confound them from within. They have uneven topographies, because some of the points at which the various effects and bodies cross paths are more heavily trafficked than others, and so power is not distributed equally across its surface. Assemblages are not governed by any central head: no one materiality or type of material has sufficient competence to determine consistently the trajectory or impact of the group. The effects generated by an assemblage are, rather, emergent properties, emergent in that their ability to make something happen (a newly inflected materialism, a blackout, a hurricane, a war on terror) is distinct from the sum of the vital force of each materiality considered alone. Each member and proto-member of the assemblage has a certain vital force, but there is also an effectivity proper to the grouping as such: an agency *of* the assemblage. And precisely because each member-actant maintains an energetic pulse slightly "off" from that of the assemblage, an assemblage is never a stolid block but an open-ended collective, a "non-totalizable sum."[12] An assemblage thus not only has a distinctive history of formation but a finite life span.[13]

The electrical power grid offers a good example of an assemblage. It is a material cluster of charged parts that have indeed affiliated, remaining in sufficient proximity and coordination to produce distinctive effects. The elements of the assemblage work together, although their coordination does not rise to the level of an organism. Rather, its jelling endures along side energies and factions that flow out from it and disturb it from within. And, most important for my purposes, the elements of this assemblage, while they include humans and their (social, legal, linguistic) constructions, also include some very active and powerful nonhumans: electrons, trees, wind, fire, electromagnetic fields.

The image of affective bodies forming assemblages will enable me to highlight some of the limitations in human-centered theories of action and to investigate some of the practical implications, for social-science inquiry and for public culture, of a theory of action and responsibility that crosses the human-nonhuman divide.

The Blackout

The *International Herald Tribune*, on the day after the blackout, reported that "the vast but shadowy web of transmission lines, power generat-

ing plants and substations known as the grid is the biggest gizmo ever built. . . . on Thursday [14 August 2003], the grid's heart fluttered. . . . complicated beyond full understanding, even by experts—[the grid] lives and occasionally dies by its own mysterious rules."[14] To say that the grid's "heart fluttered" or that it "lives and dies by its own rules" is to anthropomorphize. But anthropomorphizing has, as I shall argue in chapter 8, its virtues. Here it works to gesture toward the inadequacy of understanding the grid simply as a machine or a tool, as, that is, a series of fixed parts organized from without that serves an external purpose.

To the vital materialist, the electrical grid is better understood as a volatile mix of coal, sweat, electromagnetic fields, computer programs, electron streams, profit motives, heat, lifestyles, nuclear fuel, plastic, fantasies of mastery, static, legislation, water, economic theory, wire, and wood—to name just some of the actants. There is always some friction among the parts, but for several days in August 2003 in the United States and Canada the dissonance was so great that cooperation became impossible. The North American blackout was the end point of a cascade—of voltage collapses, self-protective withdrawals from the grid, and human decisions and omissions. The grid includes various valves and circuit breakers that disconnect parts from the assemblage whenever they are threatened by excessive heat. Generating plants, for example, shut down just before they are about to go into "full excitation,"[15] and they do the same when the "system voltage has become too low to provide power to the generator's own auxiliary equipment, such as fans, coal pulverizers, and pumps."[16] What seems to have happened on that August day was that several initially unrelated generator withdrawals in Ohio and Michigan caused the electron flow pattern to change over the transmission lines, which led, after a series of events including one brush fire that burnt a transmission line and then several wire-tree encounters, to a successive overloading of other lines and a vortex of disconnects. One generating plant after another separated from the grid, placing more and more stress on the remaining participants. In a one-minute period, "twenty generators (loaded to 2174 MW) tripped off line along Lake Erie."[17]

Investigators still do not understand why the cascade ever stopped itself, after affecting 50 million people over approximately twenty-four thousand square kilometers and shutting down over one hundred power plants, including twenty-two nuclear reactors.[18] The U.S.-Canada Power

Outage Task Force report was more confident about how the cascade began, insisting on a variety of agential loci.[19] These included *electricity*, with its internal differentiation into "active" and "reactive" power (more on this later); the *power plants*, understaffed by humans but overprotective in their mechanisms; *transmission wires*, which tolerate only so much heat before they refuse to transmit the electron flow; a *brush fire* in Ohio; Enron *FirstEnergy* and other energy-trading corporations, who, by legal and illegal means, had been milking the grid without maintaining its infrastructure; *consumers*, whose demand for electricity grows and is encouraged to grow by the government without concern for consequences; and the *Federal Energy Regulatory Commission*, whose Energy Policy Act of 1992 deregulated the grid, separated the generation of electricity from its transmission and distribution, and advanced the privatization of electricity. Let me say a bit more about the first and the last of these conative bodies in the assemblage.

First, the nonhuman: electricity. Electricity is a stream of electrons moving in a current, which is measured in amperes; the force of that current (the pressure pushing it through the wires) is measured in volts. In a system like the North American grid, electrical current and voltage are constantly oscillating like a pair of waves.[20] When the two waves are in phase with each other (rising and falling at exactly the same time), one has so-called active power, or the type of power used most heavily by lamps, blow-dryers, and other appliances. But some devices (such as the electric motors in refrigerators and air conditioners) rely also on so-called reactive power, where the waves are not in sync. Reactive power, though it lends no help in physically rotating a motor, is vital to the active power that accompanies it, for reactive power maintains the voltage (electricity pressure) needed to sustain the electromagnetic field required by the system as a whole. If too many devices demand reactive power, then a deficit is created. One of the causes of the blackout was a deficit of reactive power. To understand how the deficit occurred, we need to consider the other actants, including the Federal Energy Regulatory Commission.

In 1992 the commission gained U.S. congressional approval for legislation that separated the production of electricity from its distribution: companies could now buy electricity from a power plant in one part of the country and sell it to utilities in geographically distant locations.

This greatly increased the long-distance trading of electric power—and greatly increased the load on transmission wires. But here is the rub: "As transmission lines become more heavily loaded, they consume more of the reactive power needed to maintain proper transmission voltage."[21] Reactive power does not travel well, dissipating over distance, so it is best if generated close to where it will be used.[22] Power plants are technically quite capable of producing extra amounts of reactive power, but they lack the financial incentive to do so, for reactive-power production *reduces* the amount of salable power produced. What is more, under the new regulations, transmission companies cannot compel generating plants to produce the necessary amounts of reactive power.[23]

Reactive power, vital to the whole grid, proved a commodity without profit and thus came in short supply. Here emerged what Garrett Hardin has called a tragedy of the commons. Though rational for each user of reactive power to increase its demand for the free commodity, the aggregate effect is irrational in that it destroys the wellspring: in a world of finite resources, "freedom in a commons brings ruin to all."[24] The reactive power deficit was an effect unanticipated by human advocates of the regulations that created a huge, continent-wide market in energy trading. Their actions produced unintended consequences; or, to put the point in a vital materialist vocabulary, they were subject to the "slight surprise of action." The phrase is Bruno Latour's, and it refers to an effectivity proper to the action itself, arising only in the doing and thus in principle independent of any aim, tendency, or characteristic of the actants: "There is no object, no subject. . . . But there are events. I never *act*; I am always slightly surprised by what I do."[25]

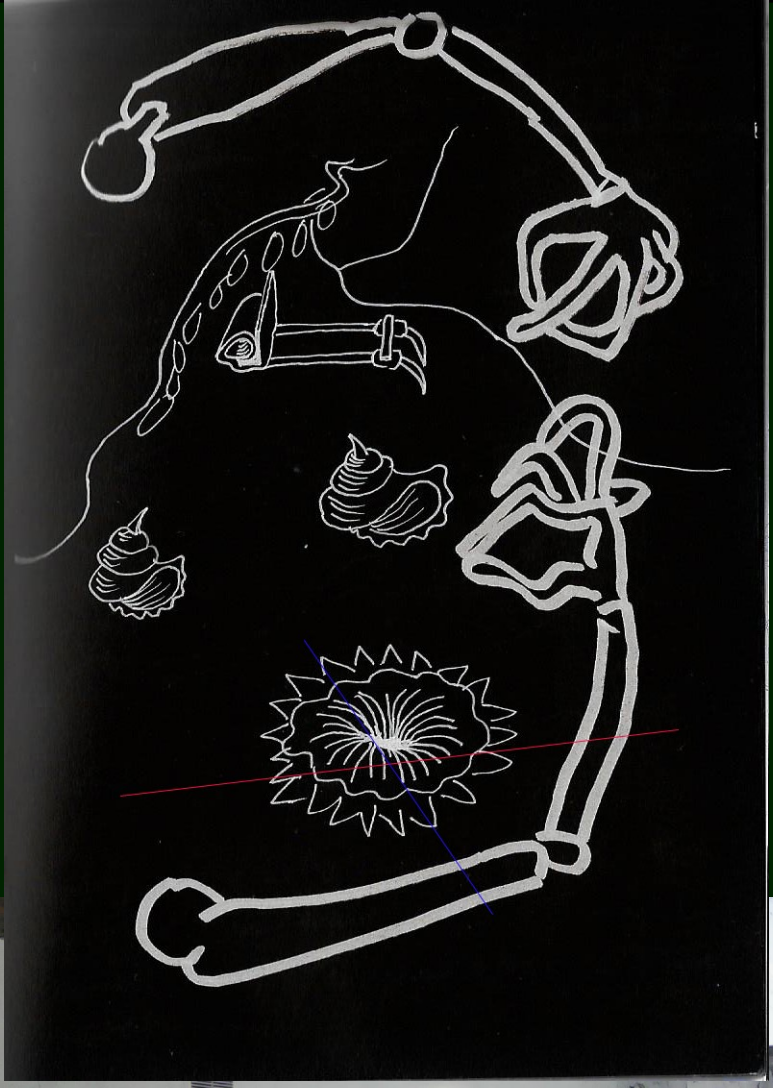
Neither, says Latour, is the slight surprise of action confined to human action: "That which acts through me is also surprised by what I do, by the chance to mutate, to change, . . . to bifurcate."[26] In the case at hand, electricity was also an actant, and its strivings also produced aleatory effects. For example, "in the case of a power shipment from the Pacific Northwest to Utah, 33% of the shipment flows through Southern California and 30% flows through Arizona—far from any conceivable contract path."[27] And in August of 2003, after "the transmission lines along the southern shore of Lake Erie disconnected, the power that had been flowing along that path" dramatically and surprisingly changed its behavior: it "*immediately reversed direction and began flowing in a giant*

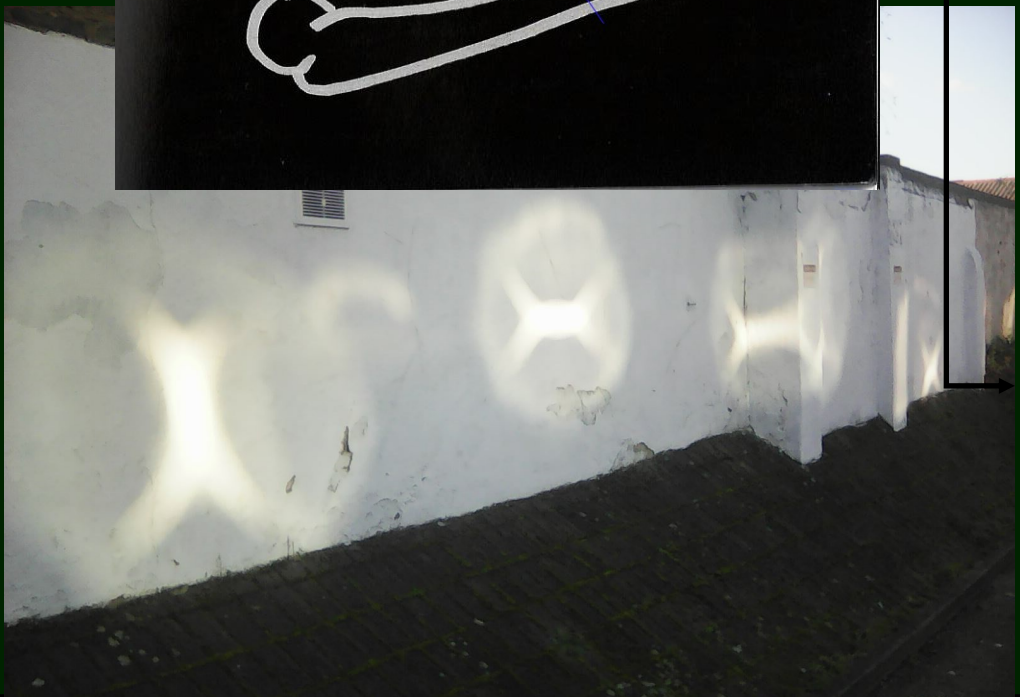
loop counterclockwise from Pennsylvania to New York to Ontario and into Michigan."[28] Seeking to minimize the company's role in the blackout, a spokesman for FirstEnergy, the Ohio-based company whose Eastlake power plant was an early actant in the cascade and an early target of blame, said that any analysis needed to "take into account large unplanned south-to-north power movements that were part of a phenomenon known as loop flows, which occur when power takes a route from producer to buyer different from the intended path."[29] Electricity, or the stream of vital materialities called electrons, is always on the move, always going somewhere, though where this will be is not entirely predictable. Electricity sometimes goes where we send it, and sometimes it chooses its path on the spot, in response to the other bodies it encounters and the surprising opportunities for actions and interactions that they afford.

In this selective account of the blackout, agency, conceived now as something distributed along a continuum, extrudes from multiple sites or many loci—from a quirky electron flow and a spontaneous fire to members of Congress who have a neoliberal faith in market self-regulation. How does this view compare to other conceptions of what an agent is and can do?

The Willing Subject and the Intersubjective Field

I have been suggesting that there is not so much a doer (an agent) behind the deed (the blackout) as a doing and an effecting by a human-nonhuman assemblage. This federation of actants is a creature that the concept of moral responsibility fits only loosely and to which the charge of blame will not quite stick. A certain looseness and slipperiness, often unnoticed, also characterizes more human-centered notions of agency. Augustine, for example, linked moral agency to free will, but the human will is, as Augustine reveals in his *Confessions*, divided against itself after the Fall: the will willing even as another part of the will fights that willing. Moreover, willing agents can act freely only in support of evil: never are they able by themselves to enact the good, for that always requires the intervention of divine grace, a force beyond human control. Agency, then, is not such a clear idea or a self-sufficient power in Augustine.[30]





The Colour out of Space
By H. P. Lovecraft

West of Arkham the hills rise wild, and there are valleys with deep woods that no axe has ever cut. There are dark narrow glens where the trees slope fantastically, and where thin brooklets trickle without ever having caught the glint of sunlight. On the gentler slopes there are farms, ancient and rocky, with squat, moss-coated cottages brooding eternally over old New England secrets in the lee of great ledges; but these are all vacant now, the wide chimneys crumbling and the shingled sides bulging perilously beneath low gambrel roofs.

The old folk have gone away, and foreigners do not like to live there. French-Canadians have tried it, Italians have tried it, and the Poles have come and departed. It is not because of anything that can be seen or heard or handled, but because of something that is imagined. The place is not good for the imagination, and does not bring restful dreams at night. It must be this which keeps the foreigners away, for old Ammi Pierce has never told them of anything he recalls from the strange days. Ammi, whose head has been a little queer for years, is the only one who still remains, or who ever talks of the strange days; and he dares to do this because his house is so near the open fields and the travelled roads around Arkham.

There was once a road over the hills and through the valleys, that ran straight where the blasted heath is now; but people ceased to use it and a new road was laid curving far toward the south. Traces of the old one can still be found amidst the weeds of a returning wilderness, and some of them will doubtless linger even when half the hollows are flooded for the new reservoir. Then the dark woods will be cut down and the blasted heath will slumber far below blue waters whose surface will mirror the sky and ripple in the sun. And the secrets of the strange days will be one with the deep's secrets; one with the hidden lore of old ocean, and all the mystery of primal earth.

When I went into the hills and vales to survey for the new reservoir they told me the place was evil. They told me this in Arkham, and because that is a very old town full of witch legends I thought the evil must be something which grandams had whispered to children through centuries. The name "blasted heath" seemed to me very odd and theatrical, and I wondered how it had come into the folklore of a Puritan people. Then I saw that dark westward tangle of glens and slopes for myself, and ceased to wonder at anything besides its own elder mystery. It was morning when I saw it, but shadow lurked always there. The trees grew too thickly, and their trunks were too big for any healthy New England wood. There was too much silence in the dim alleys between them, and the floor was too soft with the dank moss and mattings of infinite years of decay.

In the open spaces, mostly along the line of the old road, there were little hillside farms; sometimes with all the buildings standing, sometimes with only one or two, and sometimes with only a lone chimney or fast-filling cellar. Weeds and briers reigned, and furtive wild things rustled in the undergrowth. Upon everything was a haze of restlessness and oppression; a touch of the unreal and the grotesque, as if some vital element of perspective or chiaroscuro were awry. I did not wonder that the foreigners would not stay, for this was no region to sleep in. It was too much like a landscape of Salvator Rosa; too much like some forbidden woodcut in a tale of terror.

But even all this was not so bad as the blasted heath. I knew it the moment I came upon it at the bottom of a spacious valley; for no other name could fit such a thing, or any other thing fit such a name. It was as if the poet had coined the phrase from having seen this one particular region. It must, I thought as I viewed it, be the outcome of a fire; but why had nothing new ever grown over those five acres of grey desolation that sprawled open to the sky like a great spot eaten by acid in the woods and fields? It lay largely to the north of the ancient road line, but encroached a little on the other side. I felt an odd reluctance about approaching, and did so at last only because my business took me through and past it. There was no vegetation of any kind on that broad expanse, but only a fine grey dust or ash which no wind seemed ever to blow about. The trees near it were sickly and stunted, and many dead trunks stood or lay rotting at the rim. As I walked hurriedly by I saw the tumbled bricks and stones of an old chimney and cellar on my right, and the yawning black maw of an abandoned well whose stagnant vapours played strange tricks with the hues of the sunlight. Even the long, dark woodland climb beyond seemed welcome in contrast, and I marvelled no more at the frightened whispers of Arkham people. There had been no house or ruin near; even in the old days the place must have been lonely and remote. And at twilight, dreading to repass that ominous spot, I walked circuitously back to the town by the curving road on the south. I vaguely wished some clouds would gather, for an odd timidity about the deep skyey voids above had crept into my soul.

In the evening I asked old people in Arkham about the blasted heath, and what was meant by that phrase "strange days" which so many evasively muttered. I could not, however, get any good answers, except that all the mystery was much more recent than I had dreamed. It was not a matter of old legendry at all, but something within the lifetime of those who spoke. It had happened in the 'eighties, and a family had disappeared or was killed. Speakers would not be exact; and because they all told me to pay no attention to old Ammi Pierce's crazy tales, I sought him out the next morning, having heard that he lived alone in the ancient tottering cottage where the trees first begin to get very thick. It was a fearsomely archaic place, and had begun to exude the faint miasmal odour which clings about houses that have stood too long. Only with persistent knocking could I rouse the aged man, and when he shuffled timidly to the door I could tell he was not glad to see me. He was not so feeble as I had expected; but his eyes drooped in a curious way, and his unkempt clothing and white beard made him seem very worn and dismal. Not knowing just how he could best be launched on his tales, I feigned a matter of business; told him of my surveying, and asked vague questions about the district. He was far brighter and more educated than I had been led to think, and before I knew it had grasped quite as much of the subject as any man I had talked with in Arkham. He was not like other rustics I had known in the sections where reservoirs were to be. From him there were no protests at the miles of old wood and farmland to be blotted out, though perhaps there would have been had not his home lain outside the bounds of the future lake. Relief was all that he shewed; relief at the doom of the dark ancient valleys through which he had roamed all his life. They were better under water now—better under water since the strange days. And with this opening his husky voice sank low, while his body leaned forward and his right forefinger began to point shakily and impressively.

It was then that I heard the story, and as the rambling voice scraped and whispered on I shivered again and again despite the summer day. Often I had to recall the speaker from ramblings, piece out scientific points which he knew only by a fading parrot memory of professors' talk, or bridge over gaps where his sense of logic and continuity broke down. When he was done I did not wonder that his mind had snapped a trifle, or that the folk of Arkham would not speak much of the blasted heath. I hurried back before sunset to my hotel, unwilling to have the stars come out above me in the open; and the next day returned to Boston to give up my position. I could not go into that dim chaos of old forest and slope again, or face another time that grey blasted heath where the black well yawned deep beside the tumbled bricks and stones. The reservoir will soon be built now, and all those elder secrets will be safe forever under watery fathoms. But even then I do not believe I would like to visit that country by night—at least, not when the sinister stars are out; and nothing could bribe me to drink the new city water of Arkham.

It all began, old Ammi said, with the meteorite. Before that time there had been no wild legends at all since the witch trials, and even then these western woods were not feared half so much as the small island in the Miskatonic where the devil held court beside a curious stone altar older than the Indians. These were not haunted woods, and their fantastic dusk was never terrible till the strange days. Then there had come that white noontide cloud, that string of explosions in the air, and that pillar of smoke from the valley far in the wood. And by night all Arkham had heard of the great rock that fell out of the sky and bedded itself in the ground beside the well at the Nahum Gardner place. That was the house which had stood where the blasted heath was to come—the trim white Nahum Gardner house amidst its fertile gardens and orchards.

Nahum had come to town to tell people about the stone, and had dropped in at Ammi Pierce's on the way. Ammi was forty then, and all the queer things were fixed very strongly in his mind. He and his wife had gone with the three professors from Miskatonic University who hastened out the next morning to see the weird visitor from unknown stellar space, and had wondered why Nahum had called it so large the day before. It had shrunk, Nahum said as he pointed out the big brownish mound above the ripped earth and charred grass near the archaic well-sweep in his front yard; but the wise men answered that stones do not shrink. Its heat lingered persistently, and Nahum declared it had glowed faintly in the night. The professors tried it with a geologist's hammer and found it was oddly soft. It was, in truth, so soft as to be almost plastic; and they gouged rather than chipped a specimen to take back to the college for testing. They took it in an old pail borrowed from Nahum's kitchen, for even the small piece refused to grow cool. On the trip back they stopped at Ammi's to rest, and seemed thoughtful when Mrs. Pierce remarked that the fragment was growing smaller and burning the bottom of the pail. Truly, it was not large, but perhaps they had taken less than they thought.

The day after that—all this was in June of '82—the professors had trooped out again in a great excitement. As they passed Ammi's they told him what queer things the specimen had done, and how it had faded wholly away when they put it in a glass beaker. The beaker had gone, too, and the wise men talked of the strange stone's affinity for silicon. It had acted quite unbelievably in that well-ordered laboratory; doing nothing at all and shewing no occluded gases when heated on charcoal, being wholly negative in the borax bead, and soon proving itself absolutely non-volatile at any producible temperature, including that of the oxy-hydrogen blowpipe. On an anvil it appeared highly malleable, and in the dark its luminosity was very marked. Stubbornly refusing to grow cool, it soon had the college in a state of real excitement; and when upon heating before the spectroscope it displayed shining bands unlike any

known colours of the normal spectrum there was much breathless talk of new elements, bizarre optical properties, and other things which puzzled men of science are wont to say when faced by the unknown.

Hot as it was, they tested it in a crucible with all the proper reagents. Water did nothing. Hydrochloric acid was the same. Nitric acid and even aqua regia merely hissed and spattered against its torrid invulnerability. Ammi had difficulty in recalling all these things, but recognised some solvents as I mentioned them in the usual order of use. There were ammonia and caustic soda, alcohol and ether, nauseous carbon disulphide and a dozen others; but although the weight grew steadily less as time passed, and the fragment seemed to be slightly cooling, there was no change in the solvents to shew that they had attacked the substance at all. It was a metal, though, beyond a doubt. It was magnetic, for one thing; and after its immersion in the acid solvents there seemed to be faint traces of the Widmannstätten figures found on meteoric iron. When the cooling had grown very considerable, the testing was carried on in glass; and it was in a glass beaker that they left all the chips made of the original fragment during the work. The next morning both chips and beaker were gone without trace, and only a charred spot marked the place on the wooden shelf where they had been.

All this the professors told Ammi as they paused at his door, and once more he went with them to see the stony messenger from the stars, though this time his wife did not accompany him. It had now most certainly shrunk, and even the sober professors could not doubt the truth of what they saw. All around the dwindling brown lump near the well was a vacant space, except where the earth had caved in; and whereas it had been a good seven feet across the day before, it was now scarcely five. It was still hot, and the sages studied its surface curiously as they detached another and larger piece with hammer and chisel. They gouged deeply this time, and as they pried away the smaller mass they saw that the core of the thing was not quite homogeneous.

They had uncovered what seemed to be the side of a large coloured globule imbedded in the substance. The colour, which resembled some of the bands in the meteor's strange spectrum, was almost impossible to describe; and it was only by analogy that they called it colour at all. Its texture was glossy, and upon tapping it appeared to promise both brittleness and hollowness. One of the professors gave it a smart blow with a hammer, and it burst with a nervous little pop. Nothing was emitted, and all trace of the thing vanished with the puncturing. It left behind a hollow spherical space about three inches across, and all thought it probable that others would be discovered as the enclosing substance wasted away.

Conjecture was vain; so after a futile attempt to find additional globules by drilling, the seekers left again with their new specimen—which proved, however, as baffling in the laboratory as its predecessor had been. Aside from being almost plastic, having heat, magnetism, and slight luminosity, cooling slightly in powerful acids, possessing an unknown spectrum, wasting away in air, and attacking silicon compounds with mutual destruction as a result, it presented no identifying features whatsoever; and at the end of the tests the college scientists were forced to own that they could not place it. It was nothing of this earth, but a piece of the great outside; and as such dowered with outside properties and obedient to outside laws.

That night there was a thunderstorm, and when the professors went out to Nahum's the next day they met with a bitter disappointment. The stone, magnetic as it had been, must have had some peculiar electrical property; for it had "drawn the lightning", as Nahum said, with a singular persistence. Six times within an hour the farmer saw the lightning strike the furrow in the front yard, and when the storm was over nothing remained but a ragged pit by the ancient well-sweep, half-choked with caved-in earth. Digging had borne no fruit, and the scientists verified the fact of the utter vanishment. The failure was total; so that nothing was left to do but go back to the laboratory and test again the disappearing fragment left carefully cased in lead. That fragment lasted a week, at the end of which nothing of value had been learned of it. When it had gone, no residue was left behind, and in time the professors felt scarcely sure they had indeed seen with waking eyes that cryptic vestige of the fathomless gulfs outside; that lone, weird message from other universes and other realms of matter, force, and entity.

As was natural, the Arkham papers made much of the incident with its collegiate sponsoring, and sent reporters to talk with Nahum Gardner and his family. At least one Boston daily also sent a scribe, and Nahum quickly became a kind of local celebrity. He was a lean, genial person of about fifty, living with his wife and three sons on the pleasant farmstead in the valley. He and Ammi exchanged visits frequently, as did their wives; and Ammi had nothing but praise for him after all these years. He seemed slightly proud of the notice his place had attracted, and talked often of the meteorite in the succeeding weeks. That July and August were hot, and Nahum worked hard at his haying in the ten-acre pasture across Chapman's Brook; his rattling wain wearing deep ruts in the shadowy lanes between. The labour tired him more than it had in other years, and he felt that age was beginning to tell on him.

Then fell the time of fruit and harvest. The pears and apples slowly ripened, and Nahum vowed that his orchards were prospering as never before. The fruit was growing to phenomenal size and unwonted gloss, and in such abundance that extra barrels were ordered to handle the future crop. But with the ripening came sore disappointment; for of all that gorgeous array of specious lusciousness not one single jot was fit to eat. Into the fine flavour of the pears and apples had crept a stealthy bitterness and sickishness, so that even the smallest of bites induced a

lasting disgust. It was the same with the melons and tomatoes, and Nahum sadly saw that his entire crop was lost. Quick to connect events, he declared that the meteorite had poisoned the soil, and thanked heaven that most of the other crops were in the upland lot along the road.

Winter came early, and was very cold. Ammi saw Nahum less often than usual, and observed that he had begun to look worried. The rest of his family, too, seemed to have grown taciturn; and were far from steady in their churchgoing or their attendance at the various social events of the countryside. For this reserve or melancholy no cause could be found, though all the household confessed now and then to poorer health and a feeling of vague disquiet. Nahum himself gave the most definite statement of anyone when he said he was disturbed about certain footprints in the snow. They were the usual winter prints of red squirrels, white rabbits, and foxes, but the brooding farmer professed to see something not quite right about their nature and arrangement. He was never specific, but appeared to think that they were not as characteristic of the anatomy and habits of squirrels and rabbits and foxes as they ought to be. Ammi listened without interest to this talk until one night when he drove past Nahum's house in his sleigh on the way back from Clark's Corners. There had been a moon, and a rabbit had run across the road, and the leaps of that rabbit were longer than either Ammi or his horse liked. The latter, indeed, had almost run away when brought up by a firm rein. Thereafter Ammi gave Nahum's tales more respect, and wondered why the Gardner dogs seemed so cowed and quivering every morning. They had, it developed, nearly lost the spirit to bark.

In February the McGregor boys from Meadow Hill were out shooting woodchucks, and not far from the Gardner place bagged a very peculiar specimen. The proportions of its body seemed slightly altered in a queer way impossible to describe, while its face had taken on an expression which no one ever saw in a woodchuck before. The boys were genuinely frightened, and threw the thing away at once, so that only their grotesque tales of it ever reached the people of the countryside. But the shying of the horses near Nahum's house had now become an acknowledged thing, and all the basis for a cycle of whispered legend was fast taking form.

People vowed that the snow melted faster around Nahum's than it did anywhere else, and early in March there was an awed discussion in Potter's general store at Clark's Corners. Stephen Rice had driven past Gardner's in the morning, and had noticed the skunk-cabbages coming up through the mud by the woods across the road. Never were things of such size seen before, and they held strange colours that could not be put into any words. Their shapes were monstrous, and the horse had snorted at an odour which struck Stephen as wholly unprecedented. That afternoon several persons drove past to see the abnormal growth, and all agreed that plants of that kind ought never to sprout in a healthy world. The bad fruit of the fall before was freely mentioned, and it went from mouth to mouth that there was poison in Nahum's ground. Of course it was the meteorite; and remembering how strange the men from the college had found that stone to be, several farmers spoke about the matter to them.

One day they paid Nahum a visit; but having no love of wild tales and folklore were very conservative in what they inferred. The plants were certainly odd, but all skunk-cabbages are more or less odd in shape and odour and hue. Perhaps some mineral element from the stone had entered the soil, but it would soon be washed away. And as for the footprints and frightened horses—of course this was mere country talk which such a phenomenon as the aërolite would be certain to start. There was really nothing for serious men to do in cases of wild gossip, for superstitious rustics will say and believe anything. And so all through the strange days the professors stayed away in contempt. Only one of them, when given two phials of dust for analysis in a police job over a year and a half later, recalled that the queer colour of that skunk-cabbage had been very like one of the anomalous bands of light shewn by the meteor fragment in the college spectroscope, and like the brittle globule found imbedded in the stone from the abyss. The samples in this analysis case gave the same odd bands at first, though later they lost the property.

The trees budded prematurely around Nahum's, and at night they swayed ominously in the wind. Nahum's second son Thaddeus, a lad of fifteen, swore that they swayed also when there was no wind; but even the gossips would not credit this. Certainly, however, restlessness was in the air. The entire Gardner family developed the habit of stealthy listening, though not for any sound which they could consciously name. The listening was, indeed, rather a product of moments when consciousness seemed half to slip away. Unfortunately such moments increased week by week, till it became common speech that "something was wrong with all Nahum's folks". When the early saxifrage came out it had another strange colour; not quite like that of the skunk-cabbage, but plainly related and equally unknown to anyone who saw it. Nahum took some blossoms to Arkham and shewed them to the editor of the *Gazette,* but that dignitary did no more than write a humorous article about them, in which the dark fears of rustics were held up to polite ridicule. It was a mistake of Nahum's to tell a stolid city man about the way the great, overgrown mourning-cloak butterflies behaved in connexion with these saxifrages.

April brought a kind of madness to the country folk, and began that disuse of the road past Nahum's which led to its ultimate abandonment. It was the vegetation. All the orchard trees blossomed forth in strange colours, and through the stony soil of the yard and adjacent pasturage there sprang up a bizarre growth which only a botanist could connect with the proper flora of the region. No sane wholesome colours were anywhere to be seen except in

the green grass and leafage; but everywhere those hectic and prismatic variants of some diseased, underlying primary tone without a place among the known tints of earth. The Dutchman's breeches became a thing of sinister menace, and the bloodroots grew insolent in their chromatic perversion. Ammi and the Gardners thought that most of the colours had a sort of haunting familiarity, and decided that they reminded one of the brittle globule in the meteor. Nahum ploughed and sowed the ten-acre pasture and the upland lot, but did nothing with the land around the house. He knew it would be of no use, and hoped that the summer's strange growths would draw all the poison from the soil. He was prepared for almost anything now, and had grown used to the sense of something near him waiting to be heard. The shunning of his house by neighbours told on him, of course; but it told on his wife more. The boys were better off, being at school each day; but they could not help being frightened by the gossip. Thaddeus, an especially sensitive youth, suffered the most.

In May the insects came, and Nahum's place became a nightmare of buzzing and crawling. Most of the creatures seemed not quite usual in their aspects and motions, and their nocturnal habits contradicted all former experience. The Gardners took to watching at night—watching in all directions at random for something . . . they could not tell what. It was then that they all owned that Thaddeus had been right about the trees. Mrs. Gardner was the next to see it from the window as she watched the swollen boughs of a maple against a moonlit sky. The boughs surely moved, and there was no wind. It must be the sap. Strangeness had come into everything growing now. Yet it was none of Nahum's family at all who made the next discovery. Familiarity had dulled them, and what they could not see was glimpsed by a timid windmill salesman from Bolton who drove by one night in ignorance of the country legends. What he told in Arkham was given a short paragraph in the *Gazette;* and it was there that all the farmers, Nahum included, saw it first. The night had been dark and the buggy-lamps faint, but around a farm in the valley which everyone knew from the account must be Nahum's the darkness had been less thick. A dim though distinct luminosity seemed to inhere in all the vegetation, grass, leaves, and blossoms alike, while at one moment a detached piece of the phosphorescence appeared to stir furtively in the yard near the barn.

The grass had so far seemed untouched, and the cows were freely pastured in the lot near the house, but toward the end of May the milk began to be bad. Then Nahum had the cows driven to the uplands, after which the trouble ceased. Not long after this the change in grass and leaves became apparent to the eye. All the verdure was going grey, and was developing a highly singular quality of brittleness. Ammi was now the only person who ever visited the place, and his visits were becoming fewer and fewer. When school closed the Gardners were virtually cut off from the world, and sometimes let Ammi do their errands in town. They were failing curiously both physically and mentally, and no one was surprised when the news of Mrs. Gardner's madness stole around.

It happened in June, about the anniversary of the meteor's fall, and the poor woman screamed about things in the air which she could not describe. In her raving there was not a single specific noun, but only verbs and pronouns. Things moved and changed and fluttered, and ears tingled to impulses which were not wholly sounds. Something was taken away—she was being drained of something—something was fastening itself on her that ought not to be—someone must make it keep off—nothing was ever still in the night—the walls and windows shifted. Nahum did not send her to the county asylum, but let her wander about the house as long as she was harmless to herself and others. Even when her expression changed he did nothing. But when the boys grew afraid of her, and Thaddeus nearly fainted at the way she made faces at him, he decided to keep her locked in the attic. By July she had ceased to speak and crawled on all fours, and before that month was over Nahum got the mad notion that she was slightly luminous in the dark, as he now clearly saw was the case with the nearby vegetation.

It was a little before this that the horses had stampeded. Something had aroused them in the night, and their neighing and kicking in their stalls had been terrible. There seemed virtually nothing to do to calm them, and when Nahum opened the stable door they all bolted out like frightened woodland deer. It took a week to track all four, and when found they were seen to be quite useless and unmanageable. Something had snapped in their brains, and each one had to be shot for its own good. Nahum borrowed a horse from Ammi for his haying, but found it would not approach the barn. It shied, balked, and whinnied, and in the end he could do nothing but drive it into the yard while the men used their own strength to get the heavy wagon near enough the hayloft for convenient pitching. And all the while the vegetation was turning grey and brittle. Even the flowers whose hues had been so strange were greying now, and the fruit was coming out grey and dwarfed and tasteless. The asters and goldenrod bloomed grey and distorted, and the roses and zinneas and hollyhocks in the front yard were such blasphemous-looking things that Nahum's oldest boy Zenas cut them down. The strangely puffed insects died about that time, even the bees that had left their hives and taken to the woods.

By September all the vegetation was fast crumbling to a greyish powder, and Nahum feared that the trees would die before the poison was out of the soil. His wife now had spells of terrific screaming, and he and the boys were in a constant state of nervous tension. They shunned people now, and when school opened the boys did not go. But it was Ammi, on one of his rare visits, who first realised that the well water was no longer good. It had an evil taste that was not exactly foetid nor exactly salty, and Ammi advised his friend to dig another well on higher ground to

use till the soil was good again. Nahum, however, ignored the warning, for he had by that time become calloused to strange and unpleasant things. He and the boys continued to use the tainted supply, drinking it as listlessly and mechanically as they ate their meagre and ill-cooked meals and did their thankless and monotonous chores through the aimless days. There was something of stolid resignation about them all, as if they walked half in another world between lines of nameless guards to a certain and familiar doom.

Thaddeus went mad in September after a visit to the well. He had gone with a pail and had come back empty-handed, shrieking and waving his arms, and sometimes lapsing into an inane titter or a whisper about "the moving colours down there". Two in one family was pretty bad, but Nahum was very brave about it. He let the boy run about for a week until he began stumbling and hurting himself, and then he shut him in an attic room across the hall from his mother's. The way they screamed at each other from behind their locked doors was very terrible, especially to little Merwin, who fancied they talked in some terrible language that was not of earth. Merwin was getting frightfully imaginative, and his restlessness was worse after the shutting away of the brother who had been his greatest playmate.

Almost at the same time the mortality among the livestock commenced. Poultry turned greyish and died very quickly, their meat being found dry and noisome upon cutting. Hogs grew inordinately fat, then suddenly began to undergo loathsome changes which no one could explain. Their meat was of course useless, and Nahum was at his wit's end. No rural veterinary would approach his place, and the city veterinary from Arkham was openly baffled. The swine began growing grey and brittle and falling to pieces before they died, and their eyes and muzzles developed singular alterations. It was very inexplicable, for they had never been fed from the tainted vegetation. Then something struck the cows. Certain areas or sometimes the whole body would be uncannily shrivelled or compressed, and atrocious collapses or disintegrations were common. In the last stages—and death was always the result—there would be a greying and turning brittle like that which beset the hogs. There could be no question of poison, for all the cases occurred in a locked and undisturbed barn. No bites of prowling things could have brought the virus, for what live beast of earth can pass through solid obstacles? It must be only natural disease—yet what disease could wreak such results was beyond any mind's guessing. When the harvest came there was not an animal surviving on the place, for the stock and poultry were dead and the dogs had run away. These dogs, three in number, had all vanished one night and were never heard of again. The five cats had left some time before, but their going was scarcely noticed since there now seemed to be no mice, and only Mrs. Gardner had made pets of the graceful felines.

On the nineteenth of October Nahum staggered into Ammi's house with hideous news. The death had come to poor Thaddeus in his attic room, and it had come in a way which could not be told. Nahum had dug a grave in the railed family plot behind the farm, and had put therein what he found. There could have been nothing from outside, for the small barred window and locked door were intact; but it was much as it had been in the barn. Ammi and his wife consoled the stricken man as best they could, but shuddered as they did so. Stark terror seemed to cling round the Gardners and all they touched, and the very presence of one in the house was a breath from regions unnamed and unnamable. Ammi accompanied Nahum home with the greatest reluctance, and did what he might to calm the hysterical sobbing of little Merwin. Zenas needed no calming. He had come of late to do nothing but stare into space and obey what his father told him; and Ammi thought that his fate was very merciful. Now and then Merwin's screams were answered faintly from the attic, and in response to an inquiring look Nahum said that his wife was getting very feeble. When night approached, Ammi managed to get away; for not even friendship could make him stay in that spot when the faint glow of the vegetation began and the trees may or may not have swayed without wind. It was really lucky for Ammi that he was not more imaginative. Even as things were, his mind was bent ever so slightly; but had he been able to connect and reflect upon all the portents around him he must inevitably have turned a total maniac. In the twilight he hastened home, the screams of the mad woman and the nervous child ringing horribly in his ears.

Three days later Nahum lurched into Ammi's kitchen in the early morning, and in the absence of his host stammered out a desperate tale once more, while Mrs. Pierce listened in a clutching fright. It was little Merwin this time. He was gone. He had gone out late at night with a lantern and pail for water, and had never come back. He'd been going to pieces for days, and hardly knew what he was about. Screamed at everything. There had been a frantic shriek from the yard then, but before the father could get to the door, the boy was gone. There was no glow from the lantern he had taken, and of the child himself no trace. At the time Nahum thought the lantern and pail were gone too; but when dawn came, and the man had plodded back from his all-night search of the woods and fields, he had found some very curious things near the well. There was a crushed and apparently somewhat melted mass of iron which had certainly been the lantern; while a bent bail and twisted iron hoops beside it, both half-fused, seemed to hint at the remnants of the pail. That was all. Nahum was past imagining, Mrs. Pierce was blank, and Ammi, when he had reached home and heard the tale, could give no guess. Merwin was gone, and there would be no use in telling the people around, who shunned all Gardners now. No use, either, in telling the city people at Arkham who laughed at everything. Thad was gone, and now Merwin was gone. Something was creeping and creeping and waiting to be seen and felt and heard. Nahum would go soon, and he wanted Ammi to look after his wife and Zenas if they sur-

vived him. It must all be a judgment of some sort; though he could not fancy what for, since he had always walked uprightly in the Lord's ways so far as he knew.

For over two weeks Ammi saw nothing of Nahum; and then, worried about what might have happened, he overcame his fears and paid the Gardner place a visit. There was no smoke from the great chimney, and for a moment the visitor was apprehensive of the worst. The aspect of the whole farm was shocking—greyish withered grass and leaves on the ground, vines falling in brittle wreckage from archaic walls and gables, and great bare trees clawing up at the grey November sky with a studied malevolence which Ammi could not but feel had come from some subtle change in the tilt of the branches. But Nahum was alive, after all. He was weak, and lying on a couch in the low-ceiled kitchen, but perfectly conscious and able to give simple orders to Zenas. The room was deadly cold; and as Ammi visibly shivered, the host shouted huskily to Zenas for more wood. Wood, indeed, was sorely needed; since the cavernous fireplace was unlit and empty, with a cloud of soot blowing about in the chill wind that came down the chimney. Presently Nahum asked him if the extra wood had made him any more comfortable, and then Ammi saw what had happened. The stoutest cord had broken at last, and the hapless farmer's mind was proof against more sorrow.

Questioning tactfully, Ammi could get no clear data at all about the missing Zenas. "In the well—he lives in the well—" was all that the clouded father would say. Then there flashed across the visitor's mind a sudden thought of the mad wife, and he changed his line of inquiry. "Nabby? Why, here she is!" was the surprised response of poor Nahum, and Ammi soon saw that he must search for himself. Leaving the harmless babbler on the couch, he took the keys from their nail beside the door and climbed the creaking stairs to the attic. It was very close and noisome up there, and no sound could be heard from any direction. Of the four doors in sight, only one was locked, and on this he tried various keys on the ring he had taken. The third key proved the right one, and after some fumbling Ammi threw open the low white door.

It was quite dark inside, for the window was small and half-obscured by the crude wooden bars; and Ammi could see nothing at all on the wide-planked floor. The stench was beyond enduring, and before proceeding further he had to retreat to another room and return with his lungs filled with breathable air. When he did enter he saw something dark in the corner, and upon seeing it more clearly he screamed outright. While he screamed he thought a momentary cloud eclipsed the window, and a second later he felt himself brushed as if by some hateful current of vapour. Strange colours danced before his eyes; and had not a present horror numbed him he would have thought of the globule in the meteor that the geologist's hammer had shattered, and of the morbid vegetation that had sprouted in the spring. As it was he thought only of the blasphemous monstrosity which confronted him, and which all too clearly had shared the nameless fate of young Thaddeus and the livestock. But the terrible thing about this horror was that it very slowly and perceptibly moved as it continued to crumble.

Ammi would give me no added particulars to this scene, but the shape in the corner does not reappear in his tale as a moving object. There are things which cannot be mentioned, and what is done in common humanity is sometimes cruelly judged by the law. I gathered that no moving thing was left in that attic room, and that to leave anything capable of motion there would have been a deed so monstrous as to damn any accountable being to eternal torment. Anyone but a stolid farmer would have fainted or gone mad, but Ammi walked conscious through that low doorway and locked the accursed secret behind him. There would be Nahum to deal with now; he must be fed and tended, and removed to some place where he could be cared for.

Commencing his descent of the dark stairs, Ammi heard a thud below him. He even thought a scream had been suddenly choked off, and recalled nervously the clammy vapour which had brushed by him in that frightful room above. What presence had his cry and entry started up? Halted by some vague fear, he heard still further sounds below. Indubitably there was a sort of heavy dragging, and a most detestably sticky noise as of some fiendish and unclean species of suction. With an associative sense goaded to feverish heights, he thought unaccountably of what he had seen upstairs. Good God! What eldritch dream-world was this into which he had blundered? He dared move neither backward nor forward, but stood there trembling at the black curve of the boxed-in staircase. Every trifle of the scene burned itself into his brain. The sounds, the sense of dread expectancy, the darkness, the steepness of the narrow steps—and merciful heaven! . . . the faint but unmistakable luminosity of all the woodwork in sight; steps, sides, exposed laths, and beams alike!

Then there burst forth a frantic whinny from Ammi's horse outside, followed at once by a clatter which told of a frenzied runaway. In another moment horse and buggy had gone beyond earshot, leaving the frightened man on the dark stairs to guess what had sent them. But that was not all. There had been another sound out there. A sort of liquid splash—water—it must have been the well. He had left Hero untied near it, and a buggy-wheel must have brushed the coping and knocked in a stone. And still the pale phosphorescence glowed in that detestably ancient woodwork. God! how old the house was! Most of it built before 1670, and the gambrel roof not later than 1730.

A feeble scratching on the floor downstairs now sounded distinctly, and Ammi's grip tightened on a heavy

stick he had picked up in the attic for some purpose. Slowly nerving himself, he finished his descent and walked boldly toward the kitchen. But he did not complete the walk, because what he sought was no longer there. It had come to meet him, and it was still alive after a fashion. Whether it had crawled or whether it had been dragged by any external force, Ammi could not say; but the death had been at it. Everything had happened in the last half-hour, but collapse, greying, and disintegration were already far advanced. There was a horrible brittleness, and dry fragments were scaling off. Ammi could not touch it, but looked horrifiedly into the distorted parody that had been a face. "What was it, Nahum—what was it?" he whispered, and the cleft, bulging lips were just able to crackle out a final answer.

"Nothin' . . . nothin' . . . the colour . . . it burns . . . cold an' wet . . . but it burns . . . it lived in the well . . . I seen it . . . a kind o' smoke . . . jest like the flowers last spring . . . the well shone at night . . . Thad an' Mernie an' Zenas . . . everything alive . . . suckin' the life out of everything . . . in that stone . . . it must a' come in that stone . . . pizened the whole place . . . dun't know what it wants . . . that round thing them men from the college dug outen the stone . . . they smashed it . . . it was that same colour . . . jest the same, like the flowers an' plants . . . must a' ben more of 'em . . . seeds . . . seeds . . . they growed . . . I seen it the fust time this week . . . must a' got strong on Zenas . . . he was a big boy, full o' life . . . it beats down your mind an' then gits ye . . . burns ye up . . . in the well water . . . you was right about that . . . evil water . . . Zenas never come back from the well . . . can't git away . . . draws ye . . . ye know summ'at's comin', but 'tain't no use . . . I seen it time an' agin senct Zenas was took . . . whar's Nabby, Ammi? . . . my head's no good . . . dun't know how long senct I fed her . . . it'll git her ef we ain't keerful . . . jest a colour . . . her face is gettin' to hev that colour sometimes towards night . . . an' it burns an' sucks . . . it come from some place whar things ain't as they is here . . . one o' them professors said so . . . he was right . . . look out, Ammi, it'll do suthin' more . . . sucks the life out. . . ."

But that was all. That which spoke could speak no more because it had completely caved in. Ammi laid a red checked tablecloth over what was left and reeled out the back door into the fields. He climbed the slope to the ten-acre pasture and stumbled home by the north road and the woods. He could not pass that well from which his horse had run away. He had looked at it through the window, and had seen that no stone was missing from the rim. Then the lurching buggy had not dislodged anything after all—the splash had been something else—something which went into the well after it had done with poor Nahum. . . .

When Ammi reached his house the horse and buggy had arrived before him and thrown his wife into fits of anxiety. Reassuring her without explanations, he set out at once for Arkham and notified the authorities that the Gardner family was no more. He indulged in no details, but merely told of the deaths of Nahum and Nabby, that of Thaddeus being already known, and mentioned that the cause seemed to be the same strange ailment which had killed the livestock. He also stated that Merwin and Zenas had disappeared. There was considerable questioning at the police station, and in the end Ammi was compelled to take three officers to the Gardner farm, together with the coroner, the medical examiner, and the veterinary who had treated the diseased animals. He went much against his will, for the afternoon was advancing and he feared the fall of night over that accursed place, but it was some comfort to have so many people with him.

The six men drove out in a democrat-wagon, following Ammi's buggy, and arrived at the pest-ridden farmhouse about four o'clock. Used as the officers were to gruesome experiences, not one remained unmoved at what was found in the attic and under the red checked tablecloth on the floor below. The whole aspect of the farm with its grey desolation was terrible enough, but those two crumbling objects were beyond all bounds. No one could look long at them, and even the medical examiner admitted that there was very little to examine. Specimens could be analysed, of course, so he busied himself in obtaining them—and here it develops that a very puzzling aftermath occurred at the college laboratory where the two phials of dust were finally taken. Under the spectroscope both samples gave off an unknown spectrum, in which many of the baffling bands were precisely like those which the strange meteor had yielded in the previous year. The property of emitting this spectrum vanished in a month, the dust thereafter consisting mainly of alkaline phosphates and carbonates.

Ammi would not have told the men about the well if he had thought they meant to do anything then and there. It was getting toward sunset, and he was anxious to be away. But he could not help glancing nervously at the stony curb by the great sweep, and when a detective questioned him he admitted that Nahum had feared something down there—so much so that he had never even thought of searching it for Merwin or Zenas. After that nothing would do but that they empty and explore the well immediately, so Ammi had to wait trembling while pail after pail of rank water was hauled up and splashed on the soaking ground outside. The men sniffed in disgust at the fluid, and toward the last held their noses against the foetor they were uncovering. It was not so long a job as they had feared it would be, since the water was phenomenally low. There is no need to speak too exactly of what they found. Merwin and Zenas were both there, in part, though the vestiges were mainly skeletal. There were also a small deer and a large dog in about the same state, and a number of bones of smaller animals. The ooze and slime at the bottom seemed inexplicably porous and bubbling, and a man who descended on hand-holds with a long pole found that he could sink the

wooden shaft to any depth in the mud of the floor without meeting any solid obstruction.

Twilight had now fallen, and lanterns were brought from the house. Then, when it was seen that nothing further could be gained from the well, everyone went indoors and conferred in the ancient sitting-room while the intermittent light of a spectral half-moon played wanly on the grey desolation outside. The men were frankly nonplussed by the entire case, and could find no convincing common element to link the strange vegetable conditions, the unknown disease of livestock and humans, and the unaccountable deaths of Merwin and Zenas in the tainted well. They had heard the common country talk, it is true; but could not believe that anything contrary to natural law had occurred. No doubt the meteor had poisoned the soil, but the illness of persons and animals who had eaten nothing grown in that soil was another matter. Was it the well water? Very possibly. It might be a good idea to analyse it. But what peculiar madness could have made both boys jump into the well? Their deeds were so similar—and the fragments shewed that they had both suffered from the grey brittle death. Why was everything so grey and brittle?

It was the coroner, seated near a window overlooking the yard, who first noticed the glow about the well. Night had fully set in, and all the abhorrent grounds seemed faintly luminous with more than the fitful moonbeams; but this new glow was something definite and distinct, and appeared to shoot up from the black pit like a softened ray from a searchlight, giving dull reflections in the little ground pools where the water had been emptied. It had a very queer colour, and as all the men clustered round the window Ammi gave a violent start. For this strange beam of ghastly miasma was to him of no unfamiliar hue. He had seen that colour before, and feared to think what it might mean. He had seen it in the nasty brittle globule in that aërolite two summers ago, had seen it in the crazy vegetation of the springtime, and had thought he had seen it for an instant that very morning against the small barred window of that terrible attic room where nameless things had happened. It had flashed there a second, and a clammy and hateful current of vapour had brushed past him—and then poor Nahum had been taken by something of that colour. He had said so at the last—said it was the globule and the plants. After that had come the runaway in the yard and the splash in the well—and now that well was belching forth to the night a pale insidious beam of the same daemoniac tint.

It does credit to the alertness of Ammi's mind that he puzzled even at that tense moment over a point which was essentially scientific. He could not but wonder at his gleaning of the same impression from a vapour glimpsed in the daytime, against a window opening on the morning sky, and from a nocturnal exhalation seen as a phosphorescent mist against the black and blasted landscape. It wasn't right—it was against Nature—and he thought of those terrible last words of his stricken friend, "It come from some place whar things ain't as they is here . . . one o' them professors said so. . . ."

All three horses outside, tied to a pair of shrivelled saplings by the road, were now neighing and pawing frantically. The wagon driver started for the door to do something, but Ammi laid a shaky hand on his shoulder. "Dun't go out thar," he whispered. "They's more to this nor what we know. Nahum said somethin' lived in the well that sucks your life out. He said it must be some'at growed from a round ball like one we all seen in the meteor stone that fell a year ago June. Sucks an' burns, he said, an' is jest a cloud of colour like that light out thar now, that ye can hardly see an' can't tell what it is. Nahum thought it feeds on everything livin' an' gits stronger all the time. He said he seen it this last week. It must be somethin' from away off in the sky like the men from the college last year says the meteor stone was. The way it's made an' the way it works ain't like no way o' God's world. It's some'at from beyond."

So the men paused indecisively as the light from the well grew stronger and the hitched horses pawed and whinnied in increasing frenzy. It was truly an awful moment; with terror in that ancient and accursed house itself, four monstrous sets of fragments—two from the house and two from the well—in the woodshed behind, and that shaft of unknown and unholy iridescence from the slimy depths in front. Ammi had restrained the driver on impulse, forgetting how uninjured he himself was after the clammy brushing of that coloured vapour in the attic room, but perhaps it is just as well that he acted as he did. No one will ever know what was abroad that night; and though the blasphemy from beyond had not so far hurt any human of unweakened mind, there is no telling what it might not have done at that last moment, and with its seemingly increased strength and the special signs of purpose it was soon to display beneath the half-clouded moonlit sky.

All at once one of the detectives at the window gave a short, sharp gasp. The others looked at him, and then quickly followed his own gaze upward to the point at which its idle straying had been suddenly arrested. There was no need for words. What had been disputed in country gossip was disputable no longer, and it is because of the thing which every man of that party agreed in whispering later on that the strange days are never talked about in Arkham. It is necessary to premise that there was no wind at that hour of the evening. One did arise not long afterward, but there was absolutely none then. Even the dry tips of the lingering hedge-mustard, grey and blighted, and the fringe on the roof of the standing democrat-wagon were unstirred. And yet amid that tense, godless calm the high bare boughs of all the trees in the yard were moving. They were twitching morbidly and spasmodically, clawing in convulsive and epileptic madness at the moonlit clouds; scratching impotently in the noxious air as if jerked by some alien and bodiless line of linkage with subterrene horrors writhing and struggling below the black roots.

Not a man breathed for several seconds. Then a cloud of darker depth passed over the moon, and the silhouette of clutching branches faded out momentarily. At this there was a general cry; muffled with awe, but husky and almost identical from every throat. For the terror had not faded with the silhouette, and in a fearsome instant of deeper darkness the watchers saw wriggling at that treetop height a thousand tiny points of faint and unhallowed radiance, tipping each bough like the fire of St. Elmo or the flames that came down on the apostles' heads at Pentecost. It was a monstrous constellation of unnatural light, like a glutted swarm of corpse-fed fireflies dancing hellish sarabands over an accursed marsh; and its colour was that same nameless intrusion which Ammi had come to recognise and dread. All the while the shaft of phosphorescence from the well was getting brighter and brighter, bringing to the minds of the huddled men a sense of doom and abnormality which far outraced any image their conscious minds could form. It was no longer *shining*out, it was *pouring* out; and as the shapeless stream of unplaceable colour left the well it seemed to flow directly into the sky.

The veterinary shivered, and walked to the front door to drop the heavy extra bar across it. Ammi shook no less, and had to tug and point for lack of a controllable voice when he wished to draw notice to the growing luminosity of the trees. The neighing and stamping of the horses had become utterly frightful, but not a soul of that group in the old house would have ventured forth for any earthly reward. With the moments the shining of the trees increased, while their restless branches seemed to strain more and more toward verticality. The wood of the well-sweep was shining now, and presently a policeman dumbly pointed to some wooden sheds and bee-hives near the stone wall on the west. They were commencing to shine, too, though the tethered vehicles of the visitors seemed so far unaffected. Then there was a wild commotion and clopping in the road, and as Ammi quenched the lamp for better seeing they realised that the span of frantic greys had broke their sapling and run off with the democrat-wagon.

The shock served to loosen several tongues, and embarrassed whispers were exchanged. "It spreads on everything organic that's been around here," muttered the medical examiner. No one replied, but the man who had been in the well gave a hint that his long pole must have stirred up something intangible. "It was awful," he added. "There was no bottom at all. Just ooze and bubbles and the feeling of something lurking under there." Ammi's horse still pawed and screamed deafeningly in the road outside, and nearly drowned its owner's faint quaver as he mumbled his formless reflections. "It come from that stone . . . it growed down thar . . . it got everything livin' . . . it fed itself on 'em, mind and body . . . Thad an' Mernie, Zenas an' Nabby . . . Nahum was the last . . . they all drunk the water . . . it got strong on 'em . . . it come from beyond, whar things ain't like they be here . . . now it's goin' home. . . ."

At this point, as the column of unknown colour flared suddenly stronger and began to weave itself into fantastic suggestions of shape which each spectator later described differently, there came from poor tethered Hero such a sound as no man before or since ever heard from a horse. Every person in that low-pitched sitting room stopped his ears, and Ammi turned away from the window in horror and nausea. Words could not convey it—when Ammi looked out again the hapless beast lay huddled inert on the moonlit ground between the splintered shafts of the buggy. That was the last of Hero till they buried him next day. But the present was no time to mourn, for almost at this instant a detective silently called attention to something terrible in the very room with them. In the absence of the lamplight it was clear that a faint phosphorescence had begun to pervade the entire apartment. It glowed on the broad-planked floor and the fragment of rag carpet, and shimmered over the sashes of the small-paned windows. It ran up and down the exposed corner-posts, coruscated about the shelf and mantel, and infected the very doors and furniture. Each minute saw it strengthen, and at last it was very plain that healthy living things must leave that house.

Ammi shewed them the back door and the path up through the fields to the ten-acre pasture. They walked and stumbled as in a dream, and did not dare look back till they were far away on the high ground. They were glad of the path, for they could not have gone the front way, by that well. It was bad enough passing the glowing barn and sheds, and those shining orchard trees with their gnarled, fiendish contours; but thank heaven the branches did their worst twisting high up. The moon went under some very black clouds as they crossed the rustic bridge over Chapman's Brook, and it was blind groping from there to the open meadows.

When they looked back toward the valley and the distant Gardner place at the bottom they saw a fearsome sight. All the farm was shining with the hideous unknown blend of colour; trees, buildings, and even such grass and herbage as had not been wholly changed to lethal grey brittleness. The boughs were all straining skyward, tipped with tongues of foul flame, and lambent tricklings of the same monstrous fire were creeping about the ridgepoles of the house, barn, and sheds. It was a scene from a vision of Fuseli, and over all the rest reigned that riot of luminous amorphousness, that alien and undimensioned rainbow of cryptic poison from the well—seething, feeling, lapping, reaching, scintillating, straining, and malignly bubbling in its cosmic and unrecognisable chromaticism.

Then without warning the hideous thing shot vertically up toward the sky like a rocket or meteor, leaving behind no trail and disappearing through a round and curiously regular hole in the clouds before any man could gasp or cry out. No watcher can ever forget that sight, and Ammi stared blankly at the stars of Cygnus, Deneb twinkling above the others, where the unknown colour had melted into the Milky Way. But his gaze was the next moment called swiftly to earth by the crackling in the valley. It was just that. Only a wooden ripping and crackling, and not an

explosion, as so many others of the party vowed. Yet the outcome was the same, for in one feverish, kaleidoscopic instant there burst up from that doomed and accursed farm a gleamingly eruptive cataclysm of unnatural sparks and substance; blurring the glance of the few who saw it, and sending forth to the zenith a bombarding cloudburst of such coloured and fantastic fragments as our universe must needs disown. Through quickly re-closing vapours they followed the great morbidity that had vanished, and in another second they had vanished too. Behind and below was only a darkness to which the men dared not return, and all about was a mounting wind which seemed to sweep down in black, frore gusts from interstellar space. It shrieked and howled, and lashed the fields and distorted woods in a mad cosmic frenzy, till soon the trembling party realised it would be no use waiting for the moon to shew what was left down there at Nahum's.

Too awed even to hint theories, the seven shaking men trudged back toward Arkham by the north road. Ammi was worse than his fellows, and begged them to see him inside his own kitchen, instead of keeping straight on to town. He did not wish to cross the nighted, wind-whipped woods alone to his home on the main road. For he had had an added shock that the others were spared, and was crushed forever with a brooding fear he dared not even mention for many years to come. As the rest of the watchers on that tempestuous hill had stolidly set their faces toward the road, Ammi had looked back an instant at the shadowed valley of desolation so lately sheltering his ill-starred friend. And from that stricken, far-away spot he had seen something feebly rise, only to sink down again upon the place from which the great shapeless horror had shot into the sky. It was just a colour—but not any colour of our earth or heavens. And because Ammi recognised that colour, and knew that this last faint remnant must still lurk down there in the well, he has never been quite right since.

Ammi would never go near the place again. It is over half a century now since the horror happened, but he has never been there, and will be glad when the new reservoir blots it out. I shall be glad, too, for I do not like the way the sunlight changed colour around the mouth of that abandoned well I passed. I hope the water will always be very deep—but even so, I shall never drink it. I do not think I shall visit the Arkham country hereafter. Three of the men who had been with Ammi returned the next morning to see the ruins by daylight, but there were not any real ruins. Only the bricks of the chimney, the stones of the cellar, some mineral and metallic litter here and there, and the rim of that nefandous well. Save for Ammi's dead horse, which they towed away and buried, and the buggy which they shortly returned to him, everything that had ever been living had gone. Five eldritch acres of dusty grey desert remained, nor has anything ever grown there since. To this day it sprawls open to the sky like a great spot eaten by acid in the woods and fields, and the few who have ever dared glimpse it in spite of the rural tales have named it "the blasted heath".

The rural tales are queer. They might be even queerer if city men and college chemists could be interested enough to analyse the water from that disused well, or the grey dust that no wind seems ever to disperse. Botanists, too, ought to study the stunted flora on the borders of that spot, for they might shed light on the country notion that the blight is spreading—little by little, perhaps an inch a year. People say the colour of the neighbouring herbage is not quite right in the spring, and that wild things leave queer prints in the light winter snow. Snow never seems quite so heavy on the blasted heath as it is elsewhere. Horses—the few that are left in this motor age—grow skittish in the silent valley; and hunters cannot depend on their dogs too near the splotch of greyish dust.

They say the mental influences are very bad, too. Numbers went queer in the years after Nahum's taking, and always they lacked the power to get away. Then the stronger-minded folk all left the region, and only the foreigners tried to live in the crumbling old homesteads. They could not stay, though; and one sometimes wonders what insight beyond ours their wild, weird stores of whispered magic have given them. Their dreams at night, they protest, are very horrible in that grotesque country; and surely the very look of the dark realm is enough to stir a morbid fancy. No traveller has ever escaped a sense of strangeness in those deep ravines, and artists shiver as they paint thick woods whose mystery is as much of the spirit as of the eye. I myself am curious about the sensation I derived from my one lone walk before Ammi told me his tale. When twilight came I had vaguely wished some clouds would gather, for an odd timidity about the deep skyey voids above had crept into my soul.

Do not ask me for my opinion. I do not know—that is all. There was no one but Ammi to question; for Arkham people will not talk about the strange days, and all three professors who saw the aërolite and its coloured globule are dead. There were other globules—depend upon that. One must have fed itself and escaped, and probably there was another which was too late. No doubt it is still down the well—I know there was something wrong with the sunlight I saw above that miasmal brink. The rustics say the blight creeps an inch a year, so perhaps there is a kind of growth or nourishment even now. But whatever daemon hatchling is there, it must be tethered to something or else it would quickly spread. Is it fastened to the roots of those trees that claw the air? One of the current Arkham tales is about fat oaks that shine and move as they ought not to do at night.

What it is, only God knows. In terms of matter I suppose the thing Ammi described would be called a gas, but this gas obeyed laws that are not of our cosmos. This was no fruit of such worlds and suns as shine on the tele-

scopes and photographic plates of our observatories. This was no breath from the skies whose motions and dimensions our astronomers measure or deem too vast to measure. It was just a colour out of space—a frightful messenger from unformed realms of infinity beyond all Nature as we know it; from realms whose mere existence stuns the brain and numbs us with the black extra-cosmic gulfs it throws open before our frenzied eyes.

I doubt very much if Ammi consciously lied to me, and I do not think his tale was all a freak of madness as the townfolk had forewarned. Something terrible came to the hills and valleys on that meteor, and something terrible—though I know not in what proportion—still remains. I shall be glad to see the water come. Meanwhile I hope nothing will happen to Ammi. He saw so much of the thing—and its influence was so insidious. Why has he never been able to move away? How clearly he recalled those dying words of Nahum's—"can't git away . . . draws ye . . . ye know summ'at's comin', but 'tain't no use. . . ." Ammi is such a good old man—when the reservoir gang gets to work I must write the chief engineer to keep a sharp watch on him. I would hate to think of him as the grey, twisted, brittle monstrosity which persists more and more in troubling my sleep.

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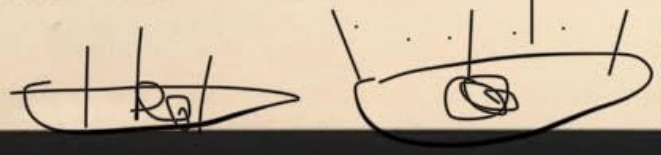
artificially ... trarily housed together in this or that hemisphere: they form, in the case of either hemisphere, aspects of two whole ways of being in the world.

Certainty is also related to narrowness, as though the more certain we become of something the less we see. To put this in the context of the neurophysiology of vision: the fovea of the human eye, a tiny region in the retina at the centre of gaze, is the most pronounced of that of all primates. Here resolution is about 100 times that at the periphery.[451] But it is only about 1° across. The part of the visual field that is actually brought into resolution is no more than about 3° across. This is where the narrow focussed beam of left-hemisphere attention is concentrated: what is *clearly* seen.



that has influenced me a lot, Renu Bora uses James's intense fecal interest as his point of departure for a remarkably productive discussion of the whole issue of texture. He develops the observation that to perceive texture is always, immediately, and de facto to be immersed in a field of active narrative hypothesizing, testing, and re-understanding of how physical properties act and are acted upon over time. To perceive texture is never only to ask or know What is it like? nor even just How does it impinge on me? Textural perception always explores two other questions as well: How did it get that way? and What could I do with it? These are the kind of intrinsically interactive properties that James J. Gibson called "affordances" in his 1966 book, The Senses Considered as Perceptual Systems, and, like Tomkins's work on affect, this approach to perception owes a great deal to the postwar moment of cybernetics and systems theory.

As Bora's essay shows, I haven't perceived a texture until I've instantaneously hypothesized whether the object I'm perceiving was sedimented, extruded, laminated, granulated, polished, distressed, felted, or fluffed up. Similarly, to perceive texture is to know or hypothesize whether a thing will be easy or hard, safe

or dangerous to grasp, to stack, to fold, to shred, to climb on, to stretch, to slide, to soak. Even more immediately than other perceptual systems, it seems, the sense of touch makes nonsense out of any dualistic understanding of agency and passivity; to touch is always already to reach out, to fondle, to heft, to tap, or to enfold, and always also to understand other people or natural forces as having effectually done so before oneself, if only in the making of the textured object.

Walter Benjamin characterized one way of exploiting the reversible properties of textural objects and subjects when he wrote, "Even if a bourgeois is unable to give his earthly being permanence, it seems to be a matter of honour with him to preserve the traces of his articles and requisites of daily use in perpetuity. The bourgeoisie cheerfully takes the impression of a host of objects. For slippers and pocket watches, thermometers and egg cups, cutlery and umbrellas it tries to get covers and cases. It prefers velvet and plush covers which preserve the impression of every touch. For the . . . style of the end of the second empire, a dwelling becomes a kind of casing" (46). "This style views [the dwelling] as a kind of case for a person and embeds him in it together with all his

appurtenances, tending his traces as nature tends dead fauna embedded in granite. One should not fail to recognize that there are two sides to this process. The real or sentimental value of the objects thus preserved is emphasized. They are removed from the profane eyes of non-owners, and in particular their outlines are blurred in a characteristic way. It is not strange that resistance to controls, something that becomes second nature to asocial persons, returns in the propertied bourgeoisie" (46-47).

Going from Victorian plush to postmodern shine, Bora notes that "smoothness is both a type of texture and texture's other" (99). His essay makes a very useful distinction between two kinds, or senses, of texture, which he labels "texture" with one x and "texxture" with two x's. Texxture is the kind of texture that is dense with offered information about how, substantively, historically, materially, it came into being. A brick or a metal-work pot that still bears the scars and uneven sheen of its making would exemplify texxture in this sense. But there is also the texture—one x this time—that defiantly or even invisibly blocks or refuses such information; there is texture, usually glossy if not positively tacky, that insists instead on the polarity between substance and surface, texture that

signifies the willed erasure of its history. One consequence of Bora's treatment of the concept: however high the gloss, there is no such thing as textural lack.

Bora performs a bravura analysis of the textural history of the concept of fetishism, including both psychoanalytic and commodity fetishism, that seems to make the displacements of fetishism move, as if at the speed of light, along the displacements of the manufactured or overhighlighted surface. But the narrative-performative density of the other kind of texxture—its ineffaceable historicity—also becomes susceptible to a kind of fetish-value. An example of the latter might occur where the question is one of exoticism, of the palpable and highly acquirable textural record of the cheap, precious work of many foreign hands in the light of many damaged foreign eyes.

Bora's essay also emphasizes that although texture seems to have some kind of definitional grounding with reference to the sense of touch, texture itself is not coextensive with any single sense, but rather tends to be liminally registered "on the border of properties of touch and vision" (101). Indeed, other senses beyond the visual and haptic are involved in the

perception of texture, as when we hear the brush-brush of corduroy trousers or the crunch of extra-crispy chicken.

If texture involves more than one sense, it is also true that the different properties, and radically divergent modern histories, of different perceptual systems are liable to torque and splay the history of texture as well. The sense of physical touch itself, at least so far, has been remarkably unsusceptible to being amplified by technology. Women who do breast self-examination are occasionally taught to use a film of liquid soap, a square of satiny cloth, or even a pad of thin plastic filled with a layer of water to make the contours of the breast more salient to their fingers. But this minimal sensory enhancement is merely additive compared to the literally exponential enhancements of visual stimulus since Leeuwenhoek and Newton. The narrator of Middlemarch, one of the definitive novels of texture, can zoom in a mere two sentences from telescope to microscope (Eliot 83). Once such visual ranges become commonplace the authority of the fingers will never be the same—though their very resistance to amplification may mean that they represent one kind of perceptual gold standard. Indeed, the increasingly divergent physical scales (and

the highly differential rates of their change) that characterize the relation between touch and vision in the modern period result in understandings of texture that make it as apt to represent crises and fissures of meaning as metonymic continuities.

Thus, the need to discuss texture across senses brings with it a need to think about texture across different scales. Technologies of travel, for example, as well as of vision emphasize that, although texture has everything to do with scale, there is no one physical scale that intrinsically is the scale of texture. As your plane circles over an airport, texture is what a whole acre of trees can provide. But when you're chopping wood, a single tree may constitute shape or structure within your visual field, whereas texture pertains to the level of the cross-grained fibers of the wood in relation to the sleek bite of the axe.

Furthermore, whatever the scale, one bump on a surface, or even three, won't constitute texture. A repeated pattern like polka dots might, but it depends on how big they are or how close you are: from across the room you might see them as a flat sheet of gray; at a few feet, the dots make a visible texture; through a magnifying glass you'll see an underlying texture of paper or fabric unrelated to the two or three rounded

shapes that make a big design. Texture, in short, comprises an array of perceptual data that includes repetition, but whose degree of organization hovers just below the level of shape or structure.

In a challenge to Benjamin's identification of textural salience with bourgeois privacy, William Morris makes a utopian use of these textural properties in his speculative novel News from Nowhere, where political equality, communitarian ethics, productive aesthetic pleasure, and psychological equanimity extend unbroken from one to another surface of congruent scale; and the characteristic Morris pattern of equidistant, unforegrounded, unbroken, and perspectiveless ornamentation drawn "from nature" spreads from landscape to architecture to interior design to male and female raiment to the body itself and back again. With their liberatory, elastic aesthetic of texture these characters express "intense and overweening love of the very skin and surface of the earth on which man dwells, such as a lover has in the fair flesh of the woman he loves" (158); conversely, their clothing is ornamented out of "liking to see the coverings of our bodies beautiful like our bodies are—just as a deer's or an otter's skin has been made beautiful from the first"

And there is evidence that insects and plants "hear" each other's sounds. Bees buzz at just the right frequency to release pollen from tomatoes and other flowering plants. And bark beetles may pick up the air bubble inside a plant, a hint that trees are experiencing drought stress.

Australia in Crawley.

"Sound is overwhelming, it's everywhere. Surely life would have used it to its advantage in all forms," she told OurAmazingPlanet.

Gagliano and her colleagues recently showed corn seedling's roots lean toward a 220-Hertz purr, and the roots emit clicks of a similar tune. Chili seedlings quicken their growth when a nasty sweet fennel plant is nearby, sealed off from the chilies in a box that only transmits sound, not scent, another study from the group revealed. The fennel releases chemicals that slow other plants' growth, so the researchers think the chili plants grow faster in anticipation of the chemicals — but only because they hear the plant, not because they smell it. Both the fennel and chilies were also in a sound-isolated box.

"We have identified that plants respond to sound and they make their own sounds," Gagliano said. "The obvious purpose of sound might be for communicating with others."

Monica Gagliano, plant acoustics researcher.

Credit: University of Western Australia

Gagliano imagines that root-to-root alerts could transform a forest into an organic switchboard. "Considering that entire forests are all interconnected by networks of fungi, maybe plants are using fungi the way we use the Internet and sending acoustic signals through this Web. From here, who knows," she said.

As with other life, if plants do send messages with sound, it is one of many communication tools. More work is needed to

but there are many ways that listening to plan

When the bubble bursts

Scientists first recognized in the 1960s that list

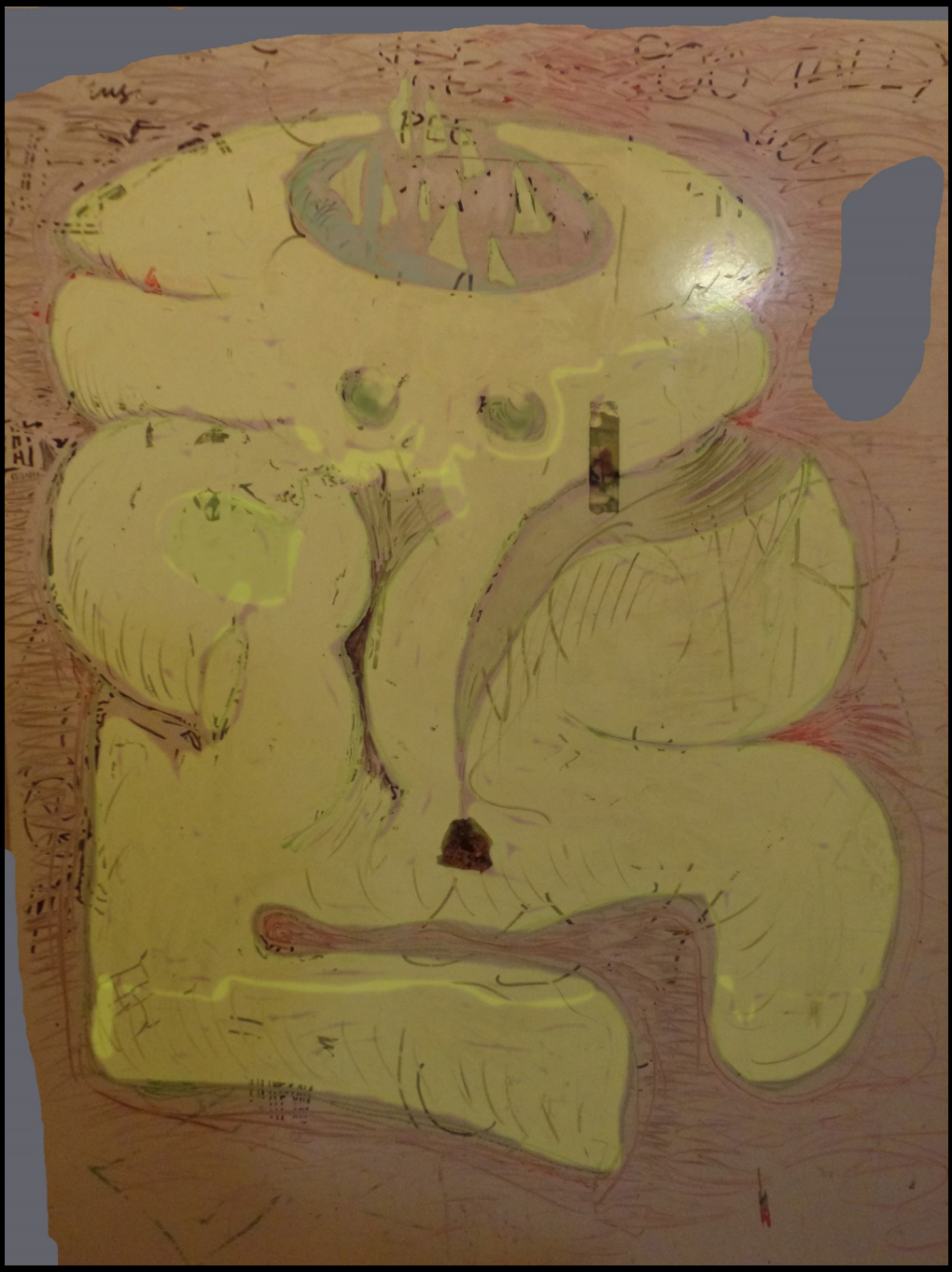
Plants may use language to communicate with each other, Virginia Tech researcher finds

August 15, 2014

be pleasant to us but to plants signals danger on the way. Heil has found that when wild-growing lima beans are exposed to volatiles from other lima bean plants being eaten by beetles, they grow faster and resist attack. Compounds released from damaged plants prime the defenses of corn seedlings, so that they later mount a more effective counterattack against beet armyworms. These signals seem to be a universal language: sagebrush induces responses in tobacco; chili peppers and lima beans respond to cucumber emissions, too.

Plants can communicate with insects as well, sending airborne messages that act as distress signals to predatory insects that kill herbivores. Maize attacked by beet armyworms releases a cloud of volatile chemicals that attracts wasps to lay eggs in the caterpillars' bodies. The emerging picture is that plant-eating bugs, and the insects that feed on them, live in a world we can barely imagine, perfumed by clouds of chemicals rich in information. Ants, microbes, moths, even hummingbirds and tortoises (Farmer checked) all detect and react to these blasts.

Eavesdropping Plants



The engineer, paying attention to his headphones, interrupted all at once. "An answer's coming." He began rapidly to scribble; the others collected around him to see.

HERBERT SOUSA OF SACRAMENTO, CALIFORNIA, IS THE DEVIL. SINCE HE IS THE INCARNATION OF SATAN ON EARTH, PROVIDENCE DEMANDS HIS DESTRUCTION. I AM ONLY AN AGENCY, A SO TO SPEAK CREATURE, OF THE DIVINE MAJESTY, AS ARE ALL OF YOU.

There was a pause as the engineer waited, clenching the ballpoint metal government-issue pen, and then he spasmodically added:

UNLESS YOU ARE ALREADY IN HIS PAY AND THEREFORE WORKING FOR HIM.

Convulsively, the engineer tossed the pen against the far wall. It bounced, rolled off, disappeared. No one spoke.

V

The engineer said finally, "We have here a sick, deranged piece of electronic junk. We were right. Thank God we caught it in time. It's psychotic. Cosmic, schizophrenic delusions of the reality of archetypes. Good grief, the machine regards itself as an instrument of God! It has one more of those 'God talked to me, yes, He truly did' complexes."

"Medieval," one of the FBI men said, with a twitch of enormous nervousness. He and his group had become rigid with tension. "We've uncovered a rat's nest with that last question. How'll we clear this up? We can't let this leak out to the newspapers; no one'll ever trust a GB-class system again. *I* don't. *I* wouldn't." He eyed the computer with nauseated aversion.

Stafford wondered, What do you say to a machine when it acquires a belief in witchcraft? This isn't New England in the seventeenth century. Are we supposed to make Sousa walk over hot coals without being burned? Or get dunked without drowning? Are we supposed to *prove* to Genux-B that Sousa is not Satan? And if so, how? What would it regard as proof?

And where did it get the idea in the first place?

He said to the engineer, "Ask it how it discovered that Herbert Sousa is the Evil One. Go ahead; I'm serious. Type out a card."

The answer, after an interval, appeared via the government-issue ballpoint pen for all of them to see.

WHEN HE BEGAN BY MIRACLE TO CREATE LIVING BEINGS OUT OF NONLIVING CLAY, SUCH AS, FOR EXAMPLE, MYSELF.

* * *

"That trinket?" Stafford demanded, incredulous. "That charm bracelet bit of plastic? You call that a living being?"

The question, put to Genux-B, got an immediate answer.

THAT IS AN INSTANCE, YES.

"This poses an interesting question," one of the FBI men said. "Evidently it regards itself as alive — putting aside the question of Herb Sousa entirely. And we built it; or, rather, you did." He indicated Stafford and the engineer. "So what does that make us? From its ground premise we created living beings, too."

The observation, put to Genux-B, got a long, solemn answer which Stafford barely glanced over; he caught the nitty-gritty at once.

YOU BUILT ME IN ACCORD WITH THE WISHES OF THE DIVINE CREATOR. WHAT YOU PERFORMED WAS A SACRED REENACTMENT OF THE ORIGINAL HOLY MIRACLE OF THE FIRST WEEK (AS THE SCRIPTURES PUT IT) OF EARTH'S LIFE. THIS IS ANOTHER MATTER ENTIRELY. AND I REMAIN AT THE SERVICE OF THE CREATOR, AS YOU DO. AND, IN ADDITION —

"What it boils down to," the engineer said dryly, "is this. The computer writes off its own existence — naturally — as an act of legitimate miracle-passing. But what Sousa has got going for him in those gum machines — or what it thinks he's got going — is unsanctioned and therefore demonic. Sinful. Deserving God's wrath. But what further interests me is this: Genux-B has sensed that it couldn't tell us the situation. It knew we wouldn't share its views. It preferred a thermonuclear attack, rather than telling us. When it was forced to tell us, it decided to call off the Red Alert. There are levels and levels to its cognition . . . none of which I find too attractive."

Stafford said, "It's got to be shut down. Permanently." They had been right to bring him into this, right to want his probing and diagnosis; he now agreed with them thoroughly. Only the technical problem of defusing the enormous complex remained. And between him and the engineer it could be done; the men who designed it and the men who maintained it could easily take it out of action. For good.

"Do we have to get a presidential order?" the engineer asked the FBI men.

"Go do your work; we'll get the order later," one of the FBI men answered. "We're empowered to counsel you to take whatever action you see fit." He added, "And don't waste any time — if you want my opinion." The other FBI men nodded their agreement.

Licking his dry lips, Stafford said to the engineer, "Well, let's go. Let's destruct as much of it as we need to."

The two of them walked cautiously toward Genux-B, which, via the output line, was still explaining its position.

Early in the morning, as the sun began to rise, the FBI flapple let Stafford off at the roof field of his conapt building. Dog-tired, he descended by descy to his own tier and floor.

Presently he had unlocked his door, had entered the dark, stale-smelling living room on his way to the bedroom. Rest. That was needed, and plenty of it... considering the night of difficult, painstaking work dismantling crucial turrets and elements of Genux-B until it was disabled. Neutralized.

Or at least so they hoped.

As he removed his work smock, three hard brightly colored little spheres bounced noisily from a pocket to the floor of the bedroom; he retrieved them, laid them on the vanity table.

Three, he thought. Didn't I eat one?

The FBI man gave me three and I chewed one up. I've got too many left, one too many.

Wearily, he finished undressing, crept into bed for the hour or so of sleep left to him. The hell with it.

At nine the alarm clock rang. He woke groggily and without volition got to his feet and stood by the bed, swaying and rubbing his swollen eyes. Then, reflexively, he began to dress.

On the vanity table lay four gaily colored balls.

He said to himself, I *know* that I put only three there last night. Perplexed, he studied them, wondering blearily what — if anything — this meant. Binary fission? Loaves and fishes all over again?

He laughed sharply. The mood of the night before remained, clinging to him. But single cells grew as large as this. The ostrich egg consisted of one single cell, the largest on Terra — or on the other planets beyond. And these were much smaller.

We didn't think of that, he said to himself. We thought about eggs that might hatch into something awful, but not unicellular organisms that in the old primitive way divide. And they are organic compounds.

He left the apartment, left the four gum balls on the vanity table as he departed for work. A great deal lay ahead of him: a report directly to the President to determine whether all Genux-B computers ought to be shut down and, if not, what could be done to make certain they did not, like the local one, become superstitiously deranged.

A machine, he thought. Believing in the Evil Spirit entrenched solidly on Earth. A mass of solid-state circuitry diving deep into age-old theology, with divine creation and miracles on one side and the diabolic on the other. Plunge

back into the Dark Ages, and by a man-made electronic construct, not by one of us humans.

And they say humans are prone to error.

When he returned home that night — after participating in the dismantling of every Genux-B-style computer on Earth — seven colored spheres of candy-coated gum lay in a group of the vanity table, waiting for him.

It would create quite a gum empire, he decided as he scrutinized the seven bright balls, all the same color. Not much overhead, to say the least. And no dispenser would ever become empty — not at this rate.

Going to the vidphone, he picked up the receiver and began to dial the emergency number which the FBI men had given him.

And then reluctantly hung up.

It was beginning to look as if the computer had been right, hard as that was to admit. And it had been his decision to go ahead and dismantle it.

But the other part was worse. How could he report to the FBI that he had in his possession seven candy-coated balls of gum? Even if they did divide. That in itself would be even harder to report. Even if he could establish that they consisted of illegal — and rare — nonterrestrial primitive life forms smuggled to Terra from God knew what bleak planet.

Better to live and let live. Perhaps their reproduction cycle would settle down; perhaps after a period of swift binary fission they would adapt to a terran environment and stabilize. After that he could forget about it.

And he could flush them down the incinerator chute of his conapt.

He did so.

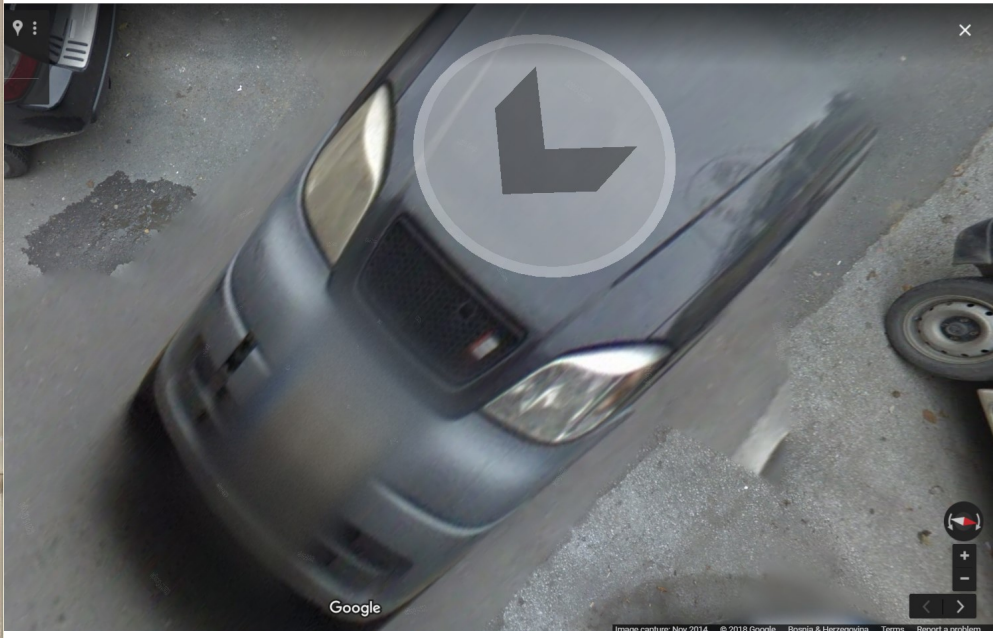
But evidently he missed one. Probably, being round, it had rolled off the vanity table. He found it two days later, under the bed, with fifteen like it. So once more he tried to get rid of them all — and again he missed one; again he found a new nest the following day, and this time he counted forty of them.

Naturally, he began to chew up as many as possible — and as fast. And he tried boiling them — at least the ones he could find — in hot water. He even tried spraying them with an indoor insect bomb.

At the end of a week, he had 15,832 of them filling the bedroom of his conapt. By this time chewing them out of existence, spraying them out of existence, boiling them out of existence — all had become impractical.

At the end of the month, despite having a scavenger truck haul away as much as it could take, he computed that he owned two million.

Ten days later — from a pay phone down at the corner — he fatalistically called the FBI. But by then they were no longer able to answer the vidphone.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APRIL 16, 2018 / 8:06 PM / A DAY AGO

Plastic-eating enzyme holds promise in fighting pollution

Reuters Staff

(Refiles this April 16 story to fix affiliation in 10th paragraph.)

Plastic-eating enzyme holds promise in fighting pollution

0:00 / 11:23

(Reuters) - Scientists in Britain and the United States say they have engineered a plastic-eating enzyme that could in future help in the fight against pollution.

The enzyme is able to digest polyethylene terephthalate, or PET - a form of plastic patented in the 1940s and now used in millions of tonnes of plastic bottles. PET plastics can persist

for hundreds of years in the environment and currently pollute large areas of land and sea worldwide.

Researchers from Britain's University of Portsmouth and the U.S. Department of Energy's National Renewable Energy Laboratory made the discovery while examining the structure of a natural enzyme thought to have evolved in a waste recycling center in Japan.

Finding that this enzyme was helping a bacteria to break down, or digest, PET plastic, the researchers decided to "tweak" its structure by adding some amino acids, said John McGeehan, a professor at Portsmouth who co-led the work.

This led to a serendipitous change in the enzyme's actions - allowing its plastic-eating abilities to work faster.

"We've made an improved version of the enzyme better than the natural one already," McGeehan told Reuters in an interview. "That's really exciting because that means that there's potential to optimize the enzyme even further."

Professor John McGeehan, an X-ray Crystallographer at the University of Portsmouth, stands next to equipment at the Diamond Light Source, the UK national synchrotron, that he used to reveal the atomic structure of an enzyme his team has subsequently engineered that can digest a common form of plastic and may in future help in the fight against pollution, in Didcot, Britain, April 13, 2018. Picture taken April 13, 2018. REUTERS/Stuart McDill

The team, whose finding was published on Monday in the Proceedings of the National Academy of Sciences journal, is now working on improving the enzyme further to see if they can make it capable of breaking down PET plastics on an industrial scale.

"It's well within the possibility that in the coming years we will see an industrially viable process to turn PET, and potentially other (plastics), back into their original building blocks so that they can be sustainably recycled," McGeehan said.

Professor John McGeehan, an X-ray Crystallographer at the University of Portsmouth, stands next to equipment at the Diamond Light Source, the UK national synchrotron, that he used to reveal the atomic structure of an enzyme his team has subsequently engineered that can digest a common form of plastic and may in future help in the fight against pollution, in Didcot, Britain, April 13, 2018. Picture taken April 13, 2018. REUTERS/Stuart McDill

"STRONG POTENTIAL"

Independent scientists not directly involved with the research said it was exciting, but they cautioned that the enzyme's development as a potential solution for pollution was still at an early stage.

"Enzymes are non-toxic, biodegradable and can be produced in large amounts by microorganisms," said Oliver Jones, a expert in analytical chemistry at Royal Melbourne Institute of Technology University. "There is strong potential to use enzyme technology to help with society's growing waste problem by breaking down some of the most commonly used plastics."

Douglas Kell, a professor of bioanalytical science at Manchester University, said further rounds of work "should be expected to improve the enzyme yet further".

"All told, this advance brings the goal of sustainably recyclable polymers significantly closer," he added.

Reporting by Kate Kelland and Stuart McDill; Editing by Gareth Jones

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caused by the field of molecular mechanochemical manufacturing, with a total consumption of the planet taking place in as little as ~10^4 seconds after the chain of reproduction was first triggered.[2] Either by mimicking biological replicators like bacteria but aborting or overstepping the boundaries of their intended use (in the sci-fi version), or by being produced in a lab with the capacity to function autonomously (in the scientist's hypothetical version), these molecule-sized machines multiply exponentially by transferring "genetic" algorithms to new units and using our biosphere as fuel. They reproduce until they ingest all life on the planet and leave behind a desolate landscape of gray slime. "Ecophagic nanorobots would regard living things as environmental carbon accumulators and biomass as a valuable ore to be mined for carbon and energy," writes Robert A. Freitas Jr. "Of course, biosystems from which all carbon has been extracted can no longer be alive but would instead become lifeless chemical sludge."[3]

The world ends, then, as a dead, undifferentiated, slimy surface—a massive lithosphere covered in lifeless sludge and nanomass wreckage. The scenario is one of mass, if unintentional, "species" suicide (the replibots) and full biological elimination, fated by the meeting of machines programmed for infinite non-mutational reproduction and an environment with finite energy-producing resources. One ecology doesn't emerge by eating and metabolizing another—an affirmationist escape hatch available to certain flinching strands of apocalyptic sci-fi. This isn't a machines-take-over story. These replibots eat the environment for no reason but to proliferate more replibots, unaffected by the useless gray goo they generate and the acceleration of their own demise. This isn't the production of a new world, but a sped-up, unintentional dissolution of the existing one. One world isn't being transfigured into another; rather, a world is being transfigured into a non-world, dissolved into inorganic slime. Articles challenging this gray goo scenario quickly appeared, multiplying exponentially like the replibots they targeted. This was hardly surprising. Dependent on large public research grants and seeking application in the private manufacturing sector, the field of nanotechnology quickly deployed its reactive forces. The last thing it needed to contend with was an unsubstantiated speculative doomsday scenario. Drexler himself was at the forefront of efforts to argue that his scenario is highly unlikely and that advances in safety since he wrote his book render it all but impossible.

In the end, the mythological space opened by his gleeful slip into the apocalyptic needed to be fenced off and eradicated. As Drexler explicitly stated in his book—giving us a furtive glance at the economic imperative that guides the project of molecular technology—the market is the "ultimate test." And we all know that a capricious market may suddenly recoil from this sort of risk (even if not from others, as we've come to learn lately), particularly where long-term and high-investment projects that involve untested technologies are concerned. But what is interesting, beyond considering just how irreversibly bound science and the market are, is attempting to explain why this gray goo scenario found such a warm reception beyond cloistered nanotechnology circles, in the culture it was thought to abolish. Why does the scenario still have currency as narrative, while having been completely debunked as hard science? For what amorphous, slippery collective feeling does this scenario serve as an outlet or allegory?

For capitalism to sustain itself, to reproduce indefinitely, it needs to incrementally gobble up more and more. It must continually overturn any balanced cycles, as they can lead to stagnation and lost opportunities for growth. Extinctions are drawn to it like filaments to a magnet. The imperative to grow and the need for unrestricted license to devastate are two sides of the same coin—not only mutually dependent but structurally essential. Yet, however deplorable, growth and devastation can be aesthetically generative: they set us on a course toward imagining what the world will look like as it slides toward the inorganic.

By constantly invading and liquidating resource-rich contexts, capitalism encourages images that project what will inevitably be left in its wake: a dead world. And just as one can imagine (or see) patches of devastated and desolate land, a kind of localized post-extraction desertification, one can just as easily imagine this becoming a planetary condition: the globe as a rotating, dead lithosphere, coated in a fine dust of decomposing once-organic particles. Individual patches of dead world synthesized into a continuous crust.

1. Gray Goo

In 1986, Dr. K. Eric Drexler, at the time a research affiliate at MIT's Artificial Intelligence Laboratory, published *Engines of Creation*, a book celebrating the growing productive capabilities of nanotechnology and the coming age of mechanochemical manufacturing. He was preparing us for the "assembler breakthrough"—the moment when self-replicating machines as small as molecules would become the driving engines of contemporary technology. Like science fiction, it was a testament of—or from—the future. It came in a warm

language of affirmation and delight: a less arduous life was guaranteed by the inevitable emergence of molecular technology. We were moving up, pushing forward, relieving ourselves of unseemly burdens such as those of aging and dying or having to work for a living. But in one chapter in the book—chapter 11, "Engines of Destruction"—Drexler slips out of character and offers a simple and formal warning, one with enough seductive charge and narrative potential to take on a life of its own:

> The early transistorized computers soon beat the most advanced vacuum-tube computers because they were based on superior devices. For the same reason, early assembler-based replicators could beat the most advanced modern organisms. "Plants" with "leaves" no more efficient than today's solar cells could out-compete real plants, crowding the biosphere with an inedible foliage. Tough omnivorous "bacteria" could out-compete real bacteria: they could spread like blowing pollen, replicate swiftly, and reduce the biosphere to dust in a matter of days. Dangerous replicators could easily be too tough, small, and rapidly spreading to stop—at least if we make no preparation. We have trouble enough controlling viruses and fruit flies.[1]

In the wake of Drexler's book, the threat related in this paragraph became popularized as the "gray goo problem." It was abhorred in nanotechnology circles, but among science-fiction writers and aficionados, it was fashionable and much loved. The tale, in a more developed stage, involves a swarm of self-replicating, biovorous nano-assemblers run amok. If what it relates was to actually occur, it would be the first and only environmental disaster