HALE'S "LITTLE ELF":
THE MENTAL BREAKDOWNS OF GEORGE ELLERY HALE

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1. The "Demon"

"The pilgrimage of mankind", wrote the historian Paul Murray Kendall, “is, at bottom, a story of human energy; how it has been used and the ends it has sought to encompass”.¹ The pilgrimage of the pioneer astrophysicist and astronomical entrepreneur George Ellery Hale was also, at bottom, a story of human energy — the gift of it, the use of it, and in the end the desperate quest for it.

Hale was born in Chicago in 1868, three years before the Great Fire. His father, William Hale, “with the boundless energy and tenacity his son would inherit”,² contributed mightily to building a new Chicago. In place of the makeshift shambles of “everlasting sham, veneer, stucco, and putty”, a city of massive steel edifices — the forerunners of modern skyscrapers — rose on Lake Michigan. William Hale built the elevators that made the towers of the Chicago skyline possible.

By contrast, Hale’s mother, Mary, lived as a virtual recluse. She was always of delicate constitution. The nature of her illnesses is not clear; probably there was a large psychosomatic component. One of George’s earliest memories was “of the upstairs bedroom where his mother, a semi-invalid with thin lips, firm chin, and brown eyes deeply set in her gaunt face, spent most of her time”.³

George would share his mother’s high-strung temperament, Calvinist brooding, and depression, in combination with his father’s restless expansively optimistic and drive for achievement. While George strove for success and won his father’s approval, his mother fretted over him and worried about his stomach troubles, backaches, and fainting spells. At the nearby Oakland Public School, where George began his education, he was frequently sick, and after an attack of typhoid, which his parents blamed on the school, they decided he must never return. At the age of twelve he was sent to the private Allen Academy, halfway between the home the Hales rented on Drexel Avenue and the centre of Chicago.

Already in his pre-adolescence George became a precocious dabbler in science, and was busy making observations with small microscopes and telescopes. All this activity worried his mother; she feared that “with his intensity and precocity, he would burn himself out early”.⁴ Nevertheless, when young George decided he must have his own research laboratory, he persuaded her to turn over to him the small room where she kept her dresses. In this “shop” he set up a Bunsen burner, batteries, and galvanometers, and carried out such chemical experiments as pouring hydrochloric acid on zinc to form hydrogen gas.
At thirteen he installed a lathe in the shop, which he ran with a homemade steam engine known as “the demon”. Fed by a second-hand boiler, it was capable of generating an eighth of a horsepower. It made the entire house shake; the steam pressure mounted “toward forbidden heights ... the roar of the exhaust, mingled
with the vibration of the speeding engine, brought joy to the excited engineers.” Hale’s mother, rushing on the scene and crying out in horror, was convinced that the speeding engine was about to explode. And yet, as Helen Wright reflects: “For years ‘the demon’ continued to run the lathe without mishap.”

Hale too seemed to be driven by an inner speeding engine — a “demon”, whose workings were sometimes as terrifying and mysterious to others as the noisy workings of this steam-engine. Time and time again, those who knew him in these early days described him in terms that implied boundless energy, enthusiasm, restlessness, and drive. He was a perpetual-motion machine; active, driven, possessed of “a driving power which was given no rest until it brought his plans and schemes to fruition”, as James Jeans wrote. “Excited over everything he was doing, he continued to rush from one scheme to the next.” Friends and colleagues spoke always of “his restless energy and intensity”, his hurry to do things, his inexhaustible curiosity, passion, and enjoyment.

And yet as with the “demon”, there was something unnerving about all this energy. The vibrations and the hissing of the steam engine, the shaking of the building, suggested a machine working near the limits of its capacity. Hale’s mother worried that, under similar high pressure, mounting “toward forbidden heights”, Hale too would break down or burn out.

2. Young Man in a Hurry

At fourteen, George looked up the famed Chicago double-star observer Sherburne W. Burnham, in order to consult with him on the best means for observing the December 1882 transit of Venus. Burnham’s advice helped George persuade his father to buy him a small refractor. Through Burnham, Hale was also invited to use the Dearborn Observatory’s 18-inch refractor (large by the standards of the day), in collaboration with classical astronomers such as Burnham and George W. Hough. But he was not very interested in their kind of astronomy, which involved the careful measurement of the positions of planets and stars. Already he yearned for something new and exciting. He was drawn to spectroscopy, and perceived the possibility of applying it to the study of the heavens. The great insight he was groping toward was that astronomy — then apparently dull, boring, and largely played out — when combined with physics equalled the “magic synthesis” of astrophysics.

After he graduated from the Allen Academy, Hale boarded a train to Pittsburgh in order to meet the optician John A. Brashear. Brashear, expecting, from previous correspondence, to meet a mature and experienced scientist, was amazed to find himself face to face with a teenager. “Mr. Hale was so young, but so well versed in optics and spectroscopy.” Brashear was a canny salesman of his handcrafted instruments and Hale, with his father’s fortune behind him, was an eager buyer. Hale and Brashear hit it off immediately.

Hale’s next destination was Europe, where he travelled with his parents and met
the renowned French solar astronomer Jules Janssen. Then, at the recommendation of his father’s associate, the Chicago architect Daniel H. Burnham, he enrolled at MIT (“Boston Tech”), where his classmates recognized above all “his restless energy and intensity. On the rare occasions when he left his lab to play tennis, he played, as he worked, at fever pitch. When he walked he seemed to run, and one of his classmates’ most vivid memories was of a small, slight figure tearing through the halls of ‘Tech’, across Copley Square, his dark cape flapping in the wind.”

While still at MIT, Hale volunteered to work in astronomical photography with Edward C. Pickering at the Harvard College Observatory. By then, the Hale family, still in Chicago, had moved into a large mansion at 4545 Drexel Boulevard in Kenwood. There was an elevator in the house, and on a lot next to the home, William Hale built a brick laboratory for his precocious son. On Hale’s graduation from MIT in 1890, his mother managed to overcome her fears and make it to the ceremony — she had come close to excusing herself on account of her illness. Two days after his graduation Hale married Evelin Conklin, and after a brief honeymoon to Niagara Falls, he and his bride returned to Chicago. The newlyweds continued west to Colorado, Yosemite, San Francisco and Lick Observatory — for Hale this was the highlight of the trip; forty years later, when he began writing his autobiographical notes, he still recalled “his first sight of that long tube, the largest telescope in the world, pointing up in the darkness of the great round dome toward the slit that seemed to him to be an opening into heaven”. He had discovered the magic of large telescopes, soon to become one of the ruling passions of his life.

After considering and rejecting solid but unexciting and traditional job offers to teach astronomy at Beloit and Illinois Colleges, Hale decided that the best offer was that being proposed by his father, who agreed to build a private observatory, equipped with a 12-inch refractor, next door to the family mansion. Kenwood Observatory was dedicated on 5 June 1891; as one of Hale’s principal experiments he hoped to perfect his ingenious and recently invented spectroheliograph. E. F. “Doc” Williams, the Congregational minister who had been Hale’s live-in tutor for several years, observed at the dedication: “When you see what he is doing day after day and year after year without any lagging interest, you may be sure that there will be something developed by and by.”

Indeed, Williams’s prediction was fulfilled; Hale did obtain brilliant results. He found that he could photograph prominences in the light of ionized calcium lines, and also recorded disturbed areas (flocculi) all over the solar disk. To follow up this result would have meant long hours at the telescope, but “Hale never had the time nor the inclination for this dogged type of observing”. Instead, he hired Ferdinand Ellerman as a full-time professional assistant.

Ever restless, Hale no sooner dedicated his observatory with great fanfare than he sped overseas (“To say that I have been busy is to put it mildly, for I have done nothing but hustle around at the top of my speed from morning till night”);
he “hustled over to Paris” to see Henri Deslandres, who had disputed priority for the spectroheliograph with him. He travelled on to Cologne, Berlin, Leipzig, Frankfurt, Basel, Milan, Genoa and Nice, to promote a scheme for an international journal for astrophysics; then he “raced back” to Paris again. “Astronomers and physicists everywhere seemed eager to help this impetuous young man, who appeared suddenly at their doors, and suddenly departed.” On seeing Deslandres again, who invited the Hales to dinner and opera, Hale himself wrote: “I am inclined to think he will have to hustle to keep ahead, if I know myself.”

Seldom has there been a young man more in a hurry, a young man in astronomy whose rise has been more sudden, dramatic, or meteoric. It is exhausting even to read of his whirlwind activities. Back in Chicago, Hale became acquainted with William Rainey Harper, himself “a bundle of energy”, the recently appointed 35-year-old “boy-president” of the new University of Chicago then being built in Hyde Park, just south of Kenwood, with financing being provided by John D. Rockefeller. After some cat and mouse negotiations with Harper, chiefly involving the status of Hale’s private observatory, which the president wished to secure for the university, Hale, at twenty-four, agreed to become an associate professor of the University of Chicago (even so there was not the slightest hint of complacency on his part; “I would not consider the thing for a moment”, he said, “were it not for the prospect of some day getting the use of a big telescope to carry out some of my pet schemes”). He soon entered into a collaboration with William W. Payne, professor of astronomy at Carleton College (Northfield, Minnesota) for a new journal, Astronomy and astro-physics, and in October 1892 he and Harper met with the streetcar-magnate Charles T. Yerkes and managed to entice him into donating funds for the 40-inch Yerkes telescope, which more than a century later remains the largest refractor in the world. Hale suffered from long uncertainty over the “great observatory”, and constantly drove himself near the limits of his strength. His chief consolation was the Sun — whenever he could, he hurried back to his beloved Kenwood telescope to observe it. “In these glorious hours he was excited by everything he did.”

3. A Case of Chronic Hypomania

During his twenties and into his thirties, Hale’s energy was clearly abnormal or supra-normal. Much of this time he appears to have been in what would now be described as a chronic “hypomanic” state. (According to the standard American psychiatric manual DSM-IV, the criteria for hypomania include: elevated and expansive mood, more than usual energy and physical restlessness, decreased need for sleep, sharpened and unusually creative thinking, increased productivity, often with unusual and self-imposed working hours — all of which characterized Hale during this immensely productive period of his life.) Hale was hypomanic for years on end; pathologically energetic. In his own day, he would have been described as having a “psychopathic temperament”, which according to the psychologist
William James meant a character that brought with it “ardor and excitability.... His conceptions tend to pass immediately into belief and action.... Such men are not mere critics and understanders with their intellect. Their ideas possess them, they inflict them, for better or worse, upon their companions or their age.”

Apart from Hale, others with similar ardour and excitability included Harper, whose “boundless imagination carried him on faster than his financial means would warrant”, and Theodore Roosevelt, whose exuberance was certainly on Hale’s and Harper’s scale. (Roosevelt “lived at an extraordinarily high level of energy and was frequently grandiose, elated, restless, overtalkative, and inordinately enthusiastic. He functioned on very few hours of sleep and wrote, administered, or explored ceaselessly. It is estimated that he wrote more than 150,000 letters in his lifetime and a phenomenal number of books.”) During his twenties and thirties, Hale was generally upbeat, energized, expansive. The cure for whatever guilt and anxieties he experienced (which his fundamentalist religious upbringing encouraged) was to throw himself wholeheartedly into his work; enormous therapeutic work. The qualities that gave him the ability to accomplish prodigious amounts of creative science and administrative work and to inspire others were his elevated mood, vivacity, energy, and charisma. He often had feverish energy, a multiplicity of ideas which he struggled to keep under restraint. Thus he drew on his own personal experience when he later commented on the need for controlled imagination in research, since “with such a multiplicity of interests, and such constant stimulus to the imagination, the danger of mere dilettantism is obvious. With scores of problems suggesting themselves for solution, and with attractions at every hand, ... the chief difficulty is to choose wisely.” Hale’s comments on this occasion can be compared to those of the art critic John Ruskin (now generally acknowledged to have been a manic-depressive of classic type):

I roll on like a ball, with the exception, that contrary to the usual laws of motion I have no friction to contend with in my mind, and of course have some difficulty in stopping myself when there is nothing else to stop me.... I am almost sick and giddy with the quantity of things in my head — trains of thought beginning and branching to infinity, crossing each other, and all tempting and wanting to be worked out.

And yet even in this earlier almost heroic period, Hale did struggle, from time to time, with nervous troubles, feelings of guilt, and periodic depressions. Though he was not then or later particularly introspective or interested in examining his own motives — “if he had been”, as Anthony Storr remarks of Winston Churchill, “he could scarcely have achieved what he did, for introspection is the accomplice of self-distrust and the enemy of action” — he did experience dark unsettled moods. During his year at MIT he seemed often morose and dissatisfied, and wrote to his good friend Harry M. Goodwin: “though I slave steadily, I don’t accomplish a thing.”
4. A True Son of the South

There is some evidence that Hale’s mood was unusually susceptible to the vicissitudes of the seasons. In his autobiographical remarks, he recalls that even in his earliest childhood, when his family first moved into their earlier, rental house on Drexel Boulevard, he eagerly awaited the return of spring to the surrounding fields: “I am no poet, but I understand the thrill expressed in one of the letters of Keats, where he described the billowing waves in such a field, swept by the winds of spring.... I have detested all my life the gloomy rigors of winter, and rejoiced in the advent of spring.”

Hale was also depressed in Berlin in 1893. After writing hundreds of letters and organizing the World Congress of Mathematics, Astronomy and Astro-Physics for the Columbian Exposition held in Chicago that year, he had gone to Germany in order to fill the gaps in his scientific knowledge. He found the dark winter days depressing and his boarding house dreary; his research ground to a halt, and he spent most of his time working on designs for the Yerkes Observatory building and scheming a break with Payne and *Astronomy and astro-physics* in order to found a completely new and more professional *Astrophysical journal*.

In spring 1894, Hale abruptly fled the gloomy winter of Berlin and his no less gloomy moods for the sunnier climate of Italy, taking with him a spectroheliograph with which he hoped to detect the solar corona from the summit of Mount Etna (in the end, he was unsuccessful). He declared himself “joyful at the prospect of the Italian sun”. At Amalfi, he spent a typical morning working on an astrophysical paper, “drinking in the scent of orange blossoms, and gazing out over the blue sea, reflecting on how wonderful it would be to live forever in such a place of eternal summer”. There was something obviously expansive and intoxicating about the Mediterranean climate. “Although of New England descent,” he observed, “I am after all a true son of the south”.

5. Hale Moves on: The Founding of Mount Wilson Observatory

The death of Hale’s father in 1898 (which seems to have precipitated a brief “religious crisis”) removed the most important obstacle to his leaving Chicago and its gloomy depressing winters. He was still working very hard — “with his own boundless enthusiasm for everything he entered into, he was unable, throughout his life, to comprehend the indifferent or perfunctory”. On one occasion, a comparatively languorous European astronomer commented:

They work too hard at the Yerkes Observatory. Morning, afternoon, and night the work seems to go on continuously.... The centre of it all is the 40-inch, which never rests. The whole performance is splendid, and strikes awe into the beholder if he happens to come from lands where folk still retain the mistaken idea that one ought to rest every now and then.

Yet by 1898 Hale realized that the new, largest refractor in the world, though
representing a great triumph in fund-raising, was really the wrong telescope in the wrong place at the wrong time. The great 40-inch was not at all well suited for the astrophysical research on stars that was Hale’s compelling dream. An even bigger-aperture reflector, which could feed a large, fixed, flexure-free spectrograph, erected on a clear-sky mountain peak, was what he really “needed”. In January 1902, the multimillionare Andrew Carnegie announced his plan to set up a lavishly funded “institution” to finance research and discovery, and the die was cast. Hale began planning to found a remote observing station of Yerkes Observatory in California, to be centred on a new 60-inch reflector. And if not immediately, soon thereafter, he began thinking of “schemes” to break loose from President Harper and his boring insistence on funding the whole University of Chicago, rather than just astrophysics.

In June 1903, he visited Wilson’s Peak, near Pasadena, and decided this was where he wanted to build his new observatory. (William J. Hussey wrote to W. W. Campbell about Hale’s then-mercurial temperament: “It appears that Hale’s characteristic is to seize one idea and to forget all the rest; to oscillate from one point of view to another. One day he thinks Mt. Wilson the best site in the United States — the next he wants Flagstaff tested; and a day later ... he thinks San Bernardino Mountains fulfill conditions.”) After visiting Wilson’s Peak, on the way back to Chicago, Hale was in very high spirits indeed, and wrote to John S. Billings: “There is certainly no observatory site at present known which seems to offer the advantages ... at Wilson’s Peak.” But soon afterwards, the Executive Committee on Astronomy of the Carnegie Institution shelved his recommendation for a “solar observatory”, as he had called it, at Wilson’s Peak — in part because his plans seemed too “grandiose”. Hale now became gloomy and depressed, his future plans “far from clear”, apart from his certainty that wherever they led, they would one day take him back to California. So they did. On arriving back in Pasadena (20 December), his “depression quickly vanished”. His wife and children joined him in California and henceforth he would not return to Yerkes Observatory except during the summers. He would write — just before resigning his position as director so that he could devote all his time and effort to the new observatory and remain in California — “I do not believe it possible that I could ever tire of such glorious conditions”. He bloomed with the eternal sunshine, the effects of which were exhilarating, and at this time began an affair with the attractive Los Angeles socialite Alicia Mosgrove in which “the problems of his life seemed to vanish”.

At the Mount Wilson Solar Observatory, a self-contained research centre, which Hale eventually succeeded in separating from Yerkes Observatory and the University of Chicago, his career paralleled his father’s (and other industrial capitalists’), though in science rather than in business, his philosophy being well expressed in a well-known saying attributed to the Chicago architect Daniel H. Burnham: “Make no little plans; they have no magic to stir men’s blood.” The second industrial revolution of the late nineteenth century, which in America
spanned the period between the Civil War and the First World War, “was entwined with the shift from the disorganized entrepreneurial capitalism of the earlier nineteenth century to the organized corporate capitalism of our time”; it was marked by the “rationalization of economic life — the drive for maximum profits through the adoption of the most efficient forms of organization moving into higher gear”.22

Even at Yerkes, Hale had become the archetypal director. Though he was a gifted researcher, his real genius was organizational, and consisted of applying the methods his father and other successful capitalist-industrialists had applied in business to science. He was learning to become a “master of operating a monopolistic observatory”.23 He had clearly recognized that the application of spectroscopy to the study of celestial bodies, the emergence of astronomical photography, and the availability of silvered mirrors for building large reflecting telescopes were creating “boom” conditions for astrophysics — the new blend of astronomy and physics which exhilarated him. It was a period of remarkable opportunity in science analogous to the one his father and other titans of Chicago enterprise had exploited in the post-Civil War era in American business, an opportunity that responded to some of the same methods of large-scale organization.

In science Hale was (with Edward C. Pickering of Harvard and W. W. Campbell of Lick) foremost in recognizing the possibility of creating “a monopolistic observatory, the biggest and most successful in the world, and in organizing combines, in the form of scientific societies and international unions”.24 At Yerkes Observatory, but even more so at Mount Wilson, Hale became the chief architect of this transformation of American science; a transformation from a confused and fragmented activity, in which individuals such as Burnham and Hale’s own optician George W. Ritchey could still play an important role, to big science, corporate science, in which the individual was subordinate to, if not crushed by, large institutions and massed resources. It was this transformation of science — paralleled in industry and social life — in which Hale emerged as a Promethean figure.

Increasingly this — and not the research which he continued to idealize and passionately promote but rarely found time to do himself — was the big-stakes game that captivated Hale. As a young man, he had already captured almost all important scientific honours: the Janssen medal of the French Academy of Sciences, the Rumford medal, the Draper medal, the gold medal of the Royal Astronomical Society, election to the National Academy of Sciences, all before he was forty. As his nemesis Ritchey observed, no doubt with some truth, “he has reached a place where scientific work and honors are not enough; he must have vast power also; power to dictate the welfare, the making or unmaking, the positions even, of scientific men both in the observatory and outside of it — as far as his influences can possibly reach”.25

A more ruthlessly driven and compulsive — sometimes frenzied, often joyless — quality does become apparent in Hale’s efforts of the early 1900s. The austere
New England fundamentalism of his youth, in which pleasures were disdained and work alone was virtue, had given him a repressive and punishing superego, a conscience that made him unstemming and relentlessly hard on himself. But he was no longer sustained — as his parents and their generation had been — by the clear goal of salvation. In them “self-scrutiny had sometimes produced intense feelings of guilt; among their uncertain descendants, for whom salvation had become unreal, self-scrutiny more often engendered a diffuse anxiety. Plagued by doubt but still driven by a Protestant conscience, introspective late Victorians felt compelled to seek relief from decision-making and responsibility.”

Certainly Hale was under enormous stress, bearing tremendous burdens of both decision-making and responsibility. Inevitably and cumulatively, the strain began to take a toll. There were battles with his “prima donna” optician Ritchey and constant worries over funding of his large projects. Hale engaged in a massive letter-writing campaign to organize the first meeting of an International Union for Solar Research at the St Louis World’s Fair in 1904. Worrying about funds that same year, he thought often about a woman in Chicago whose “nervous trouble” developed into melancholia, “and she did what so many victims of this disorder do — killed herself”.

"Probably he worried that if he did not end up like this sick soul, he would become like his mother, depressed, withdrawn, reclusive (as in fact he eventually did). The following year, it was not Hale, however, but his wife, Evelina, who broke down and was sent to a sanitarium for recovery (“whenever he was furiously active he was well, but Evelina was ill. When new projects thinned out and old ones soured, Hale became ill and his wife thrived.”). "Many depressives”, writes Storr, “deny themselves rest because they cannot afford to stop. If they are forced by circumstances to do so, the black cloud comes down upon them.”

This was no doubt Hale’s strategy too: keep up a frantic pace, stay ahead of depression by constant activity. However, as he grew older, the hectic pace became harder to sustain; he was more vulnerable to exhaustion — physical, mental, and emotional. And more vulnerable to depression. Certainly by 1906, Hale, tired and run down, was searching for a rest cure by the sea in Santa Barbara. He had become more involved in high scientific policy, and was afraid of the changes he was seeing in himself — he suffered from “sleeplessness”, also “my own nervousness, which has increased in the last few years”. He was now profoundly distressed about the funding for yet another large telescope — the 100-inch, of which the disk was being cast by the St Gobain glassmaking works in Paris. Meanwhile, the 60-inch had not yet gone into operation — it would not do so until December 1908. Hale suffered badly from “nervousness” when he went to Europe in 1908; he suffered from headaches and indigestion; his letters to his wife show “a highly disturbed inner man, whose thoughts combined intense but repressed sexuality … and severe guilt for past unfaithfulness. He had great difficulty sleeping, and in concentrating when awake. Probably, he thought he was about to die.”
6. The Crack-up

For several years, Hale’s friends and colleagues had been concerned about the toll that running a scientific corporation had been taking on him. After the 60-inch was in working order, Georgio Abetti and Harold Babcock noted that work on the mountain seemed to be moving “at an extraordinarily rapid pace”. Only to Hale did the progress seem painfully slow. After leaving Yerkes Observatory, he had once again founded the greatest observatory in the world; he was absorbed in research on the magnetic fields of sunspots, was full of plans to revive the National Academy of Sciences, and was scheming to transform the Throop Polytechnic Institute in Pasadena into a technological university that would be the West Coast equivalent of MIT. He also dreamed of establishing an organization for astronomy on an international scale (the Solar Union). “He had been working at top speed, without relaxing.” Now, however, the vibrations and shaking of the engine, the “demon” within him were becoming more evident. Hale told Babcock of his “terribly hard dreams”; he was a thing going bump in the night, as half-awake he found himself attempting to climb the picture frames on the walls. Always high-strung, he seemed even more nervous than usual. He confided to the pioneer English spectroscopist William Huggins: “Last summer I had a great deal of trouble from nervousness, and my physician told me I ought to give up my work....” He ignored his physician’s advice at the time, seemed to recover for a while, but then the headaches and bouts of indigestion increased. He suffered from chronic insomnia and was unable to concentrate for any length of time.

In 1910, the steel-magnate and Mount Wilson benefactor Andrew Carnegie visited the observatory, in the company of the paleontologist Henry Fairfield Osborn. Osborn observed with Hale until two o’clock in the morning with the 60-inch. During a pause in the observing, Osborn turned to Hale and said: “This is grand, but I am worried about one thing.” Hale: “What’s that?” Osborn: “Why, the most precious instrument, and the one most difficult to replace ... George Ellery Hale.” Hale admitted he was tired, but was dismissive of Osborn’s concerns. All he needed, he said, was a good fishing trip, then he would be rested and recovered for the International Solar Union meeting he planned for August 1910 at Mount Wilson. But he overestimated his powers of recuperation. At the meeting, when astronomers and astrophysicists came from everywhere to admire the telescopes at Mount Wilson, he appeared for only one day. Finding himself unable to face work or people, he departed precipitately with Evelina for a fishing trip to Lake Tahoe where he hoped to pull himself together again. His assistant director, Walter S. Adams, and staff member Frederick H. Seares were left to run the meeting as best they could.

After Tahoe, still worried about the 100-inch disk being cast in Paris, the precariousness of the observatory’s funding, and his ongoing battles with Ritchey, Hale moved restlessly on to Oregon and more fishing. Evelina urged him to consider doing as she had done and checking into a sanitarium; he refused, saying he could not live without her.
In an attempt to get his mind off astronomy, Hale resolved on rest and travel, the cure that had been adopted by many similarly worn-out and broken-down American businessmen of that era who suffered from overtaxed or collapsed nervous systems. He had a bad case of what was then often referred to as “neurasthenia”, an amorphous amalgam of anxiety, depression, and somatic complaints including, typically, ringing in the ears and indigestion that had been popularized by the American neurologist George M. Beard. According to Beard, neurasthenia was limited to those of the “higher orders” who used their minds to create new ideas (and embraced, without question, the Protestant work ethic and hard-driving capitalism; it was reassuring that muscle-workers who dominated the lower classes — and could not afford the often expensive treatments, such as respites on the French Riviera — did not, apparently, suffer from the same enervating fatigue). Beard himself had prescribed a host of cures, including electricity, rest, massage, work, diet, exercise, and a range of medications, such as strychnine, marijuana, and arsenic. However, the most popular cure remained travel — flight from anxiety — especially by means of the European tour, advocated since the Continental style of living was obviously slower and more traditional than the pressured and nerve-wracking American way of life.31

Hale now proposed that he and Evelina set sail for Europe, “travel about as [they] might choose, to new places and old, avoiding all scientific men and institutions, and renewing youth in a second wedding journey”. This mention of “renewing youth” sounds almost pathetic in a man only forty-two years old; but it was appropriate. Hale was prematurely aged and exhausted. He and his wife reached England in October; the trans-Atlantic journey, he admitted, had been “very hard on my head”, which he often spoke of as if it were a separate object detached from himself. Obviously this was a strategy that had the effect of depersonalizing his mental problems, making them seem as if they were somehow separate from himself; a useful method of abdicating responsibility for them. In London, he conceded he felt “rather blue”. He was actually worse off than he admitted. The British astronomer David Gill found him “looking exceedingly ill and suffering from severe nervous pains and noises in his head, symptoms that demanded rest from all excitement”.32 He was examined by several doctors, including the famed internist Sir William Osler; none, however, succeeded in identifying a physical cause to account for his problems, so he received the usual recommendation — rest and travel — as well as permission, which he found more difficult to act upon, not to worry about either the observatory or the 100-inch disk. With Egypt their eventual destination, he and Evelina travelled on to Paris, where he was “in some anxiety in regard to the great mirror”, then they boarded the train to continue the rest cure in France.

7. The “Little Elf” Makes an Appearance

At Mentone, in southern France, Hale had a strange experience, intimately tied up with this severe bout of depression that he later referred to as his “breakdown”. It has
always seemed one of the most peculiar events in his biography. Wright recounts it simply (her account is based on a 1911 letter Hale wrote to Goodwin and some later remarks she attributed to one of Hale’s physicians, Dr Leland Hunnicutt):

An odd thing ... happened during this visit. It was something he himself could never explain entirely. One night, when he was sitting in his room, out of nowhere a little man suddenly appeared, and soon was advising him on the conduct of his life. Sometimes Hale had a ringing in his ears. Now the visitation of this little elf seemed to be connected in some way with that ringing. After this, his first visit, he came often, in many widely scattered places, until he became almost a mascot.

Wright’s account has become part of the popular mythology about Hale.\textsuperscript{33} Taken at face value, she seems to indicate that he literally saw a little man or an elf, something that clearly suggests a hallucinated vision; an interpretation that Wright bolsters by connecting the vision with the “noises” in Hale’s head. It has been impossible to rule out this interpretation, particularly as Wright wrote her book under the patronage of Hale’s widow, and had several boxes of material on his life and career that have not yet become available to other scholars.

However, both on professional psychiatric grounds and on a close reading of what Hale actually said in his letter to Goodwin, Wright’s interpretation does not seem probable. Hale did \textit{not} use the word “elf” or “man”; instead, he referred to a “little demon” in such a way as to suggest that he intended it to be taken figuratively, not literally. What Hale actually said in his letter, written from Rome on the way back from Egypt, is this:

I have reached a stage where it seems almost impossible to keep interested in anything — except, of course, the forbidden things in my own line forcing themselves upon me. Until I got back from Egypt I was able to read, with pleasure, a great variety of books. But now I can’t keep my mind on the subject, as a little demon stands by my side, and every few minutes prods me with the suggestion that, after all, the book is not interesting, and that all my attention belongs to him. How to escape this new form of torture I do not know. If I could only do a little of my regular work there would be no difficulty. But work excites me and sets the back of my head to aching, and so appears to be out of the question.\textsuperscript{34}

After that there are pages of praise for Goodwin’s son, for Hale’s own children, and for the beauties of Egypt. But then, in a postscript, on a small piece of a different kind of stationery, no doubt slipped in by Hale after his wife had read the letter, he added: “Since writing it has occurred to me I can get rid of the ‘demon’ by having some regular work to do each day — something light and easy, such as tracing drawings, writing library cards, or even proof reading.” All of these tasks he mentioned were in his “own line” of research, writing, and building observatories, as contrasted with the high culture his wife and doctors were trying
to force on him. He went on to ask Goodwin if he had any suggestions, and wrote: “The work must keep my mind busy, without taxing it too much. And it must be of some use to someone.”

The symptoms Hale described, including problems with attention and a general lack of interest in things, are among the cardinal symptoms of depression. His work excited him too much. Hale seems not to have questioned the view of his personal physician, James H. McBride, that overwork or “brain exhaustion” was the cause of his disorder; McBride contending it had been caused by twenty-five years of a “pretty steady strain in one direction. No brain thus exhausted could recover its normal vigor in a few months or even a year”. McBride strongly endorsed the rest cure: “I think you will never be able to work as you have worked”, Hale was told, “and your breakdown will prove a happy event if you learn from it that in the future you will need do, not what you like to do, but what you have to do in order ‘to be saved’”. All the same, the rest-cure clearly bored Hale.

Hale personified his depression as the “little demon”, as Winston Churchill would later personify his periods of gloom and depression as his “black dog”. Despite following McBride’s advice, Hale continued to suffer from a “terrible haunted feeling”. He would be haunted by his “demon” for the rest of his life. He was then one of the two or three most powerful figures in American astronomy; the head of a great “monopolistic” observatory and manager of far-flung scientific corporations that were not only American but international in scope. Yet for all his power and influence, he was personally impotent and immobilized, not even the master of himself or of his “head”. Clearly he had lost his grip.

In earlier years Hale had been possessed of extraordinary energy which he took for granted; everything had come easily to him, he had possessed, like his “demon” steam-engine, a machine-like drive and energy. Now another “demon” — the other side of a Janus-faced mood disorder — instead of urging him on to renewed activity checked his action and puzzled his will.

8. Searching for a Cure

On his return from Egypt in early 1911, Hale showed some improvement; he remained optimistic during the spring, but by summer, when his brother William met him at the dock in New York and took him back to Chicago, he was “all done up again”. In Chicago, he rested in a vain attempt to get over his “bad head”. He was eager to return to Pasadena. But Evelina did not feel he was ready yet, and instead they went to London. In May, one of his British friends, the astronomer H. F. Newall, brought him from the “despairing gloom” of London to his estate at Madingley Rise, Cambridge, where in the peaceful countryside, with the dome of Cambridge Observatory rising in the distance, Hale seemed to improve.

In a retrospective letter to Newall written twenty years later, Hale mentioned his passion for Egypt. Then he continued:
[But] there is one other spot — Madingley Rise — that holds first place in my affections. I so keenly recall how I found praise there even at the time when, during my first and most severe nervous breakdown, there seemed to be no peace elsewhere in the world. The demons of unknown fears, which had so sharply assailed me in Egypt, became even more violent in Rome, whence they followed me to England. I shall never forget how you rescued me ... and carried me off to your haven of true repose, where I could sit quietly in your garden on heavenly English days. From that time the demons slipped into hiding, and have never emerged since in their original fury. Hence one of the friendly forms in which you appear to me is that of Imhotep, First of Physicians.\textsuperscript{36}

(We have taken the liberty of italicizing “demons”, which Hale used twice in this short excerpt, to emphasize that it is the same word that Wright thought meant a “little elf”, an apparition, which is clearly not the case here.)

However Hale saw the matter from two decades later, his optimism about conquering his demons was not shared by his physician, Dr McBride, in 1911. McBride continued to advise him to avoid exertion and to “save himself”.

Knowing as I do that you are worth saving, I am writing this because I know what you cannot possibly know, of the uncertainties of your future. As simple as it may seem to you, as well as you seem to be, I can tell you that your improvement is only on the surface, and that you are now, and will be for some time, living on the edge of a precipice.\textsuperscript{37}

McBride urged Hale to take the step that he had resisted thus far and enter a sanitarium in Bethel, Massachusetts, run by an acquaintance of McBride’s, Dr John G. Gehring. This time Hale was better able to accept the thought of being separated from his wife, so to the sanitarium he went.

In the same fanciful vein in which he had personified his depression as a “little demon” (and would describe Newall as “Imhotep, First of Physicians”), Hale described the sanitarium as a “castle” with “dungeons”. Gehring was a “wizard” and a “Satanic holiness”, whose piercing eye “transfixed his very soul”. The doctor declared that the problem lay in Hale’s “guts” — purportedly his large intestine had become displaced and enlarged, while long use of one part of his brain had weakened it and allowed the poisons generated in his intestine to act upon it (!). Gehring’s therapies were marginally more useful than his diagnoses; he applied light massage to Hale’s abdomen, probably in order to convince Hale that he was being treated for a physical ailment. (Hale described himself to Goodwin as being “set upon and mauled”. He would, in fact, have his appendix and gall bladder removed in August 1914, though this — despite Adams’s fervent hope — failed to clear up the problems with his head.) Gehring also recommended large amounts of outdoor exercise, such as sawing wood at the “fiendish wood pile”, as Hale put it. “And I am to suffer other tortures and trials without limit”, he complained to Goodwin (the fiendish tortures included gardening and tennis!).\textsuperscript{38} Gehring, being
a modish physician, also dabbled in hypnosis; he made many suggestions to the “arch enemy in the back of Hale’s head”, and subtly encouraged Hale’s belief that he was getting well. The approach worked temporarily.

A year later — with Hale again struggling with Ritchey over the 100-inch telescope — he had a relapse, and McBride sent him back to the Bethel Sanitarium again. Hale would never be cured. His head troubles continued intermittently for the rest of his life — except for the years 1916–17, when he was actively involved in preparations for the American entrance into the European War; in hundreds of letters to his wife written then, “not once does he mention his head, depression, or anxiety as he had in so many letters when he was trying to do research and run an observatory”.

Hale’s troubles at Mount Wilson Observatory came to a climax in 1919, when he finally fired the insubordinate optician Ritchey. A year later he found himself suffering from lumbago and again was having difficulty concentrating. In February 1922 — while in the midst of the “schemes”, on which he thrived, such as planning the National Academy of Sciences building and designing a spectroscopic laboratory for Caltech (as the reorganized Throop Polytechnic Institute was now called) — he had a “sharp recurrence of my old head trouble”. He resolved on another leave of absence and more travels in Europe, and at last resigned the directorship of Mount Wilson. In his resignation letter, written from Rome, he detailed his medical history and problems from his “preliminary nervous attack” in 1908 through his severe breakdown in 1910, and estimated he had not enjoyed one-third working capacity during the previous sixteen years.

Even resignation of the Mount Wilson directorship failed to improve his mental condition, however. As 1924 began, Hale, at fifty-five, reported having renewed trouble with his head, and could only endure life by avoiding people. He did succeed in nerving himself to take part in the dedication of the National Academy of Sciences building, but during the final preparations he was unable to stand the strain; as he had done at the International Solar Union meeting at Mount Wilson, he fled — this time to New York City. The doctors there diagnosed him as suffering from high blood pressure and being in a “psychoneurotic state”.

Hale desperately tried to find relief in travel and by reliving the triumphs of his youth. He spent more and more of his time building his private Solar Observatory, a new version of the Kenwood Observatory of his early Chicago years. In 1927, he entered a new sanitarium — Dr Austen F. Riggs’s residential centre at Stockbridge, Massachusetts. It was then, as it still is today, an asylum for the wealthy, where they purchase an escape from the pressures and responsibilities of life. A strict vegetarian diet helped his blood pressure; his head remained, alas, “about the same”.

Hale lived on, a mere shadow of his former self. His later years became a variant on the old quest motif of medieval romance — it was a search for “grace”, the fervent (but vain) pursuit of some semblance of his former happiness, youth,
Hale’s “Little Elf”

Fig. 2. George Ellery Hale at age 57 (1925), in sombre mood, two years after he had resigned as director of Mount Wilson Observatory. (Courtesy of the Henry Huntington Library.)
and energy. Near the end, he spent much of his time at his solar observatory — located near the Caltech campus, some two miles from his home. Going to his lab automatically meant getting away from his wife, and with its pleasant library and the solar spectroheliograph in the basement, it became his asylum, his refuge from the anxieties, bouts of depression and “psychoneuroses” with which he had so long contended. There Hale could indulge in his own research; principally, he and his assistants at Mount Wilson sought the grail of the Sun’s general magnetic field. Hale never did find it, though later Harold and Horace Babcock detected and measured it at his solar observatory, using photomultiplier tubes and electronic circuits undreamed of in Hale’s scientifically active years.

The happiness he sought eluded him; he admitted, near the end, that “he had very little energy”, and complained that “he was accomplishing almost nothing”. After a mild stroke Hale suffered on a train near Toronto in 1936, his wife and his brother brought him back to Chicago and then on to Pasadena. There, described guardedly by family members as often “disturbed” or “confused”, he spent the last year and a half of his life as a patient in Las Encinas Sanitarium. He died in 1938.

9. The “Crazier” the Better (Within Limits)

It is probably always dangerous to indulge in retrospective or posthumous diagnostic studies (though as Albert Einstein once said, “I have reached the point where only diagnoses post mortem inspire my confidence”). However, we, a psychiatrist and a research astronomer, believe ourselves to be in a better position to link the two worlds of psychiatry and astronomy than most others who have written biographical accounts of Hale. We believe that there is compelling evidence that Hale experienced wide mood swings; in his twenties and thirties, he was chronically hypomanic (with elevated and expansive mood, more than usual energy and physical restlessness, decreased need for sleep, sharpened and unusually creative thinking, increased productivity). A psychologist who has specialized in manic-depressive illness, Kay Redfield Jamison, suggests that “the tendency for highly accomplished individuals, almost by definition, to be highly productive and energetic, results in ... diagnostic bias — an inclination to underdiagnose manic aspects of affective illness”. Our contention is that this has indeed been the case with previous studies of Hale. The depressive episodes of his later years, on the other hand, are well documented; the chronic hypomania of his earlier career made them all the more noticeable (and relatively paradoxical even to himself) during the years after his breakdowns in 1908 and 1910. That Hale suffered from a rather severe form of manic-depressive illness is a reasonable interpretation of the abundant medical and psychological information available about him. More specifically, in terms of DSM-IV, he suffered from Bipolar II (a clinical course characterized by one or more major depressive episodes and at least one hypomanic episode; note that according to DSM-IV, “individuals with Bipolar II may not view the hypomanic episodes as pathological, though others may be troubled by the individuals’ erratic behavior”).

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Hale’s “Little Elf”

The relation of Hale’s illness to his great achievements raises more interesting, and ultimately more difficult, questions. For there were many George Ellery Hales. He was an outstanding organizer of science and a builder of scientific institutions and organizations. He was also a man who had many creative ideas and who did excellent research himself when he was young and had time for it. In some ways it was a tragedy that he gave up, gradually and unwillingly, doing science as he devoted himself more and more to running it, but probably his overall contribution turned out to be greater that way. He founded great observatories, and the final telescope for which he obtained funding, the 200-inch Palomar reflector, would after its dedication as the “Hale telescope” in 1948 become the most productive research telescope for four decades (until the Hubble Space Telescope began work). Allan Sandage, one of the outstanding observers who used the Hale telescope, has said: “The longer I work in astronomy the more overpowering is the conviction that we owe all to Hale and his dreams and positive actions to put those dreams into glass and steel. Where would world astronomy be today if Hale had not been an ‘empire builder’. But there was a price to be paid. His greatness in organizational matters came at a tremendous cost in mental anguish — or perhaps the greatness and the anguish were two aspects of the same thing, the makeup of his own mind. Certainly he had break-through ideas, and none of his contemporaries succeeded as he did in making his dreams of big telescopes and great observatories come true.

Hale early had a sense of his own destiny, and he was an extreme extrovert when acting in his leadership role. He was euphoric while in his intensively creative episodes, though he always reported great difficulty sleeping after them. Hale was an “impassioned authority”; during his productive period he had many characteristics of hypomanic states as described by Jamison: “high energy level, enthusiasm, intensity of emotion, persuasion by mood, charisma, and contagion of spirit, gregariousness and extraversion, increased belief in one’s self and one’s ideas (including grandiosity), ‘grasping beyond the common grasp’.” He was “the hero ... the ardent one, ... the one who overflows with energy and life”. All of his contemporaries, from Adams to Van Biesbroeck, saw him this way. He was definitely a deviant in personality from most scientists (who in general seem to suffer much less from manic-depressive illness than, say, poets). He was a genius in getting funds for scientific research, which made him godlike in the eyes of nearly all scientists.

“Had he been a stable and equable man,” Storr has said of Winston Churchill, “he could never have inspired the nation. In 1940, when all odds were against Britain, a leader of sober judgment might well have concluded that we were finished.” The same might well be said of Hale. He was a man who if completely stable and sane would never have dreamed of — and then set out to actually build — big telescopes and great observatories.

Obviously, in emphasizing Hale’s instability, his mood swings, head troubles, and manic-depressive illness, we have not attempted a balanced or a complete view
Fig. 3. George Ellery Hale at age 55 (1924), retired solar physicist but still active statesman of science, just before the dedication of the National Academy of Sciences building which he did so much to create. (Courtesy of the National Academy of Sciences.)
of his life. Instead we have emphasized certain themes that have not perhaps been given sufficient weight in earlier attempts to come to terms with Hale’s complex personality. Hale was a famous astronomer and leader of astronomers, who is now almost the patron saint of big science (and corporatized science) in the United States. But he was also, in good part, dreamer and wild-eyed seer. What Nietzsche once seemed particularly apt in summing up the career of George Ellery Hale: “One must harbor chaos within oneself to give birth to a dancing star.” It is the chaos that lies at the heart of all productive science.

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32. Osterbrock, *op. cit.* (ref. 9), 124.

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