

end. After 60 million years of mysterious oblivion, one of the group, *Latimeria*, then appeared before the eyes of the South African fishermen, apparently little changed in structure from its ancient ancestors. But where had these fishes been in the meantime?

The story of the coelacanths did not end in 1938. Believing there must be other such fish in the sea, an ichthyologist in South Africa, Professor J. L. B. Smith, began a patient search that lasted 14 years before it was successful. Then, in December 1952, a second coelacanth was captured near the island of Anjouan, off the northwestern tip of Madagascar. It differed enough from *Latimeria* to be placed in a separate genus, but like the first coelacanth known in modern times, it can tell us much of a shadowy chapter in the evolution of living things.

Occasionally a very primitive type of shark, known from its puckered gills as a 'frillshark,' is taken in waters between a quarter of a mile and half a mile down. Most of these have been caught in Norwegian and Japanese waters—there are only about 50 preserved in the museums of Europe and America—but recently one was captured off Santa Barbara, California. The frillshark has many anatomical features similar to those of the ancient sharks that lived 25 to 30 million years ago. It has too many gills and too few dorsal fins for a modern shark, and its teeth, like those of fossil sharks, are three-pronged and briarlike. Some ichthyologists regard it as a relic derived from very ancient shark ancestors that have died out in the upper waters but, through this single species, are still carrying on their struggle for earthly survival, in the quiet of the deep sea.

Possibly there are other such anachronisms lurking down in these regions of which we know so little, but they are likely to be few and scattered. The terms of existence in these deep waters are far too uncompromising to support life unless that life is plastic, molding itself constantly to the harsh conditions, seizing every advantage that makes possible the survival of living protoplasm in a world only a little less hostile than the black reaches of interplanetary space.

MAURICE MAETERLINCK

THE TREE of animal evolution divides into two enormous trunks—the vertebrates who have spinal columns and the arthropods who do not. Vertebrate life reaches its climax in man. Arthropod behavior culminates in the social insects. So radically different are these two ways of meeting problems of survival that one would almost expect the two groups to have evolved on different planets. All the actions we consider "human" are learned reactions, acquired by each individual through long years of training by his elders. Insects, on the other hand, are virtually unteachable. They come into existence fully equipped with an elaborate pattern of inborn behavior. In the social insects—such as bees, wasps, ants, and termites—these instincts reach unbelievable levels of specialization. The colony itself takes on the characteristics of a super-organism—a totalitarian state in which there is not even the possibility of "anti-social" behavior. It is little wonder that of the two million or so different insect species, the social insects—the honeybee in particular—have excited the greatest interest of zoologists and laymen alike.

As a young man, Belgian poet and playwright Maurice Maeterlinck (1862-1949) made beekeeping his principal hobby. Inspired by the essays of Fabre, he began a period of observation and experiment with his apiary that resulted in 1901 in the publication of *The Life of the Bee*. Written in a highly poetic vein, with a skillful blending of fact, fancy, and mystical speculation, it became far and away the most popular book ever written about insect life.

Subsequent research has corrected some of Maeterlinck's errors and added new and even more fantastic data. In a series of beautifully devised experiments the Bavarian zo-

ologist Karl von Frisch proved that bee scouts, after returning to the hive, execute a series of rapid gyrations that tell the workers how far away the new-found nectar is and in exactly what direction! More recent experiments have shown that bees possess a built-in method of measuring time irrespective of external factors such as sunlight.

The selection presented here is Maeterlinck's unrivaled description of the nuptial flight of the queen. The dramatic meeting in the sky, followed by the death of the pursuer, provides a magnificent background for the Belgian poet's reflections on the meaning of good and evil, love and death.

MAURICE MAETERLINCK

The Nuptial Flight

WE WILL now consider the manner in which the impregnation of the queen-bee comes to pass. Here again nature has taken extraordinary measures to favor the union of males with females of a different stock; a strange law, whereto nothing would seem to compel her; a caprice, or initial inadvertence, perhaps, whose reparation calls for the most marvelous forces her activity knows.

If she had devoted half the genius she lavishes on crossed fertilization and other arbitrary desires to making life more certain, to alleviating pain, to softening death and warding off horrible accidents, the universe would probably have presented an enigma less incomprehensible, less pitiable, than the one we are striving to solve. But our consciousness, and the interest we take in existence, must grapple, not with what might have been, but with what is.

Around the virgin queen, and dwelling with her in the hive, are hundreds of exuberant males, forever drunk on honey; the sole reason for their existence being one act of love. But, notwithstanding the incessant contact of two desires that elsewhere invariably triumph over every obstacle, the union never takes place in the hive, nor has it been possible to bring about the impregnation of a captive queen. While she lives in their midst the lovers about her know not what she is. They seek her in space, in the remote depths of the horizon, never suspecting that they have but this moment quitted her; have shared the same comb with her, have brushed against her, per-

haps, in the eagerness of their departure. One might almost believe that those wonderful eyes of theirs, that cover their head as though with a glittering helmet, do not recognize or desire her save when she soars in the blue. Each day, from noon till three, when the sun shines resplendent, this plumed horde sallies forth in search of the bride, who is indeed more royal, more difficult of conquest, than the most inaccessible princess of fairy legend; for twenty or thirty tribes will hasten from all the neighboring cities, her court thus consisting of more than ten thousand suitors; and from these ten thousand one alone will be chosen for the unique kiss of an instant that shall wed him to death no less than to happiness; while the others will fly helplessly round the intertwined pair, and soon will perish without ever again beholding this prodigious and fatal apparition.

I am not exaggerating this wild and amazing prodigality of nature. The best-conducted hives will, as a rule, contain four to five hundred males. Weaker or degenerate ones will often have as many as four or five thousand; for the more a hive inclines to its ruin, the more males will it produce. It may be said that, on an average, an apiary composed of ten colonies will at a given moment send an army of ten thousand males into the air, of whom ten or fifteen at most will have the occasion of performing the one act for which they were born.

In the meanwhile they exhaust the supplies of the city; each one of the parasites requiring the unceasing labor of five or six workers to maintain it in its abounding and voracious idleness, its activity being indeed solely confined to its jaws. But nature is always magnificent when dealing with the privileges and prerogatives of love. She becomes miserly only when doling out the organs and instruments of labor. She is especially severe on what men have termed virtue, whereas she strews the path of the most uninteresting lovers with innumerable jewels and favors. "Unite and multiply; there is no other law, or aim, than love," would seem to be her constant cry on all sides, while she mutters to herself, perhaps:

"and exist afterward if you can; that is no concern of mine." Do or desire what else we may, we find, everywhere on our road, this morality that differs so much from our own. And note, too, in these same little creatures, her unjust avarice and insensate waste. From her birth to her death, the austere forager has to travel abroad in search of the myriad flowers that hide in the depths of the thickets. She has to discover the honey and pollen that lurk in the labyrinths of the nectaries and in the most secret recesses of the anthers. And yet her eyes and olfactory organs are like the eyes and organs of the infirm, compared with those of the male. Were the drones almost blind, had they only the most rudimentary sense of smell, they scarcely would suffer. They have nothing to do, no prey to hunt down; their food is brought to them ready prepared, and their existence is spent in the obscurity of the hive, lapping honey from the comb. But they are the agents of love; and the most enormous, most useless gifts are flung with both hands into the abyss of the future. Out of a thousand of them, one only, once in his life, will have to seek, in the depths of the azure, the presence of the royal virgin. Out of a thousand one only will have, for one instant, to follow in space the female who desires not to escape. That suffices. The partial power flings open her treasury, wildly, even deliriously. To every one of these unlikely lovers, of whom nine hundred and ninety-nine will be put to death a few days after the fatal nuptials of the thousandth, she has given thirteen thousand eyes on each side of their head, while the worker has only six thousand. According to Cheshire's calculations, she has provided each of their antennæ with thirty-seven thousand eight hundred olfactory cavities, while the worker has only five thousand in both. There we have an instance of the almost universal disproportion that exists between the gifts she rains upon love and her niggardly doles to labor; between the favors she accords to what shall, in an ecstasy, create new life, and the indifference wherewith she regards what will patiently have to maintain itself by toil. Whoever would seek faithfully to depict the character of nature, in accordance with the traits we discover here, would design an extraordi-

nary figure, very foreign to our ideal, which nevertheless can only emanate from her. But too many things are unknown to man for him to essay such a portrait, wherein all would be deep shadow save one or two points of flickering light.

Very few, I imagine, have profaned the secret of the queen-bee's wedding, which comes to pass in the infinite, radiant circles of a beautiful sky. But we are able to witness the hesitating departure of the bride-elect and the murderous return of the bride.

However great her impatience, she will yet choose her day and her hour, and linger in the shadow of the portal till a marvelous morning fling open wide the nuptial spaces in the depths of the great azure vault. She loves the moment when drops of dew still moisten the leaves and the flowers, when the last fragrance of dying dawn still wrestles with burning day, like a maiden caught in the arms of a heavy warrior; when through the silence of approaching noon is heard, once and again, a transparent cry that has lingered from sunrise.

Then she appears on the threshold—in the midst of indifferent foragers, if she have left sisters in the hive; or surrounded by a delirious throng of workers, should it be impossible to fill her place.

She starts her flight backwards, returns twice or thrice to the alighting-board; and then, having definitely fixed in her mind the exact situation and aspect of the kingdom she has never yet seen from without, she departs like an arrow to the zenith of the blue. She soars to a height, a luminous zone, that other bees attain at no period of their life. Far away, caressing their idleness in the midst of the flowers, the males have beheld the apparition, have breathed the magnetic perfume that spreads from group to group till every apiary near is instinct with it. Immediately crowds collect, and follow her into the sea of gladness, whose limpid boundaries ever recede. She, drunk with her wings, obeying the magnificent law of the race that chooses her lover, and enacts that the strongest alone shall attain her in the solitude of the

ether, she rises still; and, for the first time in her life, the blue morning air rushes into her stigmata singing its song, like the blood of heaven, in the myriad tubes of the tracheal sacs, nourished on space, that fill the center of her body. She rises still. A region must be found unhaunted by birds, that else might profane the mystery. She rises still; and already the ill-assorted troop below are dwindling and falling asunder. The feeble, infirm, the aged, unwelcome, ill-fed, who have flown from inactive or impoverished cities, these renounce the pursuit and disappear in the void. Only a small, indefatigable cluster remain, suspended in infinite opal. She summons her wings for one final effort; and now the chosen of incomprehensible forces has reached her, has seized her, and bounding aloft with united impetus, the ascending spiral of their intertwined flight whirls for one second in the hostile madness of love.

Most creatures have a vague belief that a very precarious hazard, a kind of transparent membrane, divides death from love; and that the profound idea of nature demands that the giver of life should die at the moment of giving. Here this idea, whose memory lingers still over the kisses of man, is realized in its primal simplicity. No sooner has the union been accomplished than the male's abdomen opens, the organ detaches itself, dragging with it the mass of the entrails; the wings relax, and, as though struck by lightning, the emptied body turns and turns on itself and sinks into the abyss.

The same idea that, before, in parthenogenesis, sacrificed the future of the hive to the unwonted multiplication of males, now sacrifices the male to the future of the hive.

This idea is always astounding; and the further we penetrate into it, the fewer do our certitudes become. Darwin, for instance, to take the man of all men who studied it the most methodically and most passionately, Darwin, though scarcely confessing it to himself, loses confidence at every step, and retreats before the unexpected and the irreconcilable. Would you have before you the nobly humiliating

spectacle of human genius battling with infinite power, you have but to follow Darwin's endeavors to unravel the strange, incoherent, inconceivably mysterious laws of the sterility and fecundity of hybrids, or of the variations of specific and generic characters. Scarcely has he formulated a principle when numberless exceptions assail him; and this very principle, soon completely overwhelmed, is glad to find refuge in some corner, and preserve a shred of existence there under the title of an exception.

For the fact is that in hybridity, in variability (notably in the simultaneous variations known as correlations of growth), in instinct, in the processes of vital competition, in geologic succession and the geographic distribution of organized beings, in mutual affinities, as indeed in every other direction, the idea of nature reveals itself, in one and the same phenomenon and at the very same time, as circumspect and shiftless, niggard and prodigal, prudent and careless, fickle and stable, agitated and immovable, one and innumerable, magnificent and squalid. There lay open before her the immense and virgin fields of simplicity; she chose to people them with trivial errors, with petty contradictory laws that stray through existence like a flock of blind sheep. It is true that our eye, before which these things happen, can only reflect a reality proportionate to our needs and our stature; nor have we any warrant for believing that nature ever loses sight of her wandering results and causes.

In any event she will rarely permit them to stray too far, or approach illogical or dangerous regions. She disposes of two forces that never can err; and when the phenomenon shall have trespassed beyond certain limits, she will beckon to life or to death—which arrives, re-establishes order, and unconcernedly marks out the path afresh.

She eludes us on every side; she repudiates most of our rules and breaks our standards to pieces. On our right she sinks far beneath the level of our thoughts, on our left she towers mountain-high above them. She appears to be constantly blundering, no less in the world of her first experi-

ments than in that of her last, of man. There she invests with her sanction the instincts of the obscure mass, the unconscious injustice of the multitude, the defeat of intelligence and virtue, the uninspired morality which urges on the great wave of the race, though manifestly inferior to the morality that could be conceived or desired by the minds composing the small and the clearer wave that ascends the other. And yet, can such a mind be wrong if it ask itself whether the whole truth—moral truths, therefore, as well as non-moral—had not better be sought in this chaos than in itself, where these truths would seem comparatively clear and precise?

The man who feels thus will never attempt to deny the reason or virtue of his ideal, hallowed by so many heroes and sages; but there are times when he will whisper to himself that this ideal has perhaps been formed at too great a distance from the enormous mass whose diverse beauty it would fain represent. He has, hitherto, legitimately feared that the attempt to adapt his morality to that of nature would risk the destruction of what was her masterpiece. But today he understands her a little better; and from some of her replies, which, though still vague, reveal an unexpected breadth, he has been enabled to seize a glimpse of a plan and an intellect vaster than could be conceived by his unaided imagination; wherefore he has grown less afraid, nor feels any longer the same imperious need of the refuge his own special virtue and reason afford him. He concludes that what is so great could surely teach nothing that would tend to lessen itself. He wonders whether the moment may not have arrived for submitting to a more judicious examination his convictions, his principles, and his dreams.

Once more, he has not the slightest desire to abandon his human ideal. That even which at first diverts him from this ideal teaches him to return to it. It were impossible for nature to give ill advice to a man who declines to include in the great scheme he is endeavoring to grasp, who declines to regard as sufficiently lofty to be definitive, any truth that is not at least as lofty as the truth he himself desires. Nothing shifts its place in his life save only to rise with him; and he

knows he is rising when he finds himself drawing near to his ancient image of good. But all things transform themselves more freely in his thoughts; and he can descend with impunity, for he has the presentiment that numbers of successive valleys will lead him to the plateau that he expects. And, while he thus seeks for conviction, while his researches even conduct him to the very reverse of that which he loves, he directs his conduct by the most humanly beautiful truth, and clings to the one that provisionally seems to be highest. All that may add to beneficent virtue enters his heart at once; all that would tend to lessen it remaining there in suspense, like insoluble salts that change not till the hour for decisive experiment. He may accept an inferior truth, but before he will act in accordance therewith he will wait, if need be for centuries, until he perceive the connection this truth must possess with truths so infinite as to include and surpass all others.

In a word, he divides the moral from the intellectual order, admitting in the former that only which is greater and more beautiful than was there before. And blame-worthy as it may be to separate the two orders in cases, only too frequent in life, where we suffer our conduct to be inferior to our thoughts, where, seeing the good, we follow the worse—to see the worse and follow the better, to raise our actions high over our idea, must ever be reasonable and salutary; for human experience renders it daily more clear that the highest thought we can attain will long be inferior still to the mysterious truth we seek. Moreover, should nothing of what goes before be true, a reason more simple and more familiar would counsel him not yet to abandon his human ideal. For the more strength he accords to the laws which would seem to set egoism, injustice, and cruelty as examples for men to follow, the more strength does he at the same time confer on the others that ordain generosity, justice, and pity; and these last laws are found to contain something as profoundly natural as the first, the moment he begins to equalize, or allot

more methodically, the share he attributes to the universe and to himself.

Let us return to the tragic nuptials of the queen. Here it is evidently nature's wish, in the interests of crossed fertilization, that the union of the drone and the queen-bee should be possible only in the open sky. But her desires blend network-fashion, and her most valued laws have to pass through the meshes of other laws, which, in their turn, the moment after, are compelled to pass through the first.

In the sky she has planted so many dangers—cold winds, storm-currents, birds, insects, drops of water, all of which also obey invincible laws—that she must of necessity arrange for this union to be as brief as possible. It is so, thanks to the startlingly sudden death of the male. One embrace suffices; the rest all enacts itself in the very flanks of the bride.

She descends from the azure heights and returns to the hive, trailing behind her, like an oriflamme, the unfolded entrails of her lover. Some writers pretend that the bees manifest great joy at this return so big with promise—Büchner, among others, giving a detailed account of it. I have many a time lain in wait for the queen-bee's return, and I confess that I have never noticed any unusual emotion except in the case of a young queen who had gone forth at the head of a swarm, and represented the unique hope of a newly founded and still empty city. In that instance the workers were all wildly excited, and rushed to meet her. But as a rule they appear to forget her, even though the future of their city will often be no less imperiled. They act with consistent prudence in all things, till the moment when they authorize the massacre of the rival queens. That point reached, their instinct halts; and there is, as it were, a gap in their foresight.—They appear to be wholly indifferent. They raise their heads; recognize, probably, the murderous tokens of impregnation; but, still mistrustful, manifest none of the gladness our expecta-

tion had pictured. Being positive in their ways, and slow at illusion, they probably need further proofs before permitting themselves to rejoice. Why endeavor to render too logical, or too human, the feelings of little creatures so different from ourselves? Neither among the bees nor among any other animals that have a ray of our intellect, do things happen with the precision our books record. Too many circumstances remain unknown to us. Why try to depict the bees as more perfect than they are, by saying that which is not? Those who would deem them more interesting did they resemble ourselves, have not yet truly realized what it is that should awaken the interest of a sincere mind. The aim of the observer is not to surprise, but to comprehend; and to point out the gaps existing in an intellect, and the signs of a cerebral organization different from our own, is more curious by far than the relating of mere marvels concerning it.

But this indifference is not shared by all; and when the breathless queen has reached the alighting-board, some groups will form and accompany her into the hive; where the sun, hero of every festivity in which the bees take part, is entering with little timid steps, and bathing in azure and shadow the waxen walls and curtains of honey. Nor does the new bride, indeed, show more concern than her people, there being not room for many emotions in her narrow, barbarous, practical brain. She has but one thought, which is to rid herself as quickly as possible of the embarrassing souvenirs her consort has left her, whereby her movements are hampered. She seats herself on the threshold, and carefully strips off the useless organs, that are borne far away by the workers; for the male has given her all he possessed, and much more than she requires. She retains only, in her spermatheca, the seminal liquid where millions of germs are floating, which, until her last day, will issue one by one, as the eggs pass by, and in the obscurity of her body accomplish the mysterious union of the male and female element, whence the worker-bees are born. Through a curious inversion, it is she who furnishes the male principle, and the drone

who provides the female. Two days after the union she lays her first eggs, and her people immediately surround her with the most particular care. From that moment, possessed of a dual sex, having within her an inexhaustible male, she begins her veritable life; she will never again leave the hive, unless to accompany a swarm; and her fecundity will cease only at the approach of death.

Prodigious nuptials these, the most fairylike that can be conceived, azure and tragic, raised high above life by the impetus of desire; imperishable and terrible, unique and bewildering, solitary and infinite. An admirable ecstasy, wherein death supervening in all that our sphere has of most limpid and loveliest, in virginal, limitless space, stamps the instant of happiness in the sublime transparency of the great sky; purifying in that immaculate light the something of wretchedness that always hovers around love, rendering the kiss one that can never be forgotten; and, content this time with moderate tithe, proceeding herself, with hands that are almost maternal, to introduce and unite, in one body, for a long and inseparable future, two little fragile lives.

Profound truth has not this poetry, but possesses another that we are less apt to grasp, which, however, we should end, perhaps, by understanding and loving. Nature has not gone out of her way to provide these two "abbreviated atoms," as Pascal would call them, with a resplendent marriage, or an ideal moment of love. Her concern, as we have said, was merely to improve the race by means of crossed fertilization. To ensure this she has contrived the organ of the male in such a fashion that he can make use of it only in space. A prolonged flight must first expand his two great tracheal sacs; these enormous receptacles being gorged on air will throw back the lower part of the abdomen, and permit the exertion of the organ. There we have the whole physiological secret—which will seem ordinary enough to some, and almost vulgar to others—of this dazzling pursuit and these magnificent nuptials.

"But must we always, then," the poet will wonder, "rejoice in regions that are loftier than the truth?"

Yes, in all things, at all times, let us rejoice, not in regions loftier than the truth, for that were impossible, but in regions higher than the little truths that our eyes can seize. Should a chance, a recollection, an illusion, a passion,—in a word, should any motive whatever cause an object to reveal itself to us in a more beautiful light than to others, let that motive be first of all dear to us. It may only be error, perhaps; but this error will not prevent the moment wherein we are likeliest to perceive its real beauty. The beauty we lend it directs our attention to its veritable beauty and grandeur, which, derived as they are from the relation wherein every object must of necessity stand to general, eternal, forces and laws, might otherwise escape observation. The faculty of admiring which an illusion may have created within us will serve for the truth that must come, be it sooner or later. It is with the words, the feelings, and ardor created by ancient and imaginary beauties, that humanity welcomes today truths which perhaps would have never been born, which might not have been able to find so propitious a home, had these sacrificed illusions not first of all dwelt in, and kindled, the heart and the reason whereinto these truths should descend. Happy the eyes that need no illusion to see that the spectacle is great! It is illusion that teaches the others to look, to admire, and rejoice. And look as high as they will, they never can look too high. Truth rises as they draw nearer; they draw nearer when they admire. And whatever the heights may be whereon they rejoice, this rejoicing can never take place in the void, or above the unknown and eternal truth that rests over all things like beauty in suspense.

Does this mean that we should attach ourselves to falsehood, to an unreal and factitious poetry, and find our gladness therein for want of anything better? Or that in the example before us—in itself nothing, but we dwell on it because it stands for a thousand others, as also for our entire

attitude in face of divers orders of truths—that here we should ignore the physiological explanation, and retain and taste only the emotions of this nuptial flight, which is yet, and whatever the cause, one of the most lyrical, most beautiful acts of that suddenly disinterested, irresistible force which all living creatures obey and are wont to call love? That were too childish; nor is it possible, thanks to the excellent habits every loyal mind has today acquired.

The fact being incontestable, we must evidently admit that the exertion of the organ is rendered possible only by the expansion of the tracheal vesicles. But if we, content with this fact, did not let our eyes roam beyond it; if we deduced therefrom that every thought that rises too high or wanders too far must be of necessity wrong, and that truth must be looked for only in the material details; if we did not seek, no matter where, in uncertainties often far greater than the one this little explanation has solved, in the strange mystery of crossed fertilization for instance, or in the perpetuity of the race and life, or in the scheme of nature; if we did not seek in these for something beyond the current explanation, something that should prolong it, and conduct us to the beauty and grandeur that repose in the unknown, I would almost venture to assert that we should pass our existence further away from the truth than those, even, who in this case willfully shut their eyes to all save the poetic and wholly imaginary interpretation of these marvelous nuptials. They evidently misjudge the form and color of the truth, but they live in its atmosphere and its influence far more than the others, who complacently believe that the entire truth lies captive within their two hands. For the first have made ample preparations to receive the truth, have provided most hospitable lodging within them; and even though their eyes may not see it, they are eagerly looking toward the beauty and grandeur where its residence surely must be.

We know nothing of nature's aim, which for us is the truth that dominates every other. But for the very love of this truth, and to preserve in our soul the ardor we need

for its search, it behooves us to deem it great. And if we should find one day that we have been on a wrong road, that this aim is incoherent and petty, we shall have discovered its pettiness by means of the very zeal its presumed grandeur had created within us; and this pettiness once established, it will teach us what we have to do. In the meanwhile it cannot be unwise to devote to its search the most strenuous, daring efforts of our heart and our reason. And should the last word of all this be wretched, it will be no little achievement to have laid bare the inanity and the pettiness of the aim of nature.

"If it would take a cannon-ball $3\frac{1}{3}$ seconds to travel four miles, and $3\frac{3}{8}$ seconds to travel the next four, and $3\frac{5}{8}$ to travel the next four, and if its rate of progress continued to diminish in the same ratio, how long would it take it to go fifteen hundred million miles?"

—"ARITHMETICUS," Virginia, Nevada.

I don't know.

—MARK TWAIN

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H. G. WELLS

WHEN THE FIRST atom bomb fell on Japan in August, 1945, an old man dying in London must have read the headlines with a strange emotion. The old man was H. G. Wells. He had already completed his final book in which he spoke of a "frightful queerness" descending on the world, and he had projected his own sentence of death into the prediction that *homo sapiens* would have to "give place to some other animal better adapted to face the fate that closes in more and more swiftly upon mankind." But more than this, he saw in the headlines a dramatic confirmation of one of his most accurate prophecies.

In 1914 Herbert George Wells (1866-1946) had written a science fiction novel titled *The World Set Free*. It opens with a prelude called "The Sun Snarers," tracing the history of man's conquest of power from the first crude use of tools and domesticated animals to the steam and electrical power of modern times. The prelude closes with a lecture by a professor of physics at the University of Edinburgh. The professor discusses the possibility of quickening radio-active decay of uranium, thereby releasing its immense energy and starting a new chapter in the history of mankind. A Scottish student, stimulated by the lecture, later watches an evening sun drop behind distant hills. "Ye auld thing," he said, and his eyes were shining and he made a kind of grabbing gesture with his hand; 'ye auld red thing. . . . We'll have ye yet.'"

The novel's first chapter opens in 1933 when a young scientist named Holsten succeeds in inducing artificial radio-activity—the first step in the tapping of atomic energy. (It was in January, 1934, that Frédéric Joliot-Curie and his wife first did exactly this by bombarding aluminum with beta