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## Strange Science

Karpenko, Lara Pauline, Claggett, Shalyn Rae

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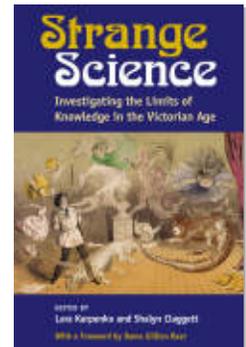
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## The Victorian Occult Atom

*Annie Besant and Clairvoyant Atomic Research*

*Sumangala Bhattacharya*



In August 1895, in the pastoral setting of Box Hill, Surrey, Annie Besant (1847–1933)—controversial Victorian feminist, freethinker, neo-Malthusian, Fabian socialist, anti-imperialist, and international leader of the Theosophical Society—conducted a series of experiments to determine the structure of the atom.<sup>1</sup> The experiments were conducted under the clairvoyant guidance of her fellow theosophist Charles Webster Leadbeater (1847–1932), a man known in his circles for the cultivation of occult powers. No laboratory setup or equipment was involved; instead, the experimenters used a form of clairvoyant meditation inspired by the yogic traditions of India to gaze into pure samples of their targeted substances. The initial results were published as an essay entitled “Occult Chemistry” in *Lucifer*, a journal published by the Theosophical Society, and later reprinted as a pamphlet in 1905. Besant and Leadbeater continued their clairvoyant research into the atom sporadically until the end of their lives, and subsequent researches resulted in three illustrated editions of the pamphlet, published by the Theosophical Publishing House in 1908, 1919, and 1951.<sup>2</sup>

This essay argues that *Occult Chemistry* (henceforth referred to as *OC*) should be read as an instantiation of what postcolonial theorist Ashis Nandy calls “a repertoire of the dissenting movements of science” that chal-

lenge the post-Enlightenment scientific values of rationality and objectivity.<sup>3</sup> The failure of *OC* with respect to the cultural power of mainstream or modern science makes it valuable as a critique of the *politics* of scientific authority.<sup>4</sup> Readily refutable by quantum theory and particle physics, *OC* nonetheless continues to enjoy an audience among readers who view the findings as prescient of later developments in atomic theory, such as isotopes and various exotic subatomic particles, or who value the experimenters' speculative approach as befitting the strangeness of quantum theory.<sup>5</sup> However, the cultural significance of the work as a critique of scientific authority has received scant attention. In his study of the trope of alchemy in the historical development of atomic theory, Mark Morrisson refers to *OC* as notable mainly for its attempt to compensate for the technological lag of instrumentation, which "offered believers a vision of a spiritual experience that was also a sensory experience of a material world," but which "simply cannot match the rhetorical power of the modern laboratory."<sup>6</sup> However, Morrisson does not engage with the gender and colonial implications of Besant's involvement in the experiments, which raise questions about the bases and biases inherent in how the "rhetorical power of the modern laboratory" is culturally constructed.

The lingering half-life of *OC* owes a great deal to the continued global resonances of Besant's eventful life, which greatly overshadowed the accomplishments of her fellow experimenter.<sup>7</sup> *OC* epitomizes a "dissenting science" perspective by blurring the distinction between experimenter and experiment: the experimenter's embodied participation is the instrumentation generating results. The contestation of scientific objectivity becomes even more apparent with the recognition that the "occult body" that performed the experiments is also a gendered body imbued with a subjectivity shaped by specific life experiences. Besant's involvement with *OC* tracks her personal journey from a crisis of religious faith to full faith in the rationality of modern science to the recognition of its limitations and a quest for alternative approaches to truth.<sup>8</sup> Emerging from a subjective and embodied perspective, the scientific narrative of *OC* offers a type of "situated knowledge" that presents a compelling resistance to the rationalized and progressive historiography of atomic science and quantum theory, and thus to the hegemonic cultural authority of science.<sup>9</sup>

### *The Discontents of Modern Science*

Similar to many of her fellow theosophists, Besant believed that mainstream or modern science should not have a monopoly on delineat-

ing reality, a perspective informed by her experience as a crusader for women's rights and by her study of Eastern philosophies.<sup>10</sup> Besant understood that being a radical woman precluded her from pursuing mainstream scientific work. The small handful of Victorian female scientists who were accepted by the scientific community were genteel middle-class women who conducted themselves with great discretion in order to maintain a modicum of credibility within the mainstream scientific community. Unlike these respectable women of science, Besant had garnered considerable notoriety for her gender and class activism. When Besant legally separated from her husband, the Reverend Frank Besant, after six years of an unhappy marriage and an agonizing crisis of faith, she was given custody of their daughter (but no financial support) while her husband retained custody of their son. To support herself and her daughter, Besant moved to London, where she found a niche among the freethinkers and socialists as a writer and a powerful orator on union issues and women's rights. Besant was catapulted into national prominence by her involvement in two sensational trials: an obscenity charge for distributing birth control literature, and, immediately following that, the custody trial for her daughter.<sup>11</sup>

Although mainstream science, with its increasing emphasis on laboratory-intensive experimentation, was closed to Besant because of her notoriety, Eastern thought offered an alternative route to knowledge production. In 1893, Besant had succeeded the late Madame Blavatsky as leader of the Theosophical Society and moved her permanent residence to the Society's compound in Madras.<sup>12</sup> Besant's study of arcane Hindu philosophies in India contributed to her conviction that Indian occult practices could be harnessed in ways that intersected with, and even transcended, the work of conventional Western science. Outside of the laboratories and beyond the control of the Victorian scientific establishment, Besant hoped to show that foundational truths about life and existence were discoverable by intuitive "lay" persons and that these alternative paths to truth would reveal an essential wholeness and harmony in the universe, thereby confirming the theosophical belief that "there is no such thing as 'dead' matter; all matter is living, the tiniest particles are lives."<sup>13</sup>

Clairvoyant atomic research challenged mainstream scientific practices on multiple levels. First, the experimenters embraced a nontechnological methodology that repudiated the gatekeeping role of the mainstream scientific establishment in controlling the access of women and non-Europeans to the laboratory. While the complex of laboratories and equipment that had become indispensable to the production of

mainstream scientific knowledge was barred to the experimenters, they contended instead that the technological complex posed an obstacle to direct human access to cosmic truths. Laboratory equipment could only show what it was designed to detect, but the human mind is not subject to such a priori limitations in what it could apprehend. Second, the premise of a holistic universe in which everything, living organisms as well as “dead matter,” was imbued with a metaphysical life force was contradictory to the classificatory imperatives of Victorian science.<sup>14</sup> Finally, by incorporating Eastern mysticism in research on the cutting-edge Western topic of atomic structure, the experimenters contested the boundary held inviolate in modern science between consciousness and the material world. Clairvoyant atomic research mounted an important critique of the core values of rationality and objectivity that undergirded the role of modern science in authorizing colonial modernity.<sup>15</sup>

Twentieth-century science studies, inflected by feminist and post-colonial theories, has been increasingly attentive to the fault lines that animated Besant and her fellow discontents of mainstream science. Modern science promised a better world through the mastery of nature achieved by the disciplined exercise of scientific core values of rationality and objectivity. This project entailed the dominance and exploitation of persons or entities perceived to lack these values. As Nandy argues, this anthropocentric vision of the future, built on an overinvestment in rationality and objectivity, promotes “the dangerous human ability to separate ideas from feelings and to pursue ideas without being burdened by feelings.”<sup>16</sup> In a similar vein, Donna Haraway deconstructs the post-Enlightenment ideal of objectivity by invoking the figure of the “modest witness,” a self-effacing, neutral observer who supposedly produces representations of nature undistorted by subjective biases within “a culture of no culture,” but who thereby facilitates the coexistence of the “dazzling promise” of modern science with “nastier and nastier technoscience dominations.”<sup>17</sup> Gyan Prakash argues that the “civilizing mission” in British India, which proceeded by substituting traditional and “superstitious” beliefs with universal reason, “served as a tool for setting up the mastery of those who possessed an instrumentalist knowledge of nature over those who did not.”<sup>18</sup> In opposition to these patriarchal and colonial agendas, clairvoyant atomic research presents an earnest contestation of the cultural authority of modern science.

The interrogations of scientific authority that culminated in *OC* were catalyzed by Besant’s failure to complete her college degree and by her involvement in the Victorian cultural debate over vivisection.<sup>19</sup> When the

University of London began granting degrees to women in 1878, Besant immediately made plans to enroll. She passed her matriculation examinations in five subjects in 1879, winning a first class in botany and animal physiology, but failed the chemistry examination thrice. She left the university without a degree, convinced that she would never overcome the stated bias of one examiner against her notoriety.<sup>20</sup> The experience highlighted for her how the scientific establishment used examinations and access to laboratory resources as gatekeeping functions to exclude women and other outsiders. Similarly, Besant's engagement in the antivivisection debate led her to a powerful critique of scientific practice. Strongly influenced by the drumroll of medical discoveries using animal experimentation, including vaccination and sterilization, Besant published a modulated defense of vivisection in the name of "the freedom of science, benefactor of all that lives."<sup>21</sup> However, upon conversion to theosophy, Besant remorsefully and vigorously repudiated the underlying assumption she had touted earlier: that scientific knowledge justified cruelty toward creatures deemed inferior. These experiences developed her perception that the empirical and positivist thrust of modern science fragmented the natural world in its quest for knowledge.

### *The Fin de Siècle Atom*

By the late nineteenth century, the notion of the atom as the building block of matter had become a familiar hypothesis undergirding the empiricist and positivist science of the period. In 1803, John Dalton (1766–1844) postulated that all matter was composed fundamentally of indivisible and indestructible atoms, too small to be visible with available instruments, each with a constant mass and figure.<sup>22</sup> Similar to Dalton's atomic hypothesis, the celebrated discovery of the laws of thermodynamics supported the Newtonian worldview in which the chaotic physical phenomena of everyday life could be rendered predictable by translation into mathematical equations dealing with mass and force. Some puzzling aspects of electricity and light were handily resolved by the postulation of ether, an all-pervasive, frictionless, surrounding medium for the propagation of light and energy that baffled all scientific efforts at observation (eventually, Einstein's theory of special relativity obviated the need for this construct).<sup>23</sup>

Although ether seemed a mysterious, perhaps even mystical, substance, Victorian positivist science had been able to count on the Dal-

tonian atom as a relatively worry-free concept. However, the 1890s were heady days for the discovery of new rays and elements, with each new discovery posing quandaries about the nature of matter. For instance, in 1895, Wilhelm Conrad Röntgen (1845–1923) discovered what he called X-rays: cathode rays that could not be deflected by magnetism and that could penetrate objects opaque to light, including human flesh, thereby giving Victorians eerie glimpses of the skeletal structure of living individuals. In 1897, English physicist J. J. Thomson (1856–1940) discovered the first subatomic particle, the negatively charged electron. Thomson proposed a squishy “plum pudding” model of the atom in which rapidly orbiting electrons were suspended, like currants in a plum pudding, in a surrounding spherical mess of positive charge that held everything in place. Groundbreaking work on radioactive decay by Marie Curie (1867–1934) and Pierre Curie (1859–1906) followed in 1898. In the same year, Ernest Rutherford (1871–1937) distinguished between two types of radioactive rays, and a few years later offered the astounding theory that radioactivity causes chemical “transmutation” in which new types of matter are produced.

The fin de siècle atom was an enigma, or as Victorian man of science William Crookes (1832–1919) called it, “a tormenting mystery.”<sup>24</sup> The Daltonian atom had given way to a strange new world of phenomena that eluded scientists’ best efforts at empirical classification. This new world and the secrets it held about the structure of matter remained imperceptible to scientists as theoretical speculation outpaced advancements in the instruments of detection. Lacking the instrumentation needed to visually observe the atom, Victorian scientists could only speculate about the residual tracks and traces glimpsed in cloud chambers and spectroscopes. This empirical impasse made atomic structure a ripe and fertile field for Besant and Leadbeater’s clairvoyant experiments.

### *The Cosmic Atom*

In the opening paragraph of *OC*, Besant announces that the experiments had picked up the quest for the atom at the frontier beyond which mainstream science could not go, remedying the scientific failure of instrumentation by the employment of “astral vision,” an additional human sense beyond the common five senses: “The keener and more delicate senses of the astral body are latent for the most part. . . . Yet they afford instruments for observation on the higher levels of the physical plane,

and bring under direct ken objects which from their minuteness or subtlety escape ordinary vision" (211–16). This explanation positions the clairvoyant atomic researcher as a superior kind of scientist. Besant's use of the noun "ken," an outmoded term that conflates vision and recognition, suggests that the clairvoyant researchers are uniquely qualified for atomic research since their spiritual knowledge enables them to understand the phenomena observable on the "higher levels of the physical plane." Additionally, the suggestion that ordinary modes of perception may be foiled not only by the microscopic size but also by the "subtlety" of the atomic world implies that the knowledge gained by the clairvoyant researcher is always potentially outside the scope—in terms of both disciplinarity and instrumentation—of the empirical scientist.

Morrisson rightly observes that Besant uses clairvoyant atomic research to stake a theosophical claim on scientific knowledge by beating out the conventional scientists.<sup>25</sup> However, Besant is also positing an alternative practice for producing knowledge that parallels and occasionally intersects with mainstream science, not merely attempting to gain a foothold on the peripheries of the mainstream science. For Besant and Leadbeater, studying the atom is not an end in itself, but a path to acquiring cosmic knowledge. The experimental process begins with "an atom of a gas, and breaking it up time after time, until what proved to be the ultimate physical atom was reached, the breaking up of this last resulting in the production of astral, and no longer of physical, matter" (*OC* 217). Attaining their immediate objective of the "ultimate physical atom" (or UPA) only points the way to new terrains of knowledge about a different reality underlying physical matter.

*OC* is grounded in the theosophical idea of the world as a continuum of material and spiritual planes. In *Ancient Wisdom*, intended as a simplified guide to theosophical beliefs, Besant explains that ether represents a more rarefied condition of matter beyond the gaseous. There are four stages of ether, and beyond those lies the "next plane" of nature. There are altogether seven planes of existence that lead back to a singular divine will (or "Logos"). While the experiments described in *OC* involve only physical matter, the lowest and least rarefied plane, they nevertheless offer a glimpse of the higher planes, since what conventional senses perceive as the physical world is composed of "spirit-matter," a condition representing an innate potential that reaches back through all the planes to the divine will.<sup>26</sup>

The underlying narrative of *OC* thus presents a physical world that is permeated by the divine will as a structural component of matter. In

*Ancient Wisdom*, Besant explains that within the circumscribed limits self-imposed by the divine will, “the universe is born, is evolved and dies . . . its forces and energies are currents of His life; He is immanent in every atom.”<sup>27</sup> Despite her use of the male pronoun, Besant posits divinity *not* as a gendered human-like being, but rather as a function of forces and energies bringing the universe into being and keeping it constantly in a state of flux intended to promote the evolution of all forms and matter toward higher planes. The physical world as we know it is created through manipulations of energy, resulting in the basic unit of spirit-matter, the ultimate physical atom: “The energy of the Logos . . . ‘digs holes in space’ in this root of matter, and this vortex of life . . . is the primary atom.”<sup>28</sup> While conventional scientists who study the atom merely seek to extend their knowledge of nature, the clairvoyant chemist realizes that to gaze into the atom is to gaze into the infinite.

### *The Enigmatic Atom*

Although Besant maintains a restrained scientific tone throughout *OC*, she describes an exciting and dynamic subatomic world of vibrant and continuous motion, strange forces, and puzzling formations. Its denizens inhabit an alien reality virtually impossible to convey to those who have not experienced it. Furthermore, every description or explanation implies the existence of even stranger and more esoteric realms of knowledge beyond the apprehension of mainstream science. While conventional science postulated that ether was a continuous fluid medium without molecular structure, the experimenters could see that ether was comprised of particles: “To astral vision, ether is a visible thing, and is seen permeating all substances and encircling every particle” (*OC* 217). Since ether not only *surrounds* the particles comprising matter but also *permeates* all substances, it transcends the realm of matter. This demonstrates that matter itself is an illusion created by energy and forces. What appears as a solid body is a system “composed of a vast number of particles suspended in ether, each vibrating backwards and forwards in a particular field at a high rate of velocity” (*OC* 217).<sup>29</sup>

Besant describes the UPA in terms that convey immense energy, unceasing movement, and enigma. A heart-shaped vortex of forces that inhabits the borderland between the material and astral planes, the UPA appears as a whole body at first glance, but is comprised of interlocking spirals of forces. Each spiral is further comprised of “spirillae, and

these again of minuter spirillae” until it transcends the material plane of existence altogether (*OC* 219). Mysterious internal processes generate brilliant colors: “Sometimes one, sometimes another, is thrown into more energetic action, and with the change of activity from one spiral to another the colour changes” (*OC* 219). Although unable to pinpoint the source of the flux, the experimenters find that the vortex form is sustained and invigorated by a constant circulation of force that “pours into the heart-shaped depression at the top of the atom, and issues from the point, and is changed in character by its passage; further, force rushes through every spiral and every spirilla” (*OC* 219). The verbs “pours” and “rushes” convey an impression of power and turbulence. When these atoms combine to form elements, “Every combination begins by a welling up of force at a centre, which is to form the centre of the combination” (*OC* 219).<sup>30</sup>

Elements of different shapes and sizes are formed by UPAs coming together in various arrangements. In Besant’s description, the spatial and relational aspects of each element also suggest personality and emotion. Hydrogen, an egg-shaped element that comprises eighteen UPAs, is in a constant state of motion that suggests nervous excitability: “It rotated with great rapidity on its own axis, vibrating at the same time, and the internal bodies performed similar gyrations. The whole atom spins and quivers, and has to be steadied before exact observation is possible” (*OC* 218). In contrast to this high-strung yet relatively simple element, oxygen is a “far more complicated and puzzling body,” comprising 290 UPAs and characterized by “extraordinary activity” and “dazzling brilliancy” (*OC* 218).<sup>31</sup> The “comparatively quiet” nitrogen, comprising 261 UPAs, is a sedate yet intricate element that includes a balloon-like body, an egg-shaped body, and six other smaller bodies. Unlike the energetic arrangements of hydrogen and oxygen, nitrogen’s arrangement is characterized by a decorous erotic restraint: “Both the balloon and egg found themselves, apparently, with the removal of their propinquity, as though they had exercised over each other some attractive influence” (*OC* 219). Curiously, the numbers of UPAs in oxygen and nitrogen, when expressed as multiples of the number in hydrogen, roughly correspond with the atomic weights of these elements as established by conventional chemistry.<sup>32</sup>

The experimenters’ clairvoyant journey into the subatomic world is an expedition of discovery and liberation. The experimenters impact the subatomic world in significant ways through the process of observation. While the elements and their components are generally enclosed,

PLATE VIII.

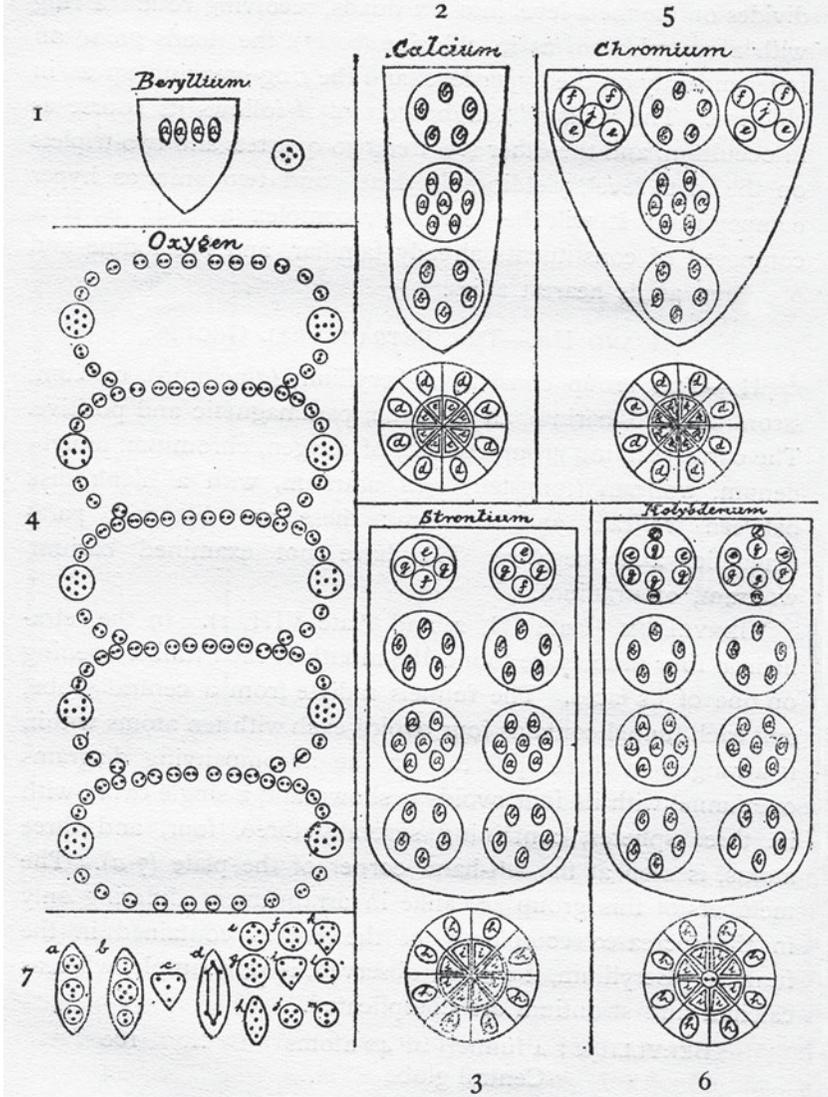


Fig. 10.1. Plate VIII, diagram of various elements: 1. Beryllium 2. Calcium 3. Strontium 4. Oxygen 5. Chromium 6. Molybdenum 7. Atomic Structures. From Annie Besant and Charles Webster Leadbeater, *Occult Chemistry: Clairvoyant Observations on the Chemical Elements* (London: Theosophical Publishing House, 1919). (Courtesy of University of Michigan and Carroll Libraries.)

the “walls” encircling them dissolve readily at the approach of the experimenter’s magnified consciousness. Since these “walls” limit the element to a lower plane, the experimenters’ curiosity liberates the enclosed UPAs for the move from the material to the astral plane of existence: “The falling away of the walls sets the contained atoms free, and we reach the ultimate physical atom. . . . The disintegration of this sets free particles of astral matter” (*OC* 217). Observation is thus not the prerogative of the neutral and objective scientist, but an active engagement with the world of the observed.

### *Magnifying Consciousness*

Since the atom is beyond the reach of conventional human senses, its study demands a research methodology that bypasses the hierarchical distinction between observer and observed. Besant explains that human beings are surrounded by a world of stimuli that are beyond their sensory capabilities “because of the inability of our physical vehicle to receive and vibrate in accord with them.”<sup>33</sup> Perhaps thinking of nineteenth-century discoveries of ultraviolet and infrared spectra, Besant adds: “Unimagined beauties, exquisite sounds, delicate subtleties, touch the walls of our prison-house and pass on unheeded.”<sup>34</sup> However, a trained clairvoyant can open herself up to these stimuli and experiences. While scientific objectivity in mainstream science requires the separation of mind and body, clairvoyant atomic research requires that mind and body work together. The embodied and subjective knowledge produced by the clairvoyant research process highlights that what is observed is a function of the process of observation and of the observer’s consciousness. As Leadbeater explains (Besant does not enter into detailed explanations of clairvoyance), clairvoyance is latent in everyone but developed enough for the apprehension of such phenomena only in a few persons.<sup>35</sup> The atomic experiments require an advanced technique that can be attained only by intensive training in arcane yogic practices designed to achieve *siddhi*, a transcendent state of awareness. Leadbeater initially describes this technique as conferring the power of microscopic vision, “magnifying at will the minutest physical or astral particle to any desired size, as though by a microscope,” which reveals the structure of matter as “visible and living realities.”<sup>36</sup> However, feeling that the analogy is inadequate, he eventually falls back on an orientalizing mystification (the work is marked throughout by Victorian ethnocentrism, demonstrating

that even an expanded consciousness cannot always transcend cultural biases). According to ancient Oriental (Hindu) texts consulted by Leadbeater, clairvoyant magnification is “the power of making oneself large or small at will,” but not in physical size: “The alteration in size is really in the student’s consciousness, and not in anything outside of himself.”<sup>37</sup>

Unlike a microscope, a magnified consciousness enables the observer not only to observe what lies beyond the limitations of physical sight, but also to interact with phenomena that confound ordinary vision. A microscope preserves the distinction between observer and observed, but a magnified consciousness evades such distinctions. Whereas a microscope functions as a prosthetic extension of eyesight, a magnified consciousness enables the experimenter to become part of the environment. Instead of selecting and focusing in on specific objects of study, the clairvoyant experimenter places her “magnified” consciousness at the same level as these objects. To be able to interact with objects in a microscopic world thus paradoxically requires one to expand oneself, and thus perhaps risk being transformed by the experience. Well aware that the methodology of *OC* violates the principle of scientific objectivity, Besant explicitly acknowledges that any kind of representation of what the observers encounter will be inadequate. Words cannot begin to convey the experience: “It is, of course, impossible to convey by words the clear conceptions that are gained by direct vision of the objects of study” (*OC* 217). The accompanying illustrations are mere third-party approximations drawn by other people based on the experimenters’ descriptions. She thereby signals that any assessment of the verity of these experimental results requires trust in the experimenters’ integrity and a lively imagination that can overcome the limitations of language. Such an approach is antithetical to mainstream scientific process. Modern science is supposed to be a universal practice, open to anyone who has the necessary skills and resources. Additionally, scientific truth claims derive from experimental verification by disinterested scientists who rely on the objectivity of instrumentation. In contrast, clairvoyant powers are sufficiently developed only in a few, rare individuals. Furthermore, a rare person possessing the powers required to repeat the experiment is unlikely to be a disinterested party, since to develop these powers, one needs training from experienced mentors. Moreover, *OC* can only proclaim that the experimenters saw what they saw and that others sufficiently trained might also see the same phenomena.

In foregrounding the failure to conform to the normative values of modern science, Besant invites an interrogation of the assumptions

undergirding those values. Modern science cannot be truly universal since it requires talented scientists (not everyone has the faculty for scientific research). The extensive training process affiliates scientists with their mentors and the scientific establishment, thereby potentially tainting the claim to scientific neutrality and objectivity. Additionally, scientific instrumentation is often inaccessible to outsiders, who must therefore *trust* in the integrity of scientists and the scientific process, much as the audience of *OC* must trust the experimenters. Latour observes that in highly specialized areas of modern science, “The proof race is so expensive that only a few people, nations, institutions or professions are able to sustain it” (174).<sup>38</sup> The authority and credibility of modern science derive from enormous financial and physical investments, which can create points of pressure on the scientific process. In contrast, Besant and Leadbeater’s do-it-yourself methodology contests the authority of truths produced by elaborate laboratory resources that are inaccessible to ordinary persons and asserts that knowledge about the world can be produced in venues and contexts other than the metropolitan Western scientific establishment.

### *A Dissident Science*

By the 1890s, Western science had become synonymous with modernity and rationality, with momentous cultural consequences for the world. As Latour notes, the complexity of laboratories has grown to such an extent that “laboratories are now powerful enough to define reality.”<sup>39</sup> According to Prakash, the colonial context further intensified the authority of science, as “Science came to signify not just scientific research in laboratories but also new forms of rule and authority” and “The reach of science’s authority extended far beyond the laboratory to function as a grammar of social and cultural transformation.”<sup>40</sup> Yet, as physicist David Bohm has argued, modern science presents a reality flawed by “deep and radical fragmentation, as well as thoroughgoing confusion” due to the scientific resistance to the insights of quantum theory, which point to “a deeper reality in which what prevails is unbroken wholeness.”<sup>41</sup>

*OC* appropriates a cultural moment in the British Raj and the Indian nationalist movement to articulate the yearning for an “outsider” and dissident stake in knowledge production.<sup>42</sup> By yoking archaic and arcane Indian (Hindu) epistemologies to atomic science, *OC* seemingly anticipates Bohm’s vision of a holistic reality. For the anti-imperialist and femi-

nist Besant, the strangeness of atomic physics called for a strange science that embraced enigmatic and mystical explanations of the nature of matter. The experimenters' repudiation of elaborate and expensive laboratory setups speaks to a Romantic privileging of individual consciousness while empowering pure theoretical research in a mode that might be pursued even in the resource-starved colonial domain. Through her clairvoyant atomic research, Besant suggests that the geopolitical arc connecting the metropolitan and imperial center of London to the colonial periphery of India may be traveled in reverse, with the colonial peripheries as the source of more significant knowledge than empirical facts generated in modern laboratories. At this present time, when mainstream science deployed across the world in the service of modernization and globalization further co-opts voices and ways of life at the peripheries, *OC* reminds us that the "mystical" and "irrational" can encode dissent from and critique of the hegemonic cultural power of science that legitimizes the domination and fragmentation of nature.

### Notes

I dedicate this article to my father, Sushil Kumar Bhattacharya (1922–2006), and my mother, Gitanjali Bhattacharya (1929–2013), and other elders who instilled in me a passion for strange science and other intellectual curiosities.

1. The Theosophical Society was a quasi-religious organization principally founded by Helena Petrovna Blavatsky (1831–1891), Henry Steel Olcott (1832–1907), and William Quan Judge (1851–1896). The organization combined aspects of various world religions, including Hinduism, Buddhism, Christianity, and Western esoteric thought. See Marian A. Fisher, "Theosophy," in *Victorian Britain: An Encyclopedia*, ed. Sally Mitchell (New York: Routledge, 2011), 803–4.

2. Annie Besant, "Occult Chemistry," *Lucifer* 17 (November 1895): 211–19; Besant and Charles Webster Leadbeater, *Occult Chemistry: Clairvoyant Observations on the Chemical Elements*, ed. Alfred Percy Sinnett (London: Theosophical Publishing House, 1919), <http://www.gutenberg.org/files/16058/16058-h/16058-h.htm>; Besant and Leadbeater, *Occult Chemistry: Investigations by Clairvoyant Magnification Into the Structure of the Atoms of the Periodic Table and Some Compounds*, ed. C. Jinarajadasa (Adyar, Madras, India: Theosophical Publishing House, 1951). Unless otherwise indicated, further citations refer to the essay version.

3. Ashis Nandy, *The Intimate Enemy: Loss and Recovery of Self under Colonialism* (New Delhi: Oxford University Press, 1983), 12.

4. I use the terms "modern science" and "mainstream science" interchangeably to describe Western post-Enlightenment empiricist scientific practices that hold objectivity and rationality as core values. For critiques of modern science, see Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities, and Modernities* (Durham, NC: Duke University Press, 2008); Bruno Latour, *Science in Action: How to Follow Scientists*

and *Engineers through Society* (Cambridge: Harvard University Press, 1987); and Nandy, *Intimate Enemy*.

5. For an argument that the experimenters had detected quarks, see Steven M. Phillips, *The Extrasensory Perception of Quarks* (London: Theosophical Publishing House, 1980). For a scientific refutation of *OC*, see Michael J. McBride, "Serious Scientific Lessons from Direct Observations of Atoms through Clairvoyance," Department of Chemistry, Yale University, last modified December 6, 1999, accessed January 2, 2013, <https://webpace.yale.edu/chem125/125/history99/8Occult/OccultAtoms.html>. For the influence of *OC* on Francis Aston's discovery of neon isotopes, see Jeff Hughes, "Occultism and the Atom: the Curious Story of Isotopes," *Physics World*, September 2003, 31–35. For the lingering influence of Besant in India, see B. Sivakumar, "Direct Knowledge," *Times of India*, January 7, 2012, <http://timesofindia.indiatimes.com/life-style/Direct-knowledge/articleshow/10725961.cms>. See also the ironic but extensive treatment of *OC* in Arthur Greenberg, *From Alchemy to Chemistry in Picture and Story* (Hoboken, NJ: John Wiley, 2007), 599–601.

6. Mark S. Morrisson, *Modern Alchemy: Occultism and the Emergence of Atomic Theory* (Oxford: Oxford University Press, 2007), 95.

7. Although Leadbeater was an influential member of the Theosophical Society, his role was dogged by scandal and he never achieved Besant's level of global prominence. Furthermore, Leadbeater's interest in the experiments focused on the mechanism of clairvoyance, whereas Besant was interested in the scientific implications of the findings. She was active throughout her life in promoting scientific education and practices that incorporated Eastern thought.

8. Carol Hanbery MacKay argues that Besant's life can be best described as an unfolding pattern of "painful deconversions" in which Besant "uncovers the elements of self-contradiction within her current belief system . . . then she explores forbidden knowledge; and finally, she embraces a more encompassing structure—one which promises a more optimistic program of dissolving those boundaries that separate human souls." *Creative Negativity: Four Victorian Exemplars of the Female Quest* (Stanford: Stanford University Press, 2001), 102. Gauri Viswanathan sees in Besant's life the convergence of multiple strands of cultural change, including domestic dissent in Britain and anticolonial struggles abroad, and argues that Besant's progressivism was complicated by a strong belief in evolutionary theory, *Outside the Fold: Conversion, Modernity, and Belief* (Princeton, NJ: Princeton University Press, 1998), 190.

9. Donna J. Haraway uses the term "situated knowledge" for a "feminist objectivity" deriving from "a doctrine of embodied objectivity that accommodates paradoxical and critical feminist science projects." Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," *Feminist Studies* 14, no. 3 (1988): 581.

10. For more on the status of women scientists in the nineteenth century, see Richard Holmes, "The Royal Society's Lost Women Scientists," *Guardian Observer*, November 20, 2010, <http://www.theguardian.com/science/2010/nov/21/royal-society-lost-women-scientists>.

11. In 1877–78, Besant and her mentor Charles Bradlaugh were sentenced to six months in prison on obscenity charges for publishing and distributing a neo-Malthusian pamphlet advocating birth control. The conviction was overturned on a technicality. A month after the final verdict, Frank Besant applied for custody of their daughter. Besant's case was the first one to be tried under the Custody of Infants Act of 1873, which allowed mothers to have access to or custody of children after separa-

tion. Besant was forced to settle for occasional visitation rights, which she eventually renounced to protect the children's emotional health. See Arthur H. Nethercot, *The First Five Lives of Annie Besant* (Chicago: University of Chicago Press, 1960), 107–44; Carol Hanbery MacKay, introduction to *Autobiographical Sketches* by Annie Besant (1885), ed. Carol Hanbery MacKay (Peterborough, ON: Broadview, 2009), 39.

12. Besant converted to theosophy almost immediately after a meeting with the charismatic Blavatsky, and quickly became a rising star of the Theosophical Society. When Blavatsky died in 1891, Besant succeeded her as the leader of the Society in Europe and India. Besant taught herself Sanskrit and conducted intensive studies of ancient Hindu texts. She also involved herself in educational and political reforms in India and became an influential, if controversial, voice in Indian nationalist politics. Nethercot, *The Last Four Lives of Annie Besant* (Chicago: University of Chicago Press, 1963), 213–91. For Besant's role in Indian nationalism and the conflict with Gandhi, see Raj Kumar, *Annie Besant's Rise to Power in Indian Politics, 1914–1917* (New Delhi: Concept Publishing, 1981).

13. Besant, *The Ancient Wisdom: An Outline of Theosophical Teachings* (1897; Adyar, Madras, India: Theosophical Publishing House, 1969), 48.

14. Besant's views appear in some respects aligned with the natural history concept of vitalism, which held that living organisms, unlike inanimate matter, were subject to an unspecified vital force that defied physical and chemical analysis. Besant goes further than most vitalists in repudiating a fundamental distinction between living organisms and “dead” matter. By the end of the nineteenth century, vitalist philosophies had been largely discredited for their reliance on a metaphysical concept instead of a genuine explanation for biological phenomena. For more on the demise of vitalism under pressure from mainstream scientific materialist approaches, see Garland E. Allen, “Mechanism, Vitalism, and Organicism in Late Nineteenth and Early Twentieth-Century Biology: The Importance of Historical Context,” *Studies in History and Philosophy of Biological and Biomedical Sciences* 36 (2005): 261–83.

15. Numerous scholars have discussed the implication of Western science in sustaining the violence and inequities institutionalized in various practices and ideologies of modernity, especially in the context of colonialism and the neocolonial state. See, for instance, Abraham Itty, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (London: Zed Books, 1998).

16. Nandy, *Intimate Enemy*, 278.

17. Donna Haraway, *Modest\_Witness@Second\_Millennium.FemaleMan©-Meets\_Oncomouse™: Feminism and Technoscience* (New York: Routledge, 1997), 41.

18. Gyan Prakash, *Another Reason: Science and the Imagination of Modern India* (Princeton, NJ: Princeton University Press, 1999), 5.

19. Noted suffragist and activist for women's rights Frances Power Cobbe helped establish the National Anti-Vivisection League in 1875. The reports of a Royal Commission on vivisection (1875–76) led to the Cruelty to Animals Act of 1876. However, the act did not provide public accountability of licensing practices, and supporters of the antivivisection movement continued their agitation. See John Ranlett, “Animal Protection,” in Mitchell, *Victorian Britain*, 26–27.

20. Besant encountered several other instances of prejudice in the course of her studies, e.g., she was denied access to facilities and only allowed to use them after regular hours; and her name was deliberately omitted from public rolls of successful students (Nethercot, *First Five Lives*, 179–82).

21. Annie Besant, “Vivisection,” in *The Moral Aspects of Vivisection* (London: Wil-

liams and Norgate, 1882), 8, [https://books.google.com/books?id=9xsdTs46pyUC&source=gbs\\_navlinks\\_s](https://books.google.com/books?id=9xsdTs46pyUC&source=gbs_navlinks_s).

22. For more on Dalton's atomic theory, see Mary Jo Nye, *Before Big Science: The Pursuit of Modern Chemistry and Physics, 1800–1940* (Cambridge: Harvard University Press, 1999), 28–56.

23. For a history of atomic science in Britain, see Alex Keller, *The Infancy of Atomic Physics: Hercules in His Cradle* (Oxford: Clarendon, 1983). For energy physics in Victorian literature, see Barri Gold, *ThermoPoetics: Energy in Victorian Literature and Science* (Cambridge: MIT Press, 2010). For a layperson's introduction to quantum theory, see John Polkinghorne, *Quantum Theory: A Very Short Introduction* (Oxford: Oxford University Press, 2002).

24. See the presidential address to the British Association for the Advancement of Science by William Crookes, "Inaugural Address," *Nature* 58 (May–September 1898): 444, [https://books.google.com/books?id=z4xFAAAAYAAJ&dq=Nature+September+1898&source=gbs\\_navlinks\\_s](https://books.google.com/books?id=z4xFAAAAYAAJ&dq=Nature+September+1898&source=gbs_navlinks_s).

25. Morrisson, *Modern Chemistry*, 67–68.

26. Besant, *Ancient Wisdom*, 48.

27. *Ibid.*, 45.

28. *Ibid.*, 47.

29. With some important differences, Besant's description of the subatomic world as one of perpetual vibrations evokes the vortex theory of matter, originally proposed by mathematical physicist William Thomson, later Lord Kelvin (1824–1907), which held that atoms were linked and knotted vortices in ether. See Helge Kragh, "The Vortex Atom: A Victorian Theory of Everything," *Centaurus* 44 (2002): 32–114.

30. Subsequent editions significantly modified these initial descriptions. The 1919 edition, extensively edited by theosophist Alfred Percy Sinnett (1840–1921), describes the UPA as possessing two gendered cognate forms. In the 1951 deluxe edition of *OC*, significantly altered by the editor C. Jinarajadasa, the term "ultimate physical atom" is replaced by the Sanskrit term *Anu*. *Anu* refers to "a minute particle, usually translated as an atom, [that] is described in early [Vedic] philosophies as a material component of the universe." Roshen Dalal, *Hinduism: An Alphabetical Guide* (New Delhi: Penguin India, 2011), 33.

31. Curuppumullage Jinarajadasa, Plate VIII, illustration in *Occult Chemistry: Clairvoyant Observations on the Chemical Elements* by Annie Besant and Charles Webster Leadbeater, ed. Alfred Percy Sinnett (London: Theosophical Publishing House, 1919), 52.

32. Such moments of inexplicable apparent consistency with mainstream scientific findings likely contribute to the continuing appeal of *OC*. Greenberg, *From Alchemy*, 599–601.

33. Besant, *Ancient Wisdom*, 57.

34. *Ibid.*

35. Leadbeater, *Clairvoyance* (London: Theosophical Publishing Society, 1903), 3, <http://www.gutenberg.org/files/29399/29399-h/29399-h.htm>.

36. *Ibid.*, 47–49.

37. *Ibid.*

38. Latour, *Science in Action*, 174.

39. *Ibid.*, 93.

40. Gyan Prakash, "The Modern Nation's Return in the Archaic," *Critical Inquiry* 23, no. 3 (1997): 538.

41. David Bohm, *Wholeness and the Implicate Order* (London: Routledge, 1980), xiii–xv.

42. While many Indian nationalists argued that a modern scientific establishment controlled by Indians was crucial to the modern nation, other Indian elites, especially among Hindus, turned to Orientalist studies of ancient Sanskrit texts to counter the resource and credibility gap by claiming for India a forgotten scientific heritage that anticipated the discoveries of modern science. Prakash argues that “the authority of the *Vedas* as science and as a sign of the nation was part of a general reevaluation and positioning of the Hindu past as an expression of the nation,” “Modern Nation’s Return,” 543. Besant’s work could also be seen as supporting this Orientalist strain regarding science in the Indian nationalist movement. See also Deepak Kumar, *Science and the Raj, 1857–1905* (New Delhi: Oxford University Press, 1995).