Science, Technology, and Civilization

A number of scholars (led by Brian W. Aldiss) consider *Frankenstein* the first science-fiction novel. It was, for instance, the first truly outstanding science fiction success, not only in print but on the stage and in motion pictures. Five years after the story first appeared, "Presumption: or the Fate of Frankenstein" was a hit on the London stage, and two other serious versions and three burlesque treatments were presented the same year. The story was an early motion picture favorite, first reaching the screen in 1910 through Thomas A. Edison's company; again as *Life Without Soul* in 1915; in an Italian version in 1920; and then in the definitive version, which made a star out of Boris Karloff, in 1931. It would be followed by one serious sequel, *The Bride* of *Frankenstein,* and then by a horde of imitations exploiting the theme for horror or humor, including recent spoofs by Andy Warhol and Mel Brooks, and then a few more serious attempts to re-imagine the scenario—none of them Mary Shelley's.

What had happened in the world to make possible *Frankenstein's* creation? While speculations about ideal systems and imaginary voyages for sport or satire were produced by writers from Homer on up through Plato, Lucian of Samosata, and the travel and utopian writers of the late Middle Ages and the Renaissance, during the centuries in which empires rose and fell, the modes of life and warfare remained virtually unchanged. Man seemed eternally at the mercy of the elements—subject to the natural processes of sun and storm, drought and disease, and the almost-as-inevitable and elemental tyranny of his fellow men.

Slowly then, but with increasing rapidity, like a flywheel gathering momentum, changes began to occur. The English longbow made the peasant a dangerous opponent and gave England its sturdy yeomen. The spinning wheel, invented in 1298, represented a new way of thinking

about work. The printing press, invented in 1450 by Gutenberg (using movable type invented in eleventh-century China), had the potential to revolutionize the transmission—and hence the very nature—of knowledge. The Age of Exploration, with its sense of adventure and expanding horizons, began in the fifteenth century. In 1520 the invention of the rifle destroyed knighthood and the tradition of the warrior—and created the soldier.

In 1589 came the knitting machine; in 1590, the microscope; in 1608, the telescope. The process of invention was speeding up, feeding upon its own success, and beginning to change the way people lived.

At first it was only the scientists themselves who were influenced, as they read about the work of their contemporaries and were inspired to new work of their own. But the telescope destroyed the medieval universe and rocked the Catholic Church, and gradually Gutenberg's invention spread the written word and only a little later the ability to read—among the growing middle class and eventually to the lower classes as well, who wished at least to read the word of God.

In 1628 came Harvey's discovery of the circulation of blood; in 1636, the invention of the micrometer; in 1661, the invention of the reflecting telescope. In 1660 English scientist Robert Boyle observed that "the invention of gunpowder hath quite altered the conditions of martial affairs over the world, both by sea and land."

The first Newcomen steam engine, the threshing machine, and the weaving machine all were invented in England before 1735; by 1750 the Industrial Revolution had begun. The blessings and curses of science and technology had come upon the land, and they were changing life for better or for worse, in spite of pain and protest. Angry weavers forced John Kay, inventor of the flying shuttle, to flee to France where he died in poverty. A London grain mill, powered

by one of James Watt's steam engines, was destroyed by fire. Elias Howe's sewing machine was opposed by many mid-nineteenth-century Americans, who believed that it would put thousands out of work.

About this time, too, men were beginning to look ahead, to see if they could guess what the future might be like, how it could be changed for the better, or how it might get worse if conditions went on as they had been going. Extrapolation—a kind of crystal ball made up of observation, imagination, and logic—became the tool of seers as well as mathematicians. According to one editor, extrapolation is one of the two basic methods for constructing a science fiction story—spotting a trend and predicting its probable course into the future—a method summed up in the title of a story by Robert Heinlein, "If This Goes On . . ." The other method, speculating about the effect of some unique event, is summed up in the title of Isaac Asimov's "What If?"

There had been earlier prophets—but it was because they were prophets, with unique powers, who could predict what others could not foresee by means they could not describe, that their methods were beyond analysis and imitation, even discussion. But the ability to extrapolate—to observe a series of events, to connect them in sequence, to discern their trend, and to continue that trend into the future—came to be only when men realized that their lives were changing, and could be changed, through their own efforts; and that man's logic could determine the course of this change and possibly influence it.

The pace of scientific and technological discovery picked up. James Watt invented the condensing steam engine in 1765; two years later came Hargreaves' spinning jenny. Mesmer introduced his new "science" of mesmerism in Vienna about 1775. In 1776 Adam Smith published his *Wealth of Nations,* the application of the scientific method to political economy,

and the Declaration of Independence, itself a scientific document, was signed.

The circular saw came in 1777; the steel pen in 1780; and the Age of Flight in 1783, with the first balloon ascensions in France by the Montgolfier brothers and Jacques Charles—and in the same year, fortuitously, the invention of the parachute.

The steamboat was invented in 1783; the iron plow in 1784; the power loom in 1785; and in 1789 came the French Revolution which, like the American Revolution, was at least in part a response of people to the new questioning attitudes of the scientific mind and its effort to seek a new scientific order based on natural law, in political systems as well as in other areas of life and commerce.

The wonders that men expected of the new age were put into verse in 1791, as were his later scientific observations, by an aspiring inventor, poet, and natural philosopher, Erasmus Darwin, who would father a famous scientific family:

> *Soon shall thy arm, UNCONQUER'D STEAM! afar*
> *Drag the slow barge, or drive the rapid car;*
> *Or on wide-leaving wings expanded bear*
> *The flying-chariot through the field of air.*
> *Fair crews triumphant, leaning from above,*
> *Shall wave their fluttering kerchiefs as they move;*
> *Or warrior-bands alarm the gaping crowd,*
> *And armies shrink beneath the shadowy cloud.*

During the closing decades of the eighteenth century and the first decades of the nineteenth century the marriage of Watt's steam engine to various forms of transportation would begin the process of shortening distance and time in the world that would culminate in our

present global village. Robert Fulton and John Stevens independently produced working steamboats by 1807, and by 1827 the first steamship had crossed the Atlantic; by 1833 the passage took twenty-five days, and five years later it was down to fifteen days.

Canals were built—beginning in England with the Bridgewater Canal in 1761 and continuing through the Eric Canal, completed in 1825, and the Suez, in 1869.

The first steam railways were opened in England (1825) and the United States (1830), and the transcontinental railroad was completed by 1869.

Public demonstrations of the results of the new laboratory sciences came with increasing frequency: Eli Whitney, who had invented the cotton gin in 1793, received in 1798 a government order for 10,000 guns and worded out machine tools to produce the necessary parts on an interchangeable basis, thus initiating American's major contribution to world industry, mass production.

In 1798 Robert Malthus published his "Essay on the Principle of Population," which for the first time suggested natural limits to the biblical injunction to "be fruitful, and multiply, and replenish the earth, and subdue it...."

In 1799 Napoleon Bonaparte ended the French Revolution and launched an era of French conquest in which even the tactics of warfare seemed to have changed with the times. He also produced, through the application of scientific thinking to the law, the Napoleonic Code.

In the quarter of a century between 1800 and 1825 the Latin American nations won their independence from Europe.

The nineteenth century loosed discovery after discovery upon the world. In electricity, Volta invented the electric batter in 1800; Ritter, the storage batter in 1813; Faraday, the electric motor in 1822; Sturgeon, the electromagnet in 1824; Pixii, the electric generator in 1832. Dalton

announced his atomic theory in 1802.

Within little more than two decades came the invention of the breech-loading rifle, the bicycle, the stethoscope, the cultivator, the camera, the calculating machine, Portland cement, the tractor, the reaper, the friction match, and the revolver.

In 1807 Goethe told Eckermann that he was confident of continual change, because "through my whole life down to the present hour one great discovery has followed on another." He felt, he said, like "one who walks towards the dawn and, when the sun rises, is astonished at its brilliancy.

In 1832 an American told De Tocqueville, who himself might be considered an early futurist, "There is a feeling among us about everything which prevents us aiming at permanence. There reigns in America a popular and universal belief in the progress of the human spirit. We are always expecting an improvement to be found in everything."

The readiness of the American people to believe in the limitless miracles of science was demonstrated by articles which appeared in the New York *Sun* during the months of August and September 1835, as "Discoveries in the Moon Lately Made at the Cape of Good Hope, by Sir John Herschel." Herschel was a distinguished English astronomer and the son of an even more distinguished astronomer; the articles, which purported to be reprinted from the *Edinburgh Journal of Science*, described his years of work to perfect a telescope that could magnify astronomical objects 40,000 times and make visible objects on the moon as small as eighteen inches in diameter. First to be discovered among the lunar mountains wee great claret-colored jewels, then bisonlike creatures adjusted to conditions on the moon by flaps over the eyes to protect them against extremes of light and darkness. Manlike creatures with batlike wings were discerned, then templelike structures. Finally, when the sun's rays struck the great lens, it acted

as a burning glass and the observatory was destroyed.

The article stirred up great excitement and New York *Sun* circulation jumped, but finally the newspaper revealed that the articles had been written by a reporter for the newspaper, Richard Adams Locke. The series came to be known as "The Moon Hoax." Other hoaxes would follow.

The world—certainly the United States, probably England and France and the rest of western civilization—was ready for science fiction, for the wildest flights of imagination that could be supported by the findings and speculations of science. By the 1840s Americans and most of the western world, having passed through the trials and triumphs of the Industrial Revolution, had accepted the social doctrine that science had led mankind to a new and more desirable order of existence.

People were looking forward to greater glories. In 1842, in his two-volume edition of *Poems*, Alfred Lord Tennyson published "Locksley Hall." In it he described "nourishing a youth sublime/With the fairy tales of science, and the long result of time...."

> Men, my brothers, men the workers, ever reaping something new;
> That which they had done but earnest of the things that they shall do:
>
> For I dipt into the future, far as human eye could see,
> Saw the Vision of the world, and all the wonder that would be;
>
> Saw the heavens fill with commerce, argosies of magic sails,
> Pilots of the purple twilight, dropping down with costly bale;
>
> Heard the heavens fill with shouting, and there rained a ghastly dew
> From the nations' air navies grappling in the central blue;
>
> Far along the world-wide whisper of the south-wind rushing warm,
> With the standards of the people plunging through the thunder-storm'
>
> Till the war-drum throbbed no longer, and the battle-flags were furl'd

In the Parliament of man, the Federation of the World.

There the common sense of most shall hold a fretful realm in awe,
And the kindly earth shall slumber, lapt in universal law....

Through the shadow of the globe we sweep into the younger day:
Better fifty years of Europe than a cycle of Cathay.

"When It's Steam-Engine Time"

Throughout most of man's history he has looked back toward a happier time, toward Paradise, toward a "golden age." Ahead lay only a hope of laying aside sufficient food to provide for a family until the next crop matured. The major changes in life were personal and natural: birth, marriage, death. From outside came war, disease, drought, flood, violence, theft, murder, execution.

The rise and fall of empires meant little to the peasant; he tilled his patch of land and seldom ventured beyond the nearest village. Everything beyond was unknown, and even for the educated, maps contained vast areas and even continents labeled "terra incognita." Men hoped to live in tranquil times so that they could enjoy at least the comfort and safety of their fathers. Almost no one could read; books, for most of the life of man, have been non-existent; science was a mental exercise; and technology was a toy.

In times like these only visionaries dream of a better way; they wrote the utopias. Then, slowly, the Industrial Revolution brought man-made change; the great wheel of invention began to accelerate. As C. P. Snow said in his "Two Cultures" lecture, "With singular unanimity, in any country where they have had the chance, the poor have walked off the land into the factories as fast as the factories would take them."

Technology shortened the distances between places; steam made man independent of wind

and animal; weapons changed warfare from a courtly sport to a grim business for citizens; books, periodicals, and literacy spread rapidly. And the promise and threat of science brought literary responses such as *Frankenstein*, the "Moon Hoax," and "Locksley Hall."

A feeling of hope for the future was not universal. Blake wrote of "dark satanic mills," and Emerson said, "Things are in the saddle, and ride mankind." But many men, if not most, agreed with the Marquis de Condercet who, facing death at the hands of the French Revolution, still was able to proclaim his undying faith in "the future progress of mankind."

The world was ready for science fiction, and when the world is ready some-one always steps forward to provide or invent whatever the times require. A later prophet, whose work was closely related to science fiction and whose ideas suggested a significant number of stories, put the concept of ripeness into more memorable words. "When it's steam-engine time people invent steam engines," Charles Fort said.

Occasionally, as we know, the world is not ready, and the pioneer before his time must endure ridicule or oblivion, like Billy Mitchell or Robert Goddard, apostles of air power and rocketry. Or like Leonardo da Vinci and his drawings of tanks and helicopters

By the nineteenth century increasing emphasis on production for trade had created a middle class, and the middle class had adopted as its philosophy the ideal of rationalism—the establishment of rational goals (in business the goal was profits) and the conscious examination of the best methods for attaining those goals. So deeply ingrained is rationalism in our society that such a philosophy seems like mere common sense, but it was not so when larger, less-measurable goals were held up by emperors or priests or warriors, when ideal rather than practical states were considered to be the proper pursuit of man. In recent days, of course, rationalism has been challenged by sensationalism, which ranks feeling above thought..

Rationalism, with its emphasis on the posing of theories and the checking of those theories by careful measurement of phenomena, became significant in Renaissance science. In the nineteenth century it spread from business to society in general, affecting law, family ties, religious beliefs, and the host of loyalties normally held by men. One immediate consequence of industrialization and rationalism was a vastly increased division of labor. In *The Republic* Plato had justified philosophically the principle of division of labor, but industrialization made it essential. New occupations appeared: the numbers and types of doctors, lawyers, and engineers multiplied. Full-time scientists, who made their livings at science, appeared for the first time in the nineteenth century, and inventors applied their ingenuity to the findings of science and their own observations of the natural world, and kept the world in a turmoil of change.

One of the eternal dreams (and bureaucratic necessities) of man has been rapid communication over great distances; governments had come up with couriers, swift vehicles and ships, and such signals as the semaphore, created in France in 1794. In 1835 Samuel Morse invented the telegraph and brought each man the potential for instant communication with the rest of the civilized world. The first submarine cable was laid in 1855; successive attempts to lay a transatlantic cable finally succeeded in 1866.

Man's dreams of abundance were coming true. Marx and Engels recognized that fact in 1848:

> The bourgeoisie during its rule of scarce 100 years has created more massive and more colossal productive forces than have all preceding generations together. Subjection of nature's forces to man, machinery, application of chemistry to industry and agriculture, steam navigation, railways, electric telegraphs, clearing of whole continents for cultivation, canalization of rivers, whole populations conjured out of the ground—what earlier century had even a presentiment that such productive forces slumbered in the lap of social labour?

Other inventions followed: electrotyping and vulcanized rubber, 1839; nitroglycerin, 1846;

the safety pin and the rifle bullet, 1849; the passenger elevator (which made possible the skyscraper), 1852; the firearm magazine, 1854; the Bessemer process for turning iron into steel, 1856; the railroad sleeping car, 1858; the internal combustion engine, 1859, as well as the spectroscope. In 1843 the term "hypnotism" began to be applied to mesmerism.

Critical changes were occurring in other fields: natural disasters such as the potato blight, which began in Ireland in 1845 and resulted in the death of one million people from starvation and disease over the next six years; political documents and upheavals such as the publication by Marx and Engels of the *Communist Manifesto* in 1848 and revolutions in France, Germany, Austria, Hungary, Bohemia, and Italy; and scientific events such as the publication in 1859 of Charles Darwin's *Origin* of *the Species.*

The Origin of the Species, possibly the most important event of the century, would have an impact not only on science and natural history but on philosophy, politics, sociology, and warfare. Much of the work of H. G. Wells developed out of his immersion in Darwinism through his studies under Thomas Huxley.

The process of invention accelerated: the steam warship, 1860; dynamite and the machine gun, 1862; smokeless powder in 1863 and 1864, as well as the player piano and the typewriter; the refrigerator car, 1868, which made practicable the transportation of meat and other perishables to urban dwellers, and thus, perhaps, made possible the city itself.

Meanwhile the Civil War tore apart the United States, Karl Marx organized the First International in London and three years later published *Das Kapital,* and the Franco-Prussian War of 1870 led to the first Paris Commune.

The Engineers Reshape Existence

In *Lives of the Engineers,* a five-volume book published in 1874, author Samuel Smiles set out:

> to give an account of some of the principal men by whom this nation has been made so great and prosperous as it is—the men by whose skill and industry large tracts of fertile land have been won back from the sea, the bog, and the fen, and made available for human habitation and sustenance; who, by their industry, skill, and genius, have made England the busiest of workshops.

"Our engineers," Smiles wrote, "may be regarded in some measure as the makers of modern civilization."

The latter half of the nineteenth century was the half-century of the engineer. It was a time of building roads and railroads; of improving the steam engine and methods of agriculture, including the use of chemical fertilizer; of discovery of gold and commercial oil wells; of development of better processes for making steel, of the chemical industry, of electricity, and of invention.

Celluloid, the first plastic, was invented in 1870, and its uses seemed limit-less. Manufacturers made it into collars and cuffs, billiard balls, motion-picture film. One of them tried to make a golf ball out of celluloid; when that failed he tried a celluloid ball filled with gutta-percha; and when that didn't work, a gutta-percha ball filled with celluloid.

Science could do anything.

The world meanwhile was changing in other, more disturbing ways. The Franco-Prussian war frightened the capitalistic world, not with the quick defeat of France but with its aftermath, the organization of the Paris Commune. 1871 brought the internal unification of Germany and Italy.

Motion pictures were invented in 1872, barbed wire in 1874 (making possible the fencing, and the farming, of the American West), and the telephone in 1876. *The New* ***York***

Times carried the following account:

Prof. A. Graham Bell's Discovery

> Boston, Mass., Oct. 19, 1876—The account of an experiment made on the evening of Oct. 9 by Alexander Graham Bell and Thomas A. Watson is interesting, as being the record of the first conversation ever carried on by word of mouth over a telegraph wire. Telephones were placed at either end of a telegraph line owned by the Walworth Manufacturing Company, extending from their office in Boston to their factory in Cambridgeport, a distance of about two miles. The company's battery, consisting of nine Daniels cells, was removed from the circuit and another of ten carbon elements substituted. Articulate conversation then took place through the wire. The sounds, at first faint and indistinct, became suddenly quite loud and intelligible.

Was that the voice of the engineer announcing the shape of things to come?

The four-cycle gas engine was invented in 1876, electric welding and the microphone in 1877, the incandescent lamp and the cash register in 1879, the high-speed internal combustion engine in 1880.

In 1881 Alexander II of Russia was assassinated by a member of a revolutionary group calling itself the People's Will.

The tuberculosis germ was discovered in 188z. The first plastic fiber, rayon, was invented in 1883. In 1884 came two inventions that made practicable the mass production of magazines and books: the linotype and the wood-pulp process for making paper. The first did away with the laborious handsetting of type; the second provided cheap and plentiful paper. Together they helped create the mass-circulation magazines, and then the pulp magazines upon which the development of science fiction would depend.

The steam turbine was invented in 1884. The first electric street railway was opened in Baltimore in 1885; that year Louis Pasteur prevented rabies with his new vaccine; and the motorcycle and the electrical transformer were invented. In 1886 the electrolytic process for

producing aluminum was developed and the halftone engraving was invented. Halftone engraving allowed magazines to provide full-page photographic illustrations for $20 that would have cost them $200 as woodcuts. The illustrated magazine became common: *McClure's Magazine,* for instance, virtually doubled its circulation with Ida Tarbell's history of Napoleon, profusely illustrated with portraits, and then doubled it again with Lincoln reminiscences illustrated with hundreds of little-known photographs and paintings.

The disc-record Gramophone was invented in 1887, the pneumatic tire and the Kodak in 1888. Advertising was beginning to appeal to the people through the mass-circulation magazines, and one ad would proclaim: "If it isn't an Eastman and Walker it isn't a Kodak."

In 1889 the World's Fair in Paris displayed the Eiffel Tower (nearly 1,000 feet high) and the first automobile, a Benz.

Color photography was invented in 1891, as well as the oil-cracking process and the first practical submarine; the diesel engine came in 1892; the commercial adding machine and the coke oven in 1893. In 1894 Thomas A. Edison's Kinetoscope, for which he had been awarded a patent in 1891, was given its first public showing.

X rays were discovered in 1895 and the radio telegraph and the photoelectric cell were invented. In 1899 the first peace conference was held at The Hague and established the permanent court of arbitration; the Boer War broke out in South Africa.

This is the environment of invention and discovery into which Jules Verne was born.

Walt Whitman described "the greatness of nineteenth-century man," I. F. Clarke observes, "in phrases that are closely related to the epic fantasies of the new science described by Jules Verne":

> His daring foot is on land and sear everywhere,
> he colonizes the Pacific, the archipelagos

With the steamship, the electric telegraph,
the newspaper, the wholesale engines of war.
With these and the world-spreading factories
he interlinks all geography, all lands.

Clarke summed it up: "Whitman's verse is a programme for the series of books that Jules Verne poured out between 1863 and his death in 1905.... Before Verne the marvels of science had on occasions been incidental to stories of romance; but Verne gained a world-wide success for his ability to make technological achievements a subject for fiction."

Universal Literary and the Mass Magazine

The major influence on the evolution of science fiction as the nineteenth century surged toward the twentieth was the mass magazine. Until the nineteenth century, and particularly its last decade and a half, periodicals were either nonexistent or scarce and relatively expensive, and what was printed in journals of the eighteenth and early nineteenth centuries was intended for a small, educated, literate upper class.

The long chain of discoveries and events that led to the development of the mass magazine began in eleventh-century China with the invention of movable type, continued through Johann Gutenberg's invention of the printing press in 1450, and culminated in a series of nineteenth-century inventions such as the rotary printing press in 1846, the linotype and wood-pulp paper in 1884, and the halftone engraving in 1886. These coincided with one other critical development: universal primary education, which resulted in general literacy.

The ways in which technology and commerce are interrelated, with each other and with tradition and social change, is a subject whose complexities would require a entire book; however, the swift appearance of the mass magazine after the inventions of the 1880s was no

coincidence. Again, it was steam-engine time.

In 1876 the United States celebrated its centennial with an exhibition in Philadelphia that featured the future more than the past: the most powerful steam engine in the world, a new device for writing letters called a typewriter, new steam-powered farm equipment, and a washable floor-covering called linoleum. The United States was the most industrialized nation in the world and had half the world's railway mileage. President James A. Garfield attributed the nation's increasing wealth to "a single mechanical contrivance, the steam locomotive."

Farms were becoming vastly more productive and efficient as farmers applied Chilean nitrates and then chemical fertilizers to their crops, and new machinery within a few decades reduced the labor of producing an acre of wheat from sixty-one hours to three hours.

Population doubled between 1870 and 1900, and the work week dropped from 12 hours a day to 10 hours while per capita income increased by 50 percent. For many Saturday was a half holiday, and Americans began to look for ways to spend their new leisure and their higher wages.

One of these ways was the popular magazine.

Magazines had been plentiful in America and England before the 1880s, but their prices were relatively high and their circulations were relatively low. Edgar Allan Poe wrote for—and edited—such magazines as the *Southern Literary Messenger, Burton's Gentleman's Magazine, Godey's Lady's Book, Graham's Magazine,* and a magazine he founded himself called *Broadway Journal;* but almost the only means of distribution was by mail, and such magazines considered themselves fortunate to accumulate a few thousand readers.

Then there were such general magazines as *Century* and the *North American Review, Harper's Magazine, Atlantic, Cosmopolitan Magazine,* and *The Saturday Evening Post.* The

Post, which began publication with an issue dated August 4, 1821, was for many years more a weekly newspaper miscellany than a magazine. In the early 1860s it carried such features as serials, news of military operations during the Civil War, and woodcut illustrations; and it advertised a circulation of between 80,000 and 90,000. It was a hand operation done by skilled workmen who set type letter by letter, carved pictures into wood blocks, and printed an issue sheet by sheet; it sold for $2 a year, raised to $2.50 in 1865.

But most magazines sold for twenty-five or thirty-five cents. The price may not seem excessive, but the average working man earned little more than one dollar a day. His alternative was the nickel weekly (in England priced sometimes at one pence, about two cents U.S.): the nickel weekly was devoted to entertainment and self-improvement, and ran an endless cycle of serials, sometimes three or four an issue.

The dime novel was another option. It was called a dime novel even though it often sold for five cents, and even though it was not a novel at all but a novelette, usually thirty-two pages. But it had a good action picture on the cover or title page and, inside, adventure, excitement, and a few original ideas, all set forth in pedestrian, often awkward prose.

Irwin Beadle was one of the earliest publishers of dime novels, with beginnings in the 1860s, but the great days of the dime novel were the 1880s and 1890s with *Beadle's Half-Dime Library, Beadle's Dime Library, Waverly Library, Beadle's Boys' Library,* and *Beadle's Pocket Library.* Some of Beadle's competitors published *Old Sleuth, Old Cap Collier, Wide Awake Library, Young Sleuth, Secret Service, Old King Brady, Pluck and Luck, Work and Win,* the *Frank Reade Library,* the *James Boys Weekly,* the *Wild West Weekly,* the *New York Weekly, Diamond Dick, Log Cabin Nugget, Buffalo Bill Stories,* and *Rough Rider Weekly.* In 1896 *Tip-Top Weekly* began presenting to American youth the incomparable character of Frank Merriwell.