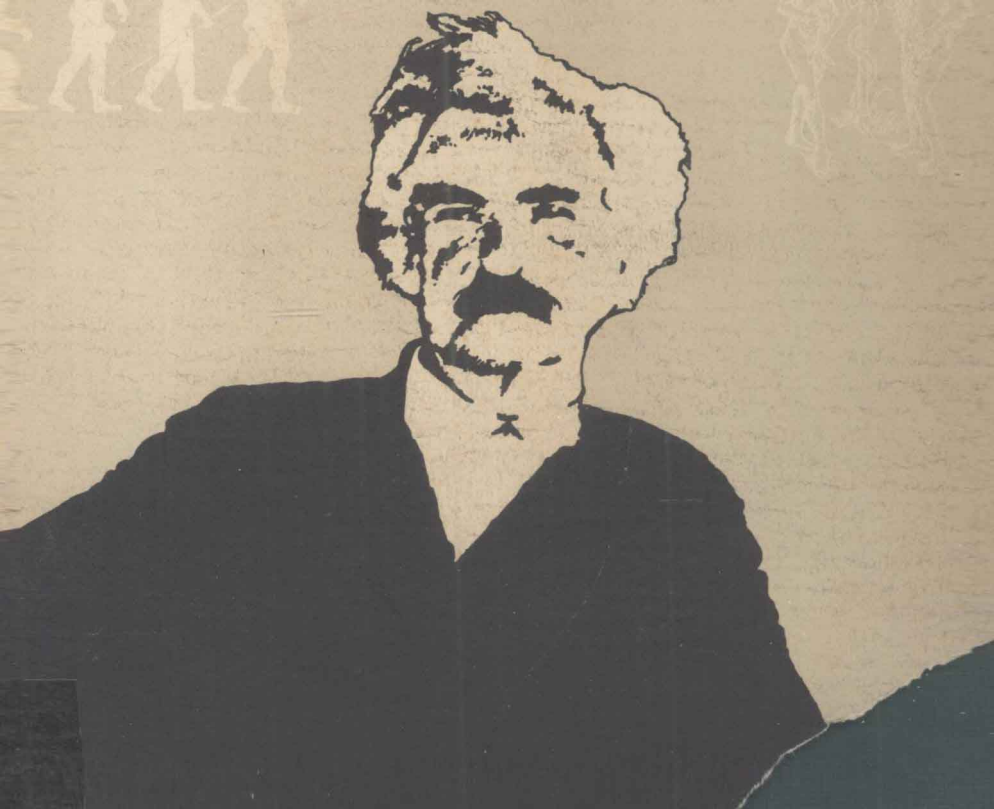
SHERWOOD CUMMINGS

Mark Twain and Science

Adventures of a Mind



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To the memory of
Sheryl Ann
Our Susy

Preface

THE READER WHO ENTERS here will search in vain for discussions of balloon travel and racing with comets, of microbic civilizations and chartless cruising on a water drop. Mark Twain's science fiction is a worthy subject and has been worthily studied, but it is not the subject of this book. Nor is Mark Twain's technical knowledge the subject. It is true that as a riverman he had practical experience in the "science of piloting" and as a silver prospector in geology, that he was an inventor and industrialist of sorts, and that he could glory in technological progress; nevertheless, he spent very little time in his writing, even in *A Connecticut Yankee*, on the technical aspects of science. Persistently philosophical, he was after bigger game. He looked to science for such meanings as it could give in answering social, moral, and cosmological questions.

That quest is betokened in his reading in science, a lifelong engagement. Science titles in his library number well over a hundred. Their principal subjects—astronomy, geology, anthropology, and evolution—are such as someone seeking a world view would take up. His major intellectual problem, both as a private person and as an author, was that before acquiescing in the world view of modern science he had established indissoluble loyalties, first to a theistic world view and later to a deistic one.

The result was personally to involve him in the conflict between the cosmogony of Genesis and science's disclosures about the antiquity of the universe and the evolution of life. As a writer he was caught in subtler, but no less painful, conflicts. In his formative years as a novelist he went to school, along with William Dean Howells, to Hippolyte Taine, the French philosopher who applied science to the arts and humanities and who gave American realism its theoretical foundation. From Taine he learned something of the realist's method, and from Taine and others he learned the clinical approach to personality and society—an approach that sporadically conflicted with the mythical or heroic views of life that he had previously absorbed.

His mind was not, as Howells' was, to be settled by a science-based theory of literature. Howells' often-repeated explanations of realism made the novelist's relation to reality seem simple and noble: It was the novelist's privilege and duty to reflect the creation honestly and with detailed accuracy, for behind that reflection lay truth. To Mark Twain, however, because of his revulsion with historic tyrannies, including American slavery and its aftermath, the creation sometimes seemed absurd, even vile; and as a creator himself, he was now and then moved to tamper with it or to reject it altogether in favor of a fantasy of his own. At the opposite pole, and as a way of suppressing his revulsion, there was his growing conviction that the laws of nature, especially as they applied to behavior, were perfect and infrangible and that they directed human thought and activity so minutely as to make moral judgments beside the point.

Between these extremes Mark Twain responded to the implications of science in certain other rather wonderful ways, which are explored herein. Perhaps a value of this exploration is to suggest a basis in the history of ideas for his alternating "patterns of consciousness" (Forrest G. Robinson's phrase). As well as being a humorist and storyteller, Mark Twain was exquisitely sensitive to the intellectual currents of his time. Unfortunately for his peace of mind, he lived in an era that featured the collision of antithetical world views.

I have taken so much time in writing this book that time has run out for two people I would like to thank. Without Henry Nash Smith's help, this book would not have been written. It was he who, in 1960, arranged for my year in the Mark Twain Papers, and it was his *Mark Twain: The Development of a Writer* that opened my eyes to much I had not seen before. His generous reading of my manuscript several months before his death led to decisive improvements. Henry knew something of my gratitude, but I am afraid I never properly thanked Fred Anderson, Series Editor of the Mark Twain Papers, for his efficiencies and kindnesses. They were offered and accepted as matters of course; it is only in retrospect that they appear, in their true light, as rare virtues.

In sharing his special knowledge with me, Robert Hirst, General Editor of the Papers and of the Works of Mark Twain, has furnished me with important information and has kept me from making cer-

tain missteps. His generous interest in my project has given me sustenance.

Colleagues at California State University, Fullerton, who read all or parts of the work in progress, giving me needed advice and much needed encouragement, are Jane Hippolito, Keith Neilson, Donald Sears, George Spangler, Albert Vogeler, and Martha Vogeler. I am especially grateful to the Vogelers for their sustaining zest in scholarship.

I thank two colleagues in Cal State Fullerton's History Department for letting me pick their brains—Leland Bellot, with his special knowledge of the French and English courts, and Ronald Rietveld, with his of the Civil War and Reconstruction. Two colleagues elsewhere also have my gratitude—Alan Gribben for his encouragement and Louis Budd not only for his encouragement but also for sharing his awesome bibliographical knowledge with me.

I am beholden to Elizabeth Cummins (then Cogell) for information uncovered in her research for the master's thesis she wrote under my direction—"The Influence of Mark Twain's Reading in Science on the Ideas of *What Is Man?*" (University of South Dakota, 1962). As for the more than three hundred graduate students in my Mark Twain seminars at Cal State Fullerton, to name a few would be to slight the many. I salute them all. Each learned with me for a semester; I learned from them for twenty years.

Contents

PART I

Samuel Clemens and Science

CHAPTER 1

Around 1870

[S]cience has given us a new reading of nature, has opened the higher questions of life and human relations, has furnished a new method to the mind, and is fast becoming a new power in literature.

—*Galaxy,* XI (January, 1871)

AROUND 1870, AMERICANS WERE uneasily aware that a new era had come into being while they had been distracted by the Civil War and its aftermath. As a consequence, they were being hustled into a philosophical conflict that Europeans had been engaged in for some time. The new era was that of modern science. The conflict was between the old faith in the existence of an unseen world and the new conviction that only the apparent world was real. An interesting manifestation of the new era was the growing popularity of Mark Twain, whose *Innocents Abroad* set a tone of mockery for revered old values. But since Mark Twain was a complex person as well as a manifestation, it is not surprising to find him sharing in the conflict.

Mark Twain and science, then, were phenomena that were catching the attention of Americans simultaneously and not unrelatedly. Their rise together is neatly exhibited in the pages of *Galaxy,* a young and growing magazine in 1870. Its enterprising editors, in casting about for ways to attract more subscribers, introduced two departments within months of each other. The first was Mark Twain's "Memoranda," beginning in May, 1870. The second, making its debut in January, 1871, was "Scientific Miscellany."

For Mark Twain the *Galaxy* contract was another step in his transformation from wild-western humorist to eastern citizen. He had come a long way in the three years since, as an uncelebrated correspondent for the *Alta California,* he had stepped off the steamship *San Francisco* in New York City. He had seen his first two books published. The second one, *Innocents Abroad* (1869), proved that the author of the regional and unremunerative *Jumping Frog* (1867) could write a book that not only sold very well indeed but received the attention of important reviewers. In his personal life he had triumphed like the disguised prince in a fairy tale. He had won not

only the gentle Olivia Langdon for his bride but Jervis Langdon, the upstate New York millionaire (or close to it), for his father-in-law. It was Jervis' money that bought Sam Clemens an interest in and an editorial position on the Buffalo *Express* and a sumptuous house at 472 Delaware Avenue.

Even so, Clemens thought of himself as at best a successful humorist and newspaperman (*Innocents Abroad*, after all, was a polished version of weekly newspaper travel "letters"), and he aspired to a higher estate. *Galaxy* would not, he wrote exultantly to "Mother" Fairbanks, require him to write "a *Humorous* department, but simply *a* department." He was so pleased with moving up to magazine status that the pay (a munificent $25 per page) was immaterial: "Do you know, Madam, that I would rather write for a magazine for $2 a page than for a newspaper at $10? I *would*. One takes more pains, the 'truck' looks nicer in print, & one has a pleasanter audience."[1]

Galaxy's decision to produce "Scientific Miscellany," which would run nearly two hundred items a year on science, was its accommodation to the "scientific revival." Other magazines had preceded *Galaxy* in featuring science. *Atlantic Monthly* added the obligatory word to its subtitle with the October, 1865, issue, to become "A Magazine of Literature, Science, Art, and Politics." *Appleton's Journal* was started in 1867 for the purpose of "emphasizing scientific news"; and *Harper's* began its monthly "Editor's Scientific Record" in 1869, the same year that, in England, *Nature* issued its first number.[2] Meanwhile, *North American Review* had been devoting scores of pages per volume to the discussion of recently published science books. *Popular Science* would begin publication in 1872.

Although *Galaxy* was not the first journal to cater to the public's hunger for scientific information, its acknowledgment of science was as handsomely expressed as any other magazine's:

> In introducing the present department into THE GALAXY at this time, its conductors are but simply yielding to that acknowledged tendency in the world of thought which is giving increasing interest and importance to scientific subjects. To rehearse the triumphs of science is superfluous; they are witnessed on every side, and civilization is full of them. To have resolved

1. Dixon Wecter (ed.), *Mark Twain to Mrs. Fairbanks* (San Marino, Calif., 1949), 127–28, 9.

2. Richard Hofstadter, *Social Darwinism in American Thought* (Philadelphia, 1945), 9, 22.

matter into its elements, to have anatomized the crust of the planet, to have arrived at the exact laws of power, to have learned the constitution of the stars, to extract pictures from sunbeams, and to be able to do business instantaneously by lightning with almost the whole world, are certainly very marvelous things; but more than all these, science has given us a new reading of nature, has opened the higher questions of life and human relations, has furnished a new method to the mind, and is fast becoming a new power in literature.[3]

Samuel Clemens surely read this tribute to science. For him it must have been still another lesson in what mattered in the society he had recently joined and in which he aimed to succeed. In eastern journals he saw the word *science* everywhere written, like the name of a god, and science itself credited with enormous powers. Science was producing machines and devices that made life easier and more exciting. It daily provided news about the immensity of the universe, the antiquity of the earth, and the ancestry of man. It offered a way of thinking that promised to carry the light of reason into the last dark corners of mystery. And in a special aside to writers—those practitioners of the mythical art of storytelling—it said: Be realistic.

Clemens' response to science was profound, pervasive, and complex; in the words of his biographer, Albert Bigelow Paine, it "amounted to a passion."[4] But before we examine that response, we need to find out what kind of science instruction Clemens and laymen like him were getting from the leading magazines around 1870.[5]

The reader of these magazines would get a clear idea of what science was, but conflicting—and often emotionally charged—instruction in how to feel about it. Science, he would gather, is a method of observing and thinking about aspects of nature for the purpose of understanding what nature is and the way it works. The method could be one of "induction from the facts of particular observations" or it could be the "originating of grand generalizations with endless patience and caution in verifying them."[6] At any rate, scien-

3. "Scientific Miscellany," *Galaxy,* XI (January, 1871), 135.

4. Albert Bigelow Paine, *Mark Twain: A Biography* (3 vols.; New York, 1912), I, 512.

5. The magazines discussed here are chosen not only because they were at the forefront of science journalism but because Clemens was familiar with them. See Alan Gribben, *Mark Twain's Library: A Reconstruction* (2 vols.; Boston, 1980).

6. "Peabody's Positive Philosophy," *North American Review,* CVI (1868), 286; "Science," *Atlantic Monthly,* XXX (1872), 508.

tific understanding was based on observable fact, and it aimed at cosmology. Science "collects facts eagerly, steadily. . . . Then, from these facts patiently observed, brought together, coordinated, classified, science deduces a *law,* a positive law, which is the expression of reality, of truth itself."[7]

Although writers about science expressed many doubts and fears, they did not question either the efficacy of the scientific method or the assumption that nature was worth understanding. The Newtonian tradition was still strong: One lived in an orderly universe whose workings were intelligible. As John Fiske, one of America's champions for science, put it, he had "faith in the constancy of nature, and in the adequacy of ordinary human experience as interpreted by science."[8]

But the Newtonian ideology had become complicated during the last century. In 1776, Jefferson could begin his Declaration of Independence by proclaiming that the separation of the colonies from England was authorized by "the laws of nature and of nature's God." This heady abstraction contains the grand idea not only that human events could and should be part of the cosmic scheme but that the laws of nature and the laws of God are identical. Between the deist's God and nature there was an absolutely harmonious relationship. In succeeding decades, however, nature became popularly romanticized and religion sentimentalized. At the same time, scientists were making radical explorations into an unsentimental universe. The two apprehensions, of "revealed" religion and of reason and science, were becoming aligned against each other. By 1870, the God of evangelical Christianity and the nature that science was revealing were poles apart, yet many an American cherished both his religion and his rationalism. Two ways of knowing, two avenues to Truth, were in conflict.

The conflict was fully and widely appreciated. It was the anguish of the times and was stated and restated in the magazines. "We see no common ground on which Science as Science, and Christianity as Christianity can come together," lamented A. A. Lipscomb in *Harper's.* "And by this we mean, that truth as an object of faith and truth as an object of reason are essentially distinct things in their relations to the mind."[9]

7. Charles Boysett, "Science and the Moral Order," *Galaxy,* XVII (January, 1874), 130.

8. John Fiske, "The Descent of Fire," *Atlantic Monthly,* XXVII (1871), 530.

9. A. A. Lipscomb, "Warfare of Modern Religious Thought," *Harper's,* XXXVI (1868), 371, 372.

Lipscomb was a Christian who regretted that the rage for "evidences" was causing men to "reject the character and offices of Christ." In his reaction he represented a considerable group, but the conflict was treated in a variety of ways. An opposing way was to claim that science had superseded religion, that mankind had come to the last of Auguste Comte's "famous three stages of development—the theological, the metaphysical, and the positive or scientific."[10] If one believed that science was the last and best of all religions, as did Charles Boysett, he spoke of it in worshipful tones:

> They [the laws of science] form a kind of strong and manly communion, for they have nothing to do with phantoms and chimeras. In short, here is the new dogma which, dismissing phantasms, reserves all its homage for those indestructible ideas which determine the everlasting relations of things, and which are themselves the everlasting and absolute truth.
>
> Yes, science alone can set upon a firm basis *moral order*—that *moral order* so childishly and so dangerously sought for in old methods of expression, in defunct doctrines, in superannuated and fossil dogmas, which some people undertake to exhume to-day with infinite labor.[11]

Between the defenders of Christianity and the evangels of science, there were those (very few) who spoke with contempt for scientists: "our modern prowlers into the earth's crust in search of lower and obscurer specimens." There were also those who, without relishing scientists' views, wrote respectfully about their methods: "Whatever may be thought of [Darwin's] generalizations, no one can deny the author the merit of painstaking and conscientious industry in the accumulation of facts." Then there were those who chastised scientists for being unscientific: "he goes astray to a degree hardly to be credited in a man of undoubted capacity and scientific training." There were also those who, like Henry James, recognized the conflict but preferred to remain above it: "We have not the purpose of discussing this doctrine; it opens up . . . the quarrel between the minds which cling to the supernatural and the minds which dismiss it." And there were those who, without quarreling and gently, as if to save the traumatized Christian from unnecessarily harsh blows, felt obliged to insist that hard ideas, such as Herbert Spencer's rejection of special creation, were correct: "We believe that sooner or later all disciplined minds will confirm this estimate of the 'special-creation hypothesis,' severe as it may

10. "Maudsley's Physiology and Pathology," *North American Review,* CVI (1868), 279.

11. Boysett, "Science and the Moral Order," 130.

seem."[12] Finally, there were those brave souls who tried to reconcile faith with science. Their efforts were strenuous and their confusion wonderful:

> Science . . . is to-day reacting powerfully upon metaphysics and tomorrow will quite as powerfully react upon theology; but its influence is beneficial rather than destructive, and will only establish more solidly whatever real truth has been seized by its elder sisters. Development, not violent metamorphosis, is the history of man. The greatest weakness of positivism in its present condition, the mark of its immaturity, is its inaptitude for profound metaphysics, and its childish contempt for theology. We admit with perfect readiness that the metaphysics and theology now existent deserve all, if not quite all, the contempt they receive from positivism; but none the less sure is it that, as positivism becomes strong and self-contained, it will see more and more to respect, as well as worthy of study, in the history of philosophy and religion.[13]

Thus wrote one anonymous conciliator. Another's effort follows:

> We accordingly mean no reproach, but a sincere homage to science, when we express our conviction that any old dame, with spectacles on nose, who devoutly patterns [her life upon] her Bible, even at the risk of swallowing its marvels as literally true, has a much better, though latent, intellectual relation to the future of thought, than even our sturdiest eaglets of science, who are yet content to find in their knowledge of what they call "the laws of nature" a full satisfaction to their spiritual aspirations, or thirst for truth.[14]

This oscillating rhetoric conveys more information about the writers' troubled minds than intrinsic meaning. The contest between science and religion is conceived as being between personified forces, neither one the putative champion, for the virtues of each are contradicted. Science in the first piece is young and powerful but careless and childish; theology is an offended and grand elder sister but temporarily deserving of contempt. In the second, piety is a saintly old dame but in danger of swallowing Bible stories whole; scientists are sturdy young eagles but without spiritual fulfillment.

12. "Mr. Hardhack on the Derivation of Man from the Monkey," *Atlantic Monthly,* XIX (1867), 301; "Darwin's Variations of Animals and Plants Under Domestication," *Atlantic Monthly,* XXII (1868), 122; "Man's Origin and Destiny," *North American Review,* CVII (1868), 369; Henry James, "Taine's English Literature," *Atlantic Monthly,* XXIX (1872), 470; F. E. Abbot, "The Principles of Biology by Herbert Spencer," *North American Review,* CVII (1868), 378–79.

13. "Maudsley's Physiology and Pathology," 279–80.

14. "Wallace's Contributions to the Theory of Natural Selection," *Atlantic Monthly,* XVI (1870), 758.

It was a dismaying conflict. There might be a winner, but small sense of victory.

Not all of science journalism was concerned with the conflict between science and religion. A flood of factual articles and items offered the reader a thorough lay knowledge of every current branch of science. Most commonly reported on were geology (for example, "Varying Density of the Earth's Crust"), astronomy ("The Approaching Solar Eclipse"), biology ("Evolution by Natural Selection"), medicine ("Detection of Brain Diseases"), archaeology ("New Discovery of Neolithic Remains"), paleontology ("Plesiosaurus in Australia"), anthropology ("Aborigines of California"), and physics ("The Spectroscope and Its Revelation"). Mixed among such items and under the rubric of science were articles that emphasized the practical, technical, or technological—for example, "Removal of Grease from Marble," "Rendering Articles Water-Proof," "Moving the Sewing Machine by Electricity," "Correction of Echo in Public Halls," and "Improved Mode of Nickel Plating." Science writers and readers were not necessarily naïve about the difference between pure science and its practical applications. Phrases such as *theoretical and applied science* and *scientific truth* as opposed to *practical utility* occasionally appeared.[15] Science was simply a fecund parent with large progeny. It embraced without embarrassment both theory and machinery.

The journalistic voice of science as technology was *Scientific American*, first published in its new series in 1859. An organ of the Munn and Company patent agency of New York, its emphasis was practical. Editorially, it aimed to be "a complete repository of useful information . . . from the Workshop, the Manufactory, the Laboratory, the Farm."[16] Actually, its purpose was to celebrate the machine. Each week its front page bore the picture and description of a new machine—reaper, cider press, cannon, typesetter, railroad car seat, sewing machine, steam plow, lathe, power loom (the forms are legion)—and inside there was a list of all the patent claims registered with the United States Patent Office during a previous week. The machines are pictured in loving detail. The eye seeks out the connections among cams and levers, bearings and braces; in imag-

15. "Summary of Scientific Progress," *Harper's*, XLIV (1872), 302; Jacob Abbott, "The Spectroscope," *Harper's*, XLI (1870), 720.

16. *Scientific American*, n.s., I (1859), 25.