and am moved by the grand, inanimate forms of nature, I am always shocked and a little frightened by those of her professed lovers to whom landscape is the most important thing, and to whom landscape is merely a matter of forms and colors. If they see or are moved by an animal or flower, it is to them merely a matter of a picturesque completion, and their fellow creature are no more than decorative details. But without some continuous awareness of the two great realms of the inanimate and the animate there can be no love of nature as I understand it, and what is worse, there must be a sort of disloyalty to our cause, to us who are colloid, not crystal. The pantheist who feels the oneness of all living things, I can understand; perhaps indeed he and I are in essential agreement. But the ultimate All is not one thing, but two. And because the alien half is in its way as proud and confident and successful as our half, its fundamental difference may not be disregarded with impunity. Of us and all we stand for, the enemy is not so much death as the not-living, or rather that great system which succeeds without ever having had the need to be alive. The frostflower is not merely a wonder; it is also a threat and a warning. How admirable, it seems to say, not living can be! What triumphs mere immutable law can achieve.

Some of Charles Peirce's strange speculations about the possibility that "natural law" is not law at all but merely a set of habits fixed more firmly than any habits we know anything about in ourselves or in the animals suggest the possibility that the snowflake was not, after all, always inanimate, that it merely surrendered at some time impossibly remote the life which once achieved its perfect organization. Yet even if we can imagine such a thing to be true, it serves only to warn us all the more strongly against the possibility that what we call the living might in the end succumb also to the seduction of the immutably fixed.

No student of the anthill has ever failed to be astonished either into admiration or horror by what is sometimes called the perfection of its society. Though even the anthill can change its ways, though even ant individuals - ridiculous as the conjunction of the two words may seem - can sometimes make choices, the perfection of the techniques, the regularity of the habits almost suggest the possibility that the insect is on its way back to inanition, that, vast as the difference still is, an anthill crystallizes somewhat as a snowflake does. But not even the anthill, nothing else indeed in the

while known universe is so perfectly planned as one of these same snowflakes. Would, then, the ultimately planned society be, like the antill, one in which no one makes plans, any more than a snowflake does? From the cradle in which it is not really born to the grave where it is only a little deader than it always was, the ant-citizen follows a plan to the making of which he no longer contributes anything.

Perhaps we men represent the ultimate to which the lion, began so long ago in some amoeba-like jelly, can go. And perhaps the inanimate is beginning the slow process of subduing us again. Certainly the psychologist and the philosopher are tending more and more to think of us as creatures who obey laws rather than creatures of will and responsibility. We are, they say, "conditioned" by this or that. Even the greatest heroes are studied on the assumption that they can be "accounted for" by something outside themselves. They are, it is explained, "the product of forces". All the emphasis is placed, not upon that power to resist and rebel which we were once supposed to have, but upon the "influences" which "formed us". Men are made by society, not society by men. History as well as character "obeys laws". In their view we crystallize in obedience to some dictate from without instead of moving in conformity with something within.

And so my eye goes questioningly back to the frosted pane. While I slept the graceful pseudo-fronds crept across the glass, assuming, as life itself does, an intricate organization. "Why live", they seem to say, "when we can be beautiful, complicated, and orderly without the uncertainty and effort required of a living thing? Once we were all that was. Perhaps some day we shall be all that is. Why not join us?"

Last summer no clod or no stone would have been heard if it had asked such a question. The hundreds of things which walked and sang, the millions which crawled and twined were all having their day. What was dead seemed to exist only in order that the living might live on it. The plants were busy turning the inorganic into green life and the animals were busy turning that green into red. When we moved, we walked mostly upon grass. Our pre-eminence was unchallenged. On this winter day nothing seems so successful as the frostflower. It thrives on the very thing which has driven some of us indoors or underground and which has been fatal to many. It is having now its hour of triumph, as we before had ours. Like the cactus flower itself, I am a hothouse plant. 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.

Via Brian Jackel <bjackel@phys.ucalgary.ca> 1996