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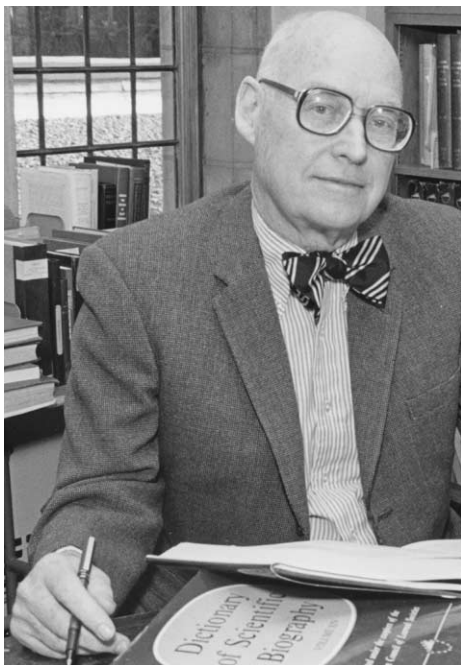


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### CHARLES COULSTON GILLISPIE (1918–2015)

For historians of science, the death of Charles Gillispie at the age of ninety-seven on 6 October 2015 marks the end of an era. He was one of the most brilliant and productive scholars of the post-war generation that founded the professional history of science. He built at Princeton one of the world's leading graduate programs in the field, and he was General Editor of the *Dictionary of Scientific Biography*, which remains its indispensable reference work. His interpretive account of European scientific ideas from Galileo to Einstein, *The Edge of Objectivity* (1960), provided for a time the preeminent scholarly introduction to the subject for students and serious readers and has never been replaced. It retained its prominence to the end of the century as a book against which new approaches were defined. His weighty two-volume work *Science and Polity in France* (1980 and 2004) emphasizes the administrative and public roles of expert science in relation to new institutions and evolving practices of state and is without peer for the range and density of archival research it encompasses. Gillispie lived long

enough to record in two witty essays his own perspective on his career.<sup>1</sup> He also had occasion to comment on some of his early writings and their reception.<sup>2</sup> I cannot think of supplanting those reflections, but only of interpreting his scholarly life from a different point of view.

In 2007, he reflected on his first impression of Thomas Kuhn's *Structure of Scientific Revolutions*, sent to him for review by *Science* in late 1962. He recalled it as "puzzled irritation." What did Kuhn mean by all the references to paradigms, puzzles, Gestalt shifts, anomalies, and incommensurability? He put the book down for a few days, he tells us, and returned to the Bibliothèque Nationale in Paris, where he was deep in Auguste Comte's *Cours de philosophie positive*. On the next page he remarks that, over their careers, he and Kuhn saw eye to eye on everything important, disagreeing only on the trifling matter of

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<sup>1</sup> Charles Coulston Gillispie, "Apologia pro Vita Sua," *Isis*, 1999, 90:S84–S94; and Gillispie, "A Professional Life in the History of Science" (2004), rpt. in Gillispie, *Essays and Reviews in History and History of Science* (Philadelphia: American Philosophical Society, 2007) (hereafter cited as Gillispie, *Essays and Reviews*).

<sup>2</sup> See the new prefaces in Charles Coulston Gillispie, *Genesis and Geology: A Study in the Relations of Scientific Thought, Natural Theology, and Social Opinion in Great Britain, 1790–1850* (1951; Cambridge, Mass.: Harvard Univ. Press, 1996), pp. xxiv–xxvi; and Gillispie, *The Edge of Objectivity: An Essay in the History of Scientific Ideas* (1960; Princeton, N.J.: Princeton Univ. Press, 1990), pp. xxii–xxiv. See also his reflective comments on papers reprinted in *Essays and Reviews*.

“the fundamental nature of science.” Back in the BN, imbibing the wisdom of the founder of positivism, he thought of Herbert Butterfield’s remarks on picking up the other end of the stick. The review he then wrote was enthusiastic, and within months he began urging Kuhn to join his new Program in History and Philosophy of Science at Princeton. A couple of years after that, Kuhn’s book made him an academic celebrity. Kuhn and Gillispie were colleagues at Princeton for sixteen years.<sup>3</sup>

In truth, the founding generation of historians of science, including Kuhn as well as Gillispie, shared a great deal. First was the experience of war, whether in uniform or not. Science had never before seemed quite so vital or so portentous. Those who made their careers in the United States experienced a massive university expansion thanks to hordes of students, of which Gillispie was one, funded by the G.I. Bill. Unprecedented research budgets for science came mainly from military sources, but under a liberal interpretation of what kinds of knowledge could contribute to national defense. Historians and generals alike chose not to reduce science to an instrument of war. Science was about ideas, not just technologies, and was a force for the shaping of culture. Gillispie and his confrères traced its lineage to Descartes rather than Bacon and to Plato more than Aristotle. That emphasis led them to the French philosophical historian Alexandre Koyré, who did far more than George Sarton to inspire this new field.<sup>4</sup>

Most came to history of science from backgrounds in a scientific discipline or in philosophy. Gillispie always said, correctly, that he had begun as a historian. To be sure, he took his undergraduate degree at Wesleyan in 1940 in chemistry, then devoted a year to graduate work in chemical engineering at MIT. However, he also had received distinction at Wesleyan for a thesis in British history. In 1941, he determined to follow his heart and abandon chemistry for graduate work at Harvard in history. The next year he was drafted into the Army, sent to officer training school, and enlisted into the 94th Chemical Mortar Battalion. The company he commanded participated in the invasion of southern Germany during the last few weeks of the European war. They also experienced the horrifying scene of Dachau when they entered the camp on or soon after 29 April 1945, leaving memories that haunted Gillispie for the rest of his life. His unit returned to the United States and prepared for more battles in the Pacific. “The atomic bomb ended all that, to the inexpressible relief of those of us facing the prospect of another invasion.”<sup>5</sup>

Back at Harvard for the spring semester of 1946, he resumed graduate study under the senior British historian David Owen. There he wrote a seminar paper on physicians in the Royal Society and began a thesis on religion in early British geology. In 1947, when Owen put him forward for an instructorship at Princeton, the position was defined as British history. He finished the thesis in 1949 and published it as *Genesis and Geology* in 1951. His reviewers included Bentley Glass, son of Chinese missionaries, who praised the book in the *Quarterly Review of Biology* for its demonstration that all “scientific belief” was conditioned by “prevailing social and religious opinion.” A reviewer of the 1969 reprint, detecting a whiff of relativism, chided him for supposing falsely that *Genesis* “was influential in nineteenth-century geology.”<sup>6</sup> He was writing self-consciously as a historian, which demanded the inclusion of such factors as religion. Scientists, he often argued, tend to write history as antiquarians, compiling lists of discoveries and missing the dynamic of growth and change. Yet he was no more a relativist in 1951 than in 1960 or 2004. He even took a position in the debates he analyzed, defending Plutonists such as James Hutton against A. G. Werner and the Neptunists, whose floods recalled Noah’s. The mixing of geology with Christianity appeared to him as a source of needless discord. His book offered an important new assessment of its

<sup>3</sup> Gillispie, *Essays and Reviews*, pp. 341–342.

<sup>4</sup> See Gillispie’s DSB article on Koyré, rpt. in *Essays and Reviews*, pp. 285–299.

<sup>5</sup> Gillispie, “Apologia pro Vita Sua” (cit. n. 1), p. S84. It seems that he never discussed the entrance to Dachau in print, nor was he eager to talk about it; but he recalled the experience to a few people, among them Jed Buchwald.

<sup>6</sup> Bentley Glass, rev. of Gillispie, *Genesis and Geology*, *Quarterly Review of Biology*, 1954, 29:150; and Gordon L. Davies, rev. of Gillispie, *Genesis and Geology*, *Geographical Journal*, 1971, 137:99.

meaning: “the difficulty as reflected in scientific literature appears to be one of religion (in a crude sense) in science rather than one of religion *versus* science.” He did not consider that Christianity required the support of natural science, and he supposed the problem was receding.<sup>7</sup>

Glass and the medical historian Owsei Temkin arranged in 1953 for Gillispie to lecture to Arthur Lovejoy’s History of Ideas Club at Johns Hopkins. Glass was already thinking of the 1959 Darwin centennial, which he would commemorate with a collection of papers entitled *Forerunners of Darwin*. Gillispie’s choice to write on Lamarck was not yet a decision to shift his focus to France, but his conclusions opened into channels of research that would occupy him for the next sixty years. He argued that Lamarckian species change bore no relation to Darwin’s and was grounded in chemical progress and decay rather than any kind of inherited variation. Lamarck came forth here as the new Heraclitus, advancing an unscientific doctrine of immanent materialist transformation.<sup>8</sup>

It was while precepting under the distinguished French historian R. R. Palmer that he decided on science and the French Revolution as his next major project. Soon he was arguing that the Enlightenment could not be an outgrowth of Newtonian science, since the *philosophes*, by idealizing nature, infused it with moral values that had no place in science. True science appears in his papers from the late 1950s as something quite special, largely disconnected from the important technologies of the period as well as from Enlightenment political argument. His boldest paper in this series was “The *Encyclopédie* and the Jacobin Philosophy of Science,” prepared for an ambitious 1957 conference in Madison, Wisconsin, and published in 1959 in the edited volume *Critical Problems in the History of Science*. “Jacobin philosophy” referred to Diderot’s rejection of mathematical science for Baconian craft skills and for an ideology of organic materialism, a perspective far more hostile to genuine science than anything the churches had ever dreamed up. Its bitter fruit, Gillispie argued, would ripen when the leaders of the Revolution shut down the Académie des Sciences.<sup>9</sup>

When he at last had the opportunity to teach an undergraduate course in history of science, these new insights from his research assumed a central role in it. The course was Humanities 304, housed in a new teaching program, and he taught it for three consecutive years beginning in 1956. Its subject matter appears unexceptional, running from Galileo to Newton (with a brief aside on Vesalius and Harvey), then science and the Enlightenment, the Chemical Revolution, Darwinism, Mendelian genetics, and nineteenth-century energy and field physics. However, its arguments, as we know them from *The Edge of Objectivity*, were bold and its style brilliant to the point of excess. His subtitle, “An Essay in the History of Scientific Ideas,” is fitting, though he took great care to associate these ideas with personalities and to link them to the intellectual styles and institutions of Italy, Germany, Britain, and France. He plotted the book in Comtean fashion as the advance of objectivity from mechanics to chemistry to biology. The real excitement turns up at and beyond its edge, where passionate antiheroes like Diderot, Goethe, and Weismann dissolve the atoms of objectivity, identifying nature with moral values and refusing to let it stand still to be measured. They depicted it instead as process: flowing, organic, sexualized, and potentially revolutionary. Gillispie called them vulgar and condemned their romanticism as the “wrong view for science.” Naturally, he found them entrancing.<sup>10</sup>

It is a complex argument for undergraduates. He dedicated his book to the students in the course and named five of them in his acknowledgments. Above and beyond its value as a teaching tool, the work con-

<sup>7</sup> See Charles Coulston Gillispie, *Genesis and Geology: A Study in the Relations of Scientific Thought, Natural Theology, and Social Opinion in Great Britain, 1790–1850* (Cambridge, Mass.: Harvard Univ. Press, 1951), p. ix; see also Gillispie, “Preface, 1996” in the 1996 reprinting (cit. n. 2), p. xxiii.

<sup>8</sup> Gillispie, *Essays and Reviews*, pp. 47–62, reprints and comments on the first published version of this paper (1956).

<sup>9</sup> “The *Encyclopédie* and the Jacobin Philosophy of Science” is reprinted, with comment, in Gillispie, *Essays and Reviews*, pp. 107–141.

<sup>10</sup> On these matters see my introduction to the new edition of *The Edge of Objectivity* (Princeton, N.J.: Princeton Univ. Press, forthcoming, 2017).

tributed greatly to his scholarly reputation. Two initiatives to hire him away from Princeton between 1959 and 1963 provided a lever to bargain for a graduate program. He now could come forward as a historian of science—and even hire as colleagues others of that genus, most notably Kuhn. The alliance with philosophy of science was in the main strategic rather than intellectual. He did not want these new positions to appear to compete with the ambitions of the Department of History, of which he remained an active member. He even put in a term as chair in the early 1970s. Although he defended science as special, his scholarship was devoted to its integration into history.

The Ph.D. students in history of science were required to work up at least one other field of history as well as a general field, “Plato to NATO,” and a specialized one within it. Yet the formation of a historian of science, like the subject itself, was still unsettled. Gillispie’s first graduate students sharpened their faculties on Galileo in the Favaro (Italian) edition. A decade later he devoted a seminar to Newton’s *Principia*. A course in the late 1970s reflected his own scholarly perspectives, including intersections of science with technology and movements of resistance to established science. From 1980 to 1985, just after the first volume of *Science and Polity*, he spent a year and then four more semesters teaching in Paris, mainly on science during the French Revolution. Through those efforts, he helped to shape a new generation of scholars there, not all of them French.<sup>11</sup>

Editing the *Dictionary of Scientific Biography* meant working with more than a thousand authors from many nations. He included a brief account of this enterprise in each of his autobiographical memoirs. The idea for the work came from the publisher Charles Scribner, Jr., whom he praised as learned and liberal. Gillispie took the lead in assembling an advisory board, raising grant funds, and organizing the work. He combined excellent administrative competence with wide knowledge and an acute appreciation of biography. This editorial work brought him a good deal of recognition. As an intellectual project, however, it did not draw deeply from his own scholarship, apart from the entries he wrote on some French scientific figures of the eighteenth and early nineteenth centuries and on Koyré. His article on Laplace was really a book in itself and later, with revisions, appeared in that form.

He never cared much about speaking to current trends. Though he grumbled privately about fashionable work that he thought misguided, he rarely put his criticism in writing unless it was about his own topic and period. The first volume of *Science and Polity in France*, his *magnum opus*, appeared in 1980 at a moment when the little world of history of science was caught up in debates between “internalists,” who emphasized scientific knowledge, and “externalists,” who focused on institutions and politics. He was sharply opposed to any approach that ignored the scientific content. Yet *Science and Polity* appears sublimely indifferent to the whole discussion. He there examines the institutions, official functions, and practical relations of science from the mid-eighteenth century through the 1790s, taking up scientific questions about agriculture, dyeing, metals, weapons, evaluation of inventions, or the probability calculus when they arose in this context.

Quite in contrast to *The Edge of Objectivity*, *Science and Polity* was not structured as an argument, even if it includes explicit argumentation at almost every point. His ambition was to recover and make meaningful a vital era for science as it shaped and was shaped by history. He kept the research as close to the ground, to specific activities and interactions, as he could. In these volumes he drew back from some of his most provocative claims from 1957 to 1960—that the relation of science to industry in the eighteenth century was almost entirely a matter of classification and clarity of description, for example, or that practical, Baconian, empirical ideals were opposed to genuinely scientific ones. Looking back from the first decade of a new millennium, he regretted “some of the unnecessary asides or ruminations” in his

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<sup>11</sup> Seymour H. Mauskopf, “A Career in the History of Science as a Student of Charles Gillispie,” in *A Master of Science History: Essays in Honor of Charles Gillispie*, ed. Jed Buchwald (New York: Springer, 2012), pp. 25–35; and Mauskopf and Michael McVaugh, “In Memoriam: Charles Gillispie in the Genesis of the History of Science,” *History of Science Newsletter*, Jan. 2016, 45(1):23–27.

early writing.<sup>12</sup> In the wake of *The Edge of Objectivity* he muted his editorial voice, relying instead on irony to disparage those dabblers and romantics who claimed to know better than scientists.

Apart, perhaps, from his book on ballooning, *The Montgolfier Brothers and the Invention of Aviation* (1983), he did not try again to write for a general audience. His authorial voice, highly formal and yet humorous, is distinctive to the point that it can often be identified from a single sentence. He was keenly attentive to style, and the volumes of *Science and Polity* are beautifully written. They also are long and erudite, aspiring even to completeness, a forgotten ideal. He declared in 1980: “If I have omitted important instances pertaining to the theme, the reason is inadvertence rather than selection.”<sup>13</sup> Many of his chapters are richer in research and analysis than the small books now favored by academic publishers. Some would surely have found more readers if published in pieces. Historians who feel daunted by so many pages on a time and place outside their specialty might think of reading in this fashion. I particularly recommend Chapter 4 on charlatans in the volume on the Old Regime and (again) Chapter 4 on the metric system in the one on the revolutionary period.<sup>14</sup>

On the matter of the “fundamental nature of science,” his views never changed. Kuhnian paradigms may be overturned, he said, but U235 is fissionable, whatever humans may say or think. There seemed to be so many truths of this kind. He took a dim view of the cultural movements of the late 1960s and early 1970s, which seemed to him to reincarnate the romantic antiscience of Diderot and of Goethe. A general revolt against authority must naturally turn also on science, unfortunately. Scientists, he complained, are needlessly alienated when sociologists or historians describe them as driven by interests rather than by knowledge.<sup>15</sup> He always denied, however, that the epistemic superiority of science implied moral goodness of scientists. In a long-running debate with Keith Baker about Condorcet and probability theory, he let on that a person who worked so hard to integrate mathematics with (admirable, in this case) political causes could scarcely do first-rate scientific work. Laplace, who acquiesced meekly to every political turn, was by far the superior mathematician. In a little-noticed paper on “Social Selection as a Factor in the Progressivism of Science,” he spoke of the “widespread instinct . . . that scientists on the whole are likely to be of a rebarbative disposition,” tending to withdraw into an impersonal world. Of such stuff, he proposed, is progressive science made. Yet impersonal science was a force for good. He concluded the paper by condemning the irreverence of “a whole generation in revolt, scornful of tradition as never before in western history.”<sup>16</sup>

That was in 1968. Historians of science, he declared, should not set themselves against the activity they study, pretending to see through it. They should acknowledge that science achieves truth. But he did not write history this way, at least not after 1960. In a half-joking reference to Comte’s theory of the three stages, he suggested in 1990 that the “over-intellectualized” treatment of science in *Edge of Objectivity* was a feature of the late metaphysical phase of his own work and of the field. *Science and Polity* focuses on human practices and interactions, not on a pristine and wholly external nature. It addresses laboratories, museums, and workshops and extends to policies, institutions, technologies, and public works as well as the regulation of medicine, inventions, and trades. The experience of “close-in research” in archives and other sources, he wrote in 2004, “led me to think that limiting one’s attention largely to the history of scientific ideas was like following the tips of icebergs.” He believed by then “that what I shall call the public

<sup>12</sup> Charles Coulston Gillispie, *Science and Polity in France at the End of the Old Regime* (Princeton, N.J.: Princeton Univ. Press, 1980), p. 551; and Gillispie, *Essays and Reviews*, p. 108.

<sup>13</sup> Gillispie, *Science and Polity* (1980), p. ix.

<sup>14</sup> Charles Coulston Gillispie, *Science and Polity in France: The Revolutionary and Napoleonic Years* (Princeton, N.J.: Princeton Univ. Press, 2004).

<sup>15</sup> See his new introductions to Gillispie, *Edge of Objectivity* (cit. n. 2), pp. xxii–xxiv, and to Gillispie, *Genesis and Geology* (cit. n. 2), pp. xxiv–xxvi; also Gillispie, “L’Envoi” (2004), in *Essays and Reviews*, pp. 405–411.

<sup>16</sup> Charles Coulston Gillispie, “Remarks on Social Selection as a Factor in the Progressivism of Science,” in *Essays and Reviews*, pp. 366–378, on pp. 372, 377.

history of science may better be elucidated through the medium of events, institutions, and practices than through abstract configurations of ideas and culture.”<sup>17</sup>

Although skeptical of social construction, he was one of the first to argue that social understandings may give shape to natural knowledge, even in physics, as in the relations of Quetelet’s statistics to Maxwell’s kinetic gas theory. That argument was too radical for the historians and philosophers of science assembled at Oxford in 1961 for a conference on Scientific Change.<sup>18</sup> The somewhat skeptical sociology that displeased him still in 1980 evolved gradually into a program for close examination of laboratories and other places of knowledge. This work he commended as a real step forward. That should not surprise us. The most distinctive word in his eccentric vocabulary was “inwardness.” To get to the heart of things was his mission—and the charge he laid on his students. In 1960, it meant scientific theories. In *Science and Polity*, this inwardness of science extended to technologies and to practices of assessment and regulation for the sake of the state. He spent decades in the archives, viewing every action, so far as possible, from the perspective of different actors and agencies, to comprehend as if from within. Positivist doctrine privileged scientific knowledge over state and administrative actions, while historical practice revealed an unsteady but necessary alliance.

His life as scholar and teacher depended on the support and participation of Emily Clapp Gillispie, his wife for sixty-four years, who, though not a scholar, was definitely part of the team. He was eighty-six when the 750-page second volume of *Science and Polity* appeared. After that he wrote a few more papers and reviews and contributed to a coauthored book incorporating his by-then classic research on Lazare and Sadi Carnot.<sup>19</sup> But he did allow himself some distractions. The project he announced to me in 2004 was to read all of Proust in the original.

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<sup>17</sup> Gillispie, *Edge of Objectivity*, preface (1990) (cit. n. 2), p. xii; and Gillispie, “Professional Life in the History of Science” (cit. n. 1), pp. xviii, xvi.

<sup>18</sup> Charles Coulston Gillispie, “Intellectual Factors in the Background of Analysis by Probabilities” (1962), rpt. with reflections in *Essays and Reviews*, pp. 390–404.

<sup>19</sup> Charles Coulston Gillispie and Raffaele Pisano, *Lazare and Sadi Carnot: A Scientific and Filial Relationship* (New York: Springer, 2014); and Gillispie, *Lazare Carnot, Savant* (Princeton, N.J.: Princeton Univ. Press, 1971).